Student Achievement Committee Meeting

Wednesday, May 27, 2026 6:00 PM
BOE Auditorium and via Zoom Meeting Platform, 129 Church Street, Bristol, CT 06010

1. **Call to Order/ Pledge of Allegiance**	
2. **Decision: Approval of Minutes from April 29, 2026**	
3. **Public Comment**	
4. **Information: Middle School Afterschool World Language Program**	**Presenter:** Sarah Lindstrom
5. **Decision**	
5.1. Grade 2 Mathematics Curriculum Revision	**Presenter:** Debra Vitale
5.2. Kindergarten Literacy Curriculum Revision	**Presenter:** Zachary Maher
5.3. Grade 1 Literacy Curriculum Revision	**Presenter:** Zachary Maher
5.4. Academic Support Transition Grade 9-12, New Curriculum	**Presenter:** Jessica Lemos and Mikayla Pascucci Wallace
5.5. Grades 7-8 Math Curriculum Revision	**Presenter:** Laura Lanza
6. **Adjournment**	

Special Student Achievement & Outcomes Committee
April 29, 2026
MINUTES

The minutes presented within this document are a summary of the discussion that took place at the Student Achievement Committee meeting. To view the meeting in its entirety and hear full reports please go to: April 29, 2026 SAC Meeting Recording.

PRESENT Committee members: Kara Ledger, Barbara Tedesco, Robert Parenti (Zoom)

ALSO PRESENT: Ken Bagley (Zoom), Carly Fortin, Sara Hale, Laura Lanza, Zach Maher, Melanie Vetrano (Zoom), Leszek Ward, Iris White

Call to Order
Commissioner Ledger called the meeting to order at 7:00 p.m.

Decision: Approval of Minutes from January 21,2026 meeting
On a motion made by Commissioner Tedesco and seconded by Commissioner Ledger, it was unanimously;
VOTED: to approve the January 21, 2026 Student Achievement minutes.

Public Comment: No public comment.

Information: New CNA Program
Mrs. Laura Lanza, Secondary STEM Supervisor, announced that we are relaunching our CNA certification program as a sustainable, grant-funded pilot for the 2026-2027 school year through a partnership with the local Excel Academy. By utilizing the Perkins grant, the district will cover all student costs—including uniforms, instruction, and exam fees—enabling students to graduate with an industry-recognized credential and immediate earning potential of approximately $25 per hour. The program features a rigorous 110-hour curriculum and clinical placements, prioritizing seniors to meet high student demand while maintaining fiscal and operational stability.

Discussion followed.

Decision: Chemistry ACA/ACC Curriculum Revision
Mrs. Lanza presented the curriculum revision proposal for academic and accelerated chemistry, which was last revised in 2019, to align with NGSS standards, emphasizing real-world phenomena like the Radium Girls case and airbag mechanics. The new framework utilizes a unified document to clearly distinguish between academic and accelerated levels while integrating digital simulations and hands-on labs to scaffold student learning. This collaborative effort established a district-wide shared resource drive, fostering teamwork between Bristol Central and Bristol Eastern teachers to ensure instructional consistency and better prepare students for state assessments.

Comments and questions followed.

On a motion made by Commissioner Tedesco and seconded by Commissioner Ledger, it was unanimously;
VOTED: to move the Chemistry ACA/ACC Curriculum Revision to the full Board of Education for approval.

Decision: PE Elective Credit for Summer (New course)

Mrs. Sara Hale, Supervisor of PE and Health, introduced a 0.5-credit summer PE elective that utilizes a hybrid model of in-school and at-home instruction to help students stay active or catch up on graduation credits. Organized by "places" rather than specific sports to accommodate varying gym availability, the curriculum requires students to develop and refine a personal fitness plan aligned with Connecticut state standards. While the course provides a flexible way to reach the 25-credit graduation threshold, it is strictly an elective and does not replace the core physical education credit required for graduation.

Comments and questions followed.

On a motion made by Commissioner Tedesco and seconded by Commissioner Ledger, it was unanimously;
VOTED: to move the PE Elective Summer Course to the full Board of Education for approval.

Decision: Ninth Grade Health Curriculum Revision

Mrs. Hale presented the curriculum revision for the 9th Grade Health course. The curriculum has been redesigned to follow a skills-based model that prioritizes seven essential life skills over traditional rote memorization of health facts. This revision vertically aligns high school health with middle school wellness, using student-centered experiences to teach topics like nutrition, mental health, and substance use through practical application and decision-making. By adopting these modern standards, the district ensures that students are not only informed but are equipped with the functional tools needed to navigate real-world health challenges through graduation and beyond.

Comments followed.

On a motion made by Commissioner Tedesco and seconded by Commissioner Ledger, it was unanimously;
VOTED: to move the Ninth Grade Health curriculum revision to the full Board of Education for approval.

Decision: English I-III Curriculum Revision

Mr. Leszek Ward, Supervisor of Secondary Humanities, presented the curriculum revision for grades 9-11 English. The curriculum was revised to create a vertically and horizontally aligned framework where complex literary skills, such as analyzing unreliable narrators and fragmented timelines, scale in difficulty each year. The new model replaces abstract goals with theme-based units—covering topics like individual agency and American ideals—while utilizing diverse anchor texts to ensure consistent pacing across the district. While the first three units are standardized to guarantee equity and rigor, a fourth capstone unit preserves teacher autonomy by allowing for student-centered projects and elective reading choices.

Questions and discussion followed.

On a motion made by Commissioner Tedesco and seconded by Commissioner Ledger, it was unanimously;
VOTED: to move the English I-III curriculum revision to the full Board of Education for approval.

There being no further discussion, Commissioner Ledger adjourned the meeting at 8:28pm.

Respectfully submitted,
Katlyne Laprise
Katlyne Laprise

PROCEDURES FOR REMOTE PUBLIC COMMENT

Members of the public are invited to comment to the Board on any topic related to school business.

Items requiring consideration by the Board must be approved as an agenda item by a 2/3ds vote of the Board members present. Such items may be referred for further study and not necessarily acted upon at this meeting.

Anyone wishing to address the Board should adhere to the following procedures:

PUBLIC COMMENT

Before a Remote Meeting

1. Send your comments to: KatlyneLaprise@bristolk12.org
2. Be sure to put **PUBLIC COMMENT-SAC** in the subject line.
3. Include your name and address.
4. Direct your comments to the Board Chair.
5. Your comments will be read at the meeting by the Board Chair.
6. All comments should be written in an appropriate manner, particularly if concerning a personnel matter.
7. Any comments not adhering to the guidelines will not be read at the meeting.

During a Remote Meeting

1. Everyone is requested to address the Chair for recognition.
2. Each speaker must state his/her name and address.
3. All speakers must observe rules of common etiquette. Personalities are not to be injected. Anyone violating this rule will be denied the floor. Unless waived by the Chairperson or a majority of the Board,
4. Each speaker shall limit his/her remarks to three (3) minutes.
5. A speaker will not be recognized for a second time on the same topic.
6. Each speaker must concern himself/herself with the topic under discussion. Anyone digressing from the topic will be ruled out of order.
7. Written statements and materials may be made available, in advance of comments, for distribution to Board members.
8. Speakers shall state their positions on the subject being discussed.
9. Board members will not respond directly to comments during the Board meeting. The Superintendent will direct the question to the appropriate staff member for follow-up.

Bristol Public Schools

Bristol, Connecticut

Course Title:	**Content Area:**	**Grade Level:**	**Credit (if applicable)**
Grade 2 Math	Math	2	

Course Description:
The big ideas in IM Grade 2 include: extending understanding of the base-ten number system; building fluency with addition and subtraction; using standard units of measure; and describing and analyzing shapes. The materials, particularly units that focus on addition and subtraction, include problem types such as Add To, Take From, Put Together or Take Apart, Compare, Result Unknown, and so on. These problem types are based on common addition and subtraction situations, as outlined in Table 1 of the "Mathematics Glossary" section of the Common Core State Standards (NGA & CCSSO).

Aligned Core Resources:	**Connection to the *BPS Vision of the Graduate***
Illustrative Mathematics 360	**Collaboration** Assume shared responsibility for collaborative work and value the individual contributions made by each team member. **Social and Cross Cultural Skills** Know when it is appropriate to listen and when to speak. **Empathy** Demonstrating understanding of others perspectives and needs by listening with an open mind. **Information Literacy** Evaluate information accurately and creatively for the issue or problem at hand. **Communication** Articulates thoughts and ideas effectively using oral, written and non-verbal communication skills in a variety of forms and contexts. Listen effectively to decipher meaning including knowledge, values, attitudes and intentions. Use communication for a range of purposes. **Goal Directed** Set goals with tangible and intangible success criteria. Persist to accomplish difficult tasks. **Content Mastery** Develop and draw from a baseline understanding of knowledge in academic disciplines from our Bristol curriculum. **Critical Thinking and Problem-Solving** Make sound judgments and decisions. Identify, define, and solve authentic problems and essential questions. Transfer knowledge to other situations.

Additional Course Information: ***Knowledge/Skill Dependent courses/prerequisites***	**Link to *Completed Equity Audit***
N/A	Grade 2 Math Completed Equity Audit

Standard Matrix

M-Major Cluster, S-Supporting Cluster, A-Additional Cluster

District Learning Expectations and Standards	**U1**	**U2**	**U3**	**U4**	**U5**	**U6**	**U7**	**U8**	**U9**
Operations and Algebraic Thinking									
Represent and solve problems involving addition and subtraction.									
2.OA.A.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	M	M	M	M		M			M
Add and subtract within 20.									
2.OA.B.2 Fluently add and subtract within 20 using mental strategies. By the end of Grade 2, know from memory all sums of two one-digit numbers.	M	M	M		M			M	M
Work with equal groups of objects to gain foundations for multiplication.									
2.OA.C.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.								S	
2.OA.C.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.								S	
Number and Operations in Base Ten									
Understand place value.									
2.NBT.A.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:					M	M	M		M
2.NBT.A.1.A 100 can be thought of as a bundle of ten tens — called a "hundred."					M				
2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.	M	M	M	M	M	M	M	M	

2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.					M	M	M		M
2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.					M		M		
Use place value understanding and properties of operations to add and subtract.									
2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	M	M	M	M		M	M		M
2.NBT.B.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.		M				M	M		
2.NBT.B.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.							M	M	M
2.NBT.B.8 Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.					M	M	M	M	
2.NBT.B.9Explain why addition and subtraction strategies work, using place value and the properties of operations.		M					M		M
Measurement and Data									
Measure and estimate lengths in standard units.									
2.MD.A.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.			M			M			M
2.MD.A.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.			M						
2.MD.A.3 Estimate lengths using units of inches, feet, centimeters, and meters.			M						
2.MD.A.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.			M						M

Relate addition and subtraction to length.									
2.MD.B.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.			M	M					M
2.MD.B.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.			M	M	M				
2.MD.C.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.						S			
2.MD.C.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?						S			
Represent and interpret data.									
2.MD.D.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.			S						S
2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.	S	S					S		
Geometry									
Reason with shapes and their attributes.									
2.G.A.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.						A			
2.G.A.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.								A	
2.G.A.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.						A			

Unit Links

Unit Title:

Unit 1: Adding, Subtracting and Working with Data

Unit Narrative

In this unit, students begin the year-long work to develop fluency with sums and differences within 20, building on concepts of addition and subtraction from grade 1. They learn new ways to represent and solve problems involving addition, subtraction, and categorical data. In grade 1, students added and subtracted within 20 using strategies based on properties of addition and place value. They developed fluency with sums and differences within 10. Students also gained experience in collecting, organizing, and representing categorical data. Students are introduced to picture graphs and bar graphs as a way to represent categorical data. They ask and answer questions about situations described by the data. The structure of the bar graphs paves the way for a new representation, the tape diagram. Students learn that tape diagrams can be used to represent and make sense of problems involving the comparison of two quantities. The diagrams also help to deepen students' understanding of the relationship between addition and subtraction. This opening unit also offers opportunities to introduce mathematical routines and structures for centers, and to develop a shared understanding of what it means to do math and to be a part of a mathematical community.

Relevant Standards: Bold indicates priority

2.OA.A.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

2.OA.B.2 Fluently add and subtract within 20 using mental strategies. By the end of Grade 2, know from memory all sums of two one-digit numbers.

2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Essential Question(s):	**Enduring Understanding(s):**
• How do we decide what operation to use when solving a real-world problem? • How can we show mathematical situations in word problems? • What does the equal sign mean in an equation? • Why is it important to learn basic facts? • Why do we collect, organize, represent and analyze data?	• Recognizing how a real-world situation fits into a common operation category helps to solve the problem. • Real-world and mathematical situations can be represented using drawings and equations. • An unknown can be in any position in a mathematical situation. • The equal sign tells us that the quantities on either side have the same value or balance. • Knowing the basic facts helps us to solve more difficult computation problems accurately and efficiently.

- Properties of operations allow us to reorder, decompose and/or compose numbers in order to make computation simpler.
- Subtraction is the opposite of or “undoes” addition.
- We collect, organize, represent, and analyze data in order to answer a question or solve a problem.
- We can organize data in specific ways to help us interpret the data more easily.

Demonstration of Learning:

CFA 1: **Lesson 3**
CFA 2: **Lesson 9**
CFA 3: **Lesson 10**
CFA 4: **Lesson 13**
CFA 5: **Lesson 15**
Checkpoints
Unit Assessment

Pacing for Unit

25 days (14 required lessons, 11 flex, 2 assessment and reaction)

Family Overview (link below)

Unit 1 Family Support Video
Unit 1 Family Support Materials (all languages)

Integration of Technology:

Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning.

Unit-specific Vocabulary:

add	fluently	subtract
addend	horizontal	sum
bar graph	label	symbol
compare	operations	table
compose	**picture graph**	tape diagram
data	place value	title
decompose	relationship	unknown
difference	represent	unknown number
equation	solve	vertical
expression	strategies	

*__Bold__ - Appears in student glossary for IM Unit 1

Aligned Unit Materials, Resources, and Technology (beyond core resources):

ST Math
District - approved online resources

Opportunities for Interdisciplinary Connections:	**Anticipated Conceptions:**
Literacy Create word problems based on class read-alouds (e.g., "If there were 12 animals in the forest and 5 ran away...") **Science** Make observations, gather data from their investigations, and then organize and represent that data using charts, graphs, or tables to understand and explain their scientific findings. • Survey classroom pets, plants, or insects; graph results (favorite animals, types of seeds planted) • Record daily weather observations (sunny, rainy, cloudy) and create graphs to find patterns • Use tally marks and graphs to record observations from science experiments or nature walks **Social Studies** Graph student preferences for activities, foods, or decorations during different cultural celebrations **PE** Count and compare jumps, hops, or steps; create graphs showing "who jumped the farthest"	• Students might rely on a keyword or phrase in a problem to suggest an operation that will lead to an incorrect solution. For example, they might think that the word more always means that addition must be used to find a solution. • Students may not completely solve a multi-step problem believing they are finished after completing one part. • Students may misunderstand the meaning of the equal sign even if they have proficient computational skills. • Students may not attend to the place value of the digits and believe that the 4 in 46 represents 4, not 40. This may also cause them to make errors in composing and decomposing tens. • Students may not have a conceptual understanding of place value so they would think 61 – 47 = 26, because they subtract the 7 in 47 from the 1 in 61 instead of decomposing a ten. • When answering a question such as, "*How many students in the class were born in January or in February?*", students may not understand that they need to combine these data points to determine the total.

Connections to Prior Units: Dependency Diagram	**Connections to Future Units:**
1.1 Adding, Subtracting and Working with Data	2.2 Addition and Subtraction within 100 2.3 Measuring Length

Differentiation through ***Universal Design for Learning***	
UDL Indicator	**Teacher Actions:**
Engagement (7.1) Optimize choice and autonomy and develop agency in the learning process. • Embed choices that align with the learning goal, such as: ○ The content to explore ○ The tools used for exploration or production ○ The opportunities for practicing and assessing learning ○ The sequence or timing for completion of tasks • Use a collaborative approach among learners and educators to co-design learning goals, activities, and tasks. **Representation (1.2)** Support multiple ways to perceive information and share information in more ways than images and text alone.	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

- Use touch equivalents (tactile graphics or objects of reference) for key visuals that represent concepts.
- Provide physical objects and spatial models to convey perspective or interaction.

Action and Expression (5.2) Use multiple tools for construction, composition, and creativity and share thoughts and ideas using tools that complement the learning goal.

- Use sentence starters or sentence strips.
- Use virtual or concrete mathematics manipulatives (e.g., base-10 blocks, algebra blocks).

Supporting Multilingual/English Learners

Related ***CELP standards:***

Learning Target	Level 1/Level 2	Level 3	Level 4/Level 5
I can fluently add and subtract within 20.	I can show my thinking by pointing, drawing, or using numbers and use words like plus, minus, or equals with support.	I can use math words like plus, minus, equals, and total to describe my thinking and write simple sentences about my strategy.	I can explain my thinking using math vocabulary and complete sentences to describe how I solved the problem and why my strategy works.
I can represent and interpret using data picture and bar graphs.	I can find information in picture and bar graphs and answer simple questions using words, numbers, or pictures.	I can read picture and bar graphs and explain what the data shows using short sentences.	I can represent data in picture and bar graphs and explain what the data means using math vocabulary.
I can represent and solve a variety of word problems using addition and subtraction.	I can use pictures, numbers, and simple words to show addition and subtraction in word problems.	I can use pictures, numbers and words to show addition and subtraction word problems and explain my thinking using simple sentences, pictures, or equations.	I can represent different types of addition and subtraction word problems and explain my thinking using math vocabulary.

Lesson Sequence	Learning Target and Success Criteria
Unit 1 Planning Map	
Section A	**Learning Target:** I can fluently add and subtract within 20. **Success Criteria:** **Lesson 1** ☐ Explain (orally) strategies for adding and subtracting within 10 **Lesson 2**

	☐ Find the value of an unknown addend for a sum of 10. ☐ Write an addition or subtraction equation to represent the cube train. **Lesson 3** ☐ Explain (orally) a strategy for finding the number that makes an equation with a sum of 20 true. **Lesson 4** ☐ Explain (orally) strategies for adding and subtracting within 20 **Lesson 5** ☐ Explain (orally) strategies for adding within 50.
Section B	**Learning Target:** I can represent and interpret data using picture and bar graphs. I can represent and solve a variety of word problems using addition and subtraction. **Success Criteria:** **Lesson 7** ☐ Compare and contrast (orally & in writing) ways to represent the same data. ☐ Create (using words & other representations) a representation of the data. **Lesson 8** ☐ Determine (orally and in writing) if a question can be answered by a given picture graph. ☐ Answer questions about data. ☐ Interpret (orally) data represented in a picture graph. **Lesson 9** ☐ Interpret (orally & in writing) data represented in a bar graph. ☐ Use the features of a bar graph to answer questions. Lesson 10 ☐ Represent given data using a picture graph and a bar graph. Lesson 11 ☐ Write questions that can be answered about data represented in picture graphs and bar graphs. ☐ Explain (orally and in writing) how to use the features of picture graphs and bar graphs to answer questions.
Section C	**Learning Target:** I can represent and solve a variety of word problems using addition and subtraction. **Success Criteria:** **Lesson 13** ☐ Use a bar graph to solve problems and represent comparisons with an equation. ☐ Use “more” and “fewer” to compare (orally & in writing) data represented in a bar graph. **Lesson 14** ☐ Understand a tape diagram and what it represents ☐ Interpret (orally) a tape diagram that represents a comparison **Lesson 15** ☐ Match (orally & in writing) tape diagrams, equations, and story problems that represent the same relationships. **Lesson 16** ☐ Solve compare problems with an unknown ☐ Use a tape diagram to interpret and solve story problems with an unknown.

Unit Title:

Unit 2: Adding and Subtracting within 100

Unit Narrative

Previously, students added and subtracted numbers within 100 using strategies they learned in grade 1, such as counting on and counting back, and with the support of tools, such as connecting cubes. In this unit, students add and subtract within 100 using strategies based on place value, the properties of operations, and the relationship between addition and subtraction. Students begin by using any strategy to find the value of sums and differences that do not involve composing or decomposing a ten. They are then introduced to base-ten blocks as a tool to represent addition and subtraction and move towards strategies that involve composing and decomposing tens. Students develop their understanding of grouping by place value, and begin to subtract one- and two-digit numbers from two-digit numbers by decomposing a ten as needed. They apply properties of operations and practice reasoning flexibly as they arrange numbers to facilitate addition or subtraction. At the end of the unit, students apply their knowledge of addition and subtraction within 100 to solve one- and two-step story problems of all types, with unknowns in all positions. To support reasoning about place value when adding and subtracting, students may choose to use connecting cubes, base-ten blocks, tape diagrams, or other representations learned in earlier units and grades.

Relevant Standards: Bold indicates priority

2.OA.A.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

2.OA.B.2 Fluently add and subtract within 20 using mental strategies. By the end of Grade 2, know from memory all sums of two one-digit numbers.

2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.B.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

2.NBT.B.8 Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.

2.NBT.B.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.

Essential Question(s):	**Enduring Understanding(s):**
• How do we decide what operation to use when solving a real-world problem? • How can we show mathematical situations in word problems? • What does the equal sign mean in a number sentence? • Why is it important to learn basic facts?	• Recognizing how a real-world situation fits into a common operation category helps to solve the problem. • Real-world and mathematical situations can be represented using drawings and equations. • An unknown can be in any position in a mathematical situation. • The equal sign tells us that the quantities on either side have the same value or balance. • Knowing the basic facts helps us to solve more difficult computation problems accurately and efficiently.

- Understanding place value enables us to represent, compare and order numbers and perform computations.
- Properties of operations allow us to reorder, decompose and/or compose numbers in order to make computation simpler.
- Subtraction is the opposite of or “undoes” addition.

Demonstration of Learning:

CFA 1: **Lesson 1**
CFA 2: **Lesson 3**
CFA 3: **Lesson 8**
CFA 4: **Lesson 9**
CFA 5: **Lesson 11**
CFA 6**: Lesson 14**
Checkpoints
Unit Assessment

Pacing for Unit

22 days (13 required lessons, 7 flex, 2 assessment and reaction)

Family Overview (link below)

Unit 2 Family Support Video
Unit 2 Family Support Materials (all languages)

Integration of Technology:

Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning.

Unit-specific Vocabulary:

addition	equation	sum
addend	expression	symbol
compose	fewer	value
decompose	more	
difference	subtract	

*__Bold__ - Appears in student glossary for IM Unit 2

Aligned Unit Materials, Resources, and Technology (beyond core resources):

ST Math
District - approved online resources

Opportunities for Interdisciplinary Connections:

ELA
Students write and illustrate addition/subtraction word problems with real classroom contexts (pets, toys, siblings). Emphasize story problem language: "Add to," "Take from," "Compare."

Science
Compare objects to determine which object will sustain different states of matter. (Unit 1 - 4th Little Pig)

Anticipated Conceptions:

- Students may not attend to the place value of the digits and believe that the 4 in 46 represents 4, not 40. This may also cause them to make errors in composing and decomposing tens.
- Students might rely on a keyword or phrase in a problem to suggest an operation that will lead to an incorrect solution. For example, they might think that the word more always means that addition must be used to find a solution.

Music Count beats in simple songs or melodies. Practice adding/subtracting measures or note sequences. **PE** Keep track of points during relay races, fitness challenges, or gym games. Solve addition/subtraction problems related to the data collection. (i.e. Team A scored 34 points, Team B scored 27. What's the difference?)	● Students may not completely solve a multi-step problem believing they are finished after completing one part. ● Students may misunderstand the meaning of the equal sign even if they have proficient computational skills. ● Students may not have a conceptual understanding of place value so they would think 61 – 47 = 26, because they subtract the 7 in 47 from the 1 in 61 instead of decomposing a ten. ● Students may not understand the terminology within story problems and be able to decipher if they will need to add or subtract. The meaning of more than /fewer than causes confusion.
Connections to Prior Units: Dependency Diagram	**Connections to Future Units:**
1.5 Adding within 100	2.3 Measuring Length 2.6 Geometry, Time and Money 2.7 Add and Subtract within 1,000

Differentiation through *Universal Design for Learning*

UDL Indicator	**Teacher Actions:**
Engagement (7.1) Optimize choice and autonomy and develop agency in the learning process. ● Connect the Learning Targets to students' personnel interested by allowing them to author addition and subtraction story problems and solve them with classmates. ● Utilize Think-Pair-Share to allow students to share their thinking with a partner first before sharing out in a larger group to reduce social anxiety and increase confidence. **Representation 3.2** Highlight and explore patterns, critical features, big ideas, and relationships ● Clarify links between information provided in texts and any accompanying representation of that information in illustrations, equations, charts, or diagrams ● Use multiple examples and non-examples to emphasize critical features ● Use cues and prompts to draw attention to critical features. ● Highlight previously learned skills that can be used to solve unfamiliar problems. **Action and Expression (5.2)** Use multiple tools for construction, composition, and creativity and share thoughts and ideas using tools that complement the learning goal. ● Use sentence starters or sentence strips. ● Use virtual or concrete mathematics manipulatives (e.g., base-10 blocks, algebra blocks).	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Supporting Multilingual/English Learners

Related CELP standards:

Learning Target	Level 1/Level 2	Level 3	Level 4/Level 5
I can add and subtract within 100 using a variety of strategies	I can add and subtract within 100 and explain my thinking with support.	I can add and subtract within 100 and explain my thinking using simple words and sentences.	I can add and subtract within 100 and explain my thinking using math vocabulary.
I can represent and solve a variety of word problems using addition and subtraction.	I can solve addition and subtraction word problems and use simple words, pictures or gestures to explain my thinking.	I can solve addition and subtraction word problems and explain my thinking using simple sentences, sentence frames or some math vocabulary.	I can solve addition and subtraction word problems and explain my thinking using math vocabulary.

Lesson Sequence	**Learning Target and Success Criteria**
Unit 2 Planning Map	
Section A	**Learning Targets:** *I can add and subtract within 100 using a variety of strategies.* *I can represent and solve a variety of word problems using addition and subtraction.* **Success Criteria:** **Lesson 1** ☐ Compare and contrast (orally) strategies for finding an unknown difference that involve addition and subtraction. ☐ Explain (orally) strategies for solving addition or subtraction problems (that do not involve composing or decomposing a ten). **Lesson 2** ☐ Explain (orally) different strategies used to find an unknown addend (including those based on place value). **Lesson 3** ☐ Solve story problems and compare and contrast (orally) strategies (including those based on place value).
Section B	**Learning Targets:** I can add and subtract within 100 using a variety of strategies. I can represent and solve a variety of word problems using addition and subtraction. **Success Criteria:** **Lesson 5** ☐ Explain (orally) a strategy for subtracting a one-digit number from a two-digit number. ☐ Interpret (orally and using other representations) subtraction strategies where you decompose a ten. **Lesson 6**

	☐ Compare and contrast (orally) strategies and recording methods for subtraction. ☐ Describe (orally) how a base-ten diagram and equations show the same subtraction strategy. **Lesson 7** ☐ Explain (orally) a strategy for subtracting 2 two-digit numbers. **Lesson 8** ☐ Compare and contrast (orally) strategies and recording methods for subtraction. ☐ Explain (orally) a strategy for subtracting 2 two-digit numbers. **Lesson 9** ☐ Match (orally) addition and subtraction expressions and base-ten diagrams that represent the same value. ☐ Solve addition or subtraction problems using any strategy
Section C	**Learning Target:** I can represent and solve a variety of word problems using addition and subtraction. **Success Criteria:** **Lesson 11** ☐ Compare and contrast (orally) representations used to make sense of and solve comparison story problems. ☐ Represent and solve comparison story problems **Lesson 12** ☐ Match (orally and in writing) story problems and tape diagrams that represent the same relationships. ☐ Represent and solve story problems **Lesson 13** ☐ Match (orally) story problems and equations that represent the same quantities and relationships. ☐ Represent story problems with equations. ☐ Solve story problems using any strategy **Lesson 14** ☐ Represent and solve one- and two-step Add To, Result Unknown problems. **Lesson 15** ☐ Understand (in written and spoken language) that the word "estimate" means “best guess” and not an exact answer when solving word problems. ☐ Determine (orally and in writing) whether an estimate for the answer to a story problem is reasonable.

Unit Title:

Unit 3: Measuring Length

Unit Narrative

This unit introduces students to standard units of lengths in the metric and customary systems. In grade 1, students expressed the lengths of objects in terms of multiple copies of a shorter object laid end to end without gaps or overlaps. The length of the shorter object serves as the unit of measurement. Students learn about standard units of length: centimeters, meters, inches, and feet. They examine how different measuring tools represent length units, learn how to use measurement tools, and measure and estimate the lengths of objects. Along the way, students notice that the length of the same object can be described with different measurements and relate this to differences in the size of the unit used to measure. Throughout the unit, students solve one- and two-step story problems involving addition and subtraction of lengths. To make sense of and solve these problems, they use previously learned strategies for adding and subtracting within 100, including strategies based on place value. To close the unit, students learn that line plots can be used to represent numerical data. They create and interpret line plots that show measurement data and use them to answer questions about the data. Students relate the structure of a line plot to the tools they use to measure lengths. This prepares students for the work in the next unit, where they interpret numbers on the number line as lengths from 0. The number line is an essential representation that will be used in future grades and throughout students' mathematical experiences.

Relevant Standards: Bold indicates priority

2.OA.A.1Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions,

2.MD.A.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes

2.MD.A.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

2.MD.A.3 Estimate lengths using units of inches, feet, centimeters, and meters.

2.MD.A.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

2.MD.B.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

2.MD.B.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

2.MD.D.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

Essential Question(s):	**Enduring Understanding(s):**
• Why do we use standard units of measurement? • How do we decide on a unit of measure and a tool when measuring an object? • How are the size of the unit and the resulting measure related?	• Standard units help us communicate a measure to others in a consistent way. • The unit of measure and tool must have the same attribute (e.g. length) we are measuring and be the most appropriate for the given situation. • There is a relationship between the size of the unit and the number of units required to cover the length.

- Why do we collect, organize, represent and analyze data?

- How do we decide what operation to use when solving a real-world problem?

- Length is measured by using an appropriate tool. Numerals on a measuring tool indicate the number of length units.

- Addition and subtraction strategies can be used to solve real-world measurement problems. A symbol can be used to represent an unknown number.

- We collect, organize, represent, and analyze data in order to answer a question or solve a problem.

Demonstration of Learning:

CFA 1: **Lesson 3**
CFA 2: **Lesson 5**
CFA 3: **Lesson 6**
CFA 4: **Lesson 8**
CFA 5: **Lesson 9**
CFA 6**: Lesson 12**
CFA 7**: Lesson 15**
Checkpoints
Unit Assessment

Pacing for Unit

23 days (14 required lessons, 7 flex, 2 assessment and reaction)

Family Overview (link below)

[Family Support Video](#)
[Family Support vocabulary in ALL Languages](#)

Integration of Technology:

Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning

Unit-specific Vocabulary:

bar graph	feet	**meter**
centimeter	**foot**	**picture graph**
compose	**inch**	ruler
data	**line plot**	unit
decompose	length	
estimate	measure	

***Bold** - Appears in student glossary for IM Unit 3

Aligned Unit Materials, Resources, and Technology (beyond core resources):

ST Math
District - approved online resources

Opportunities for Interdisciplinary Connections:

ELA
Record and illustrate measurement terms to help students understand academic vocabulary.

Science:
Measure heights of plants in a classroom or school garden as they grow over time; record data in a bar

Anticipated Conceptions:

- Students may believe that the numbers on a ruler are counting the tick marks instead of the units or spaces between the marks.

- Some students might think that they can only measure length with a ruler starting at the left edge or 0 instead of starting at another number and

graph and solve comparison problems. **Social Studies:** Research occupations that rely on measurement (construction workers, carpenters, architects, tailors) Measure furniture, desks, doorways, and classroom dimensions in centimeters and meters to understand space and community. **PE** Measure jump distances, height of jumps, or distances students can throw. Create a bar graph to represent the data.	determining the number of length units used from end to end. ● Students may assume that a key word or phrase in a problem suggests the same operation will be used every time. ● Students may try to represent categorical data (i.e “Favorite Pets”or “Pizza Toppings”) on a line plot. ● When creating a line plot, students may not space the tick marks equally along the line and may also omit numbers not included in the data set.
Connections to Prior Units: Dependency Diagram	**Connections to Future Units:**
1.6 Length Measurements within 120 Units	2.4 Addition and Subtraction on the Number Line

Differentiation through *Universal Design for Learning*

UDL Indicator	**Teacher Actions:**
Engagement 7.2 Invite personal response, evaluation, and self-reflection to content and activities. ● Embed choices that align with the learning goal, such as: ○ The content to explore ○ The tools used for exploration or production ○ The type of rewards or recognition available ○ The opportunities for practicing and assessing learning ○ The design or graphics of layouts, etc. ○ The sequence or timing for completion of tasks **Representation 2.3** Cultivate understanding and respect across languages and dialects ● Define domain-specific vocabulary (e.g., “map key” in social studies) using both domain-specific and common terms. ● Embed visual, non-linguistic supports for vocabulary clarification (e.g., pictures, videos, etc.). ● Use multiple examples and non-examples to emphasize critical features. **Action and Expression 5.3** Build fluencies with graduated support for practice and performance ● Use prompts to “show and explain your work” ● Use scaffolds that can be gradually released with increasing independence and skills (e.g., embedded into digital reading and writing software). ● Solve problems using a variety of strategies. ● Use sentence starters or sentence strips. ● Use physical manipulatives	See Illustrative Math Teachers Guide for identified “Access for Students with Disabilities” by lesson and activity.

Supporting Multilingual/English Learners

Related *CELP standards:*

Learning Target	Level 1/Level 2	Level 3	Level 4/Level 5
I can estimate and measure length using a variety of tools.	I can measure objects and explain my thinking by pointing, using gestures or my native language.	I can measure objects and use a sentence frame to help me explain my thinking.	I can measure objects and justify why my measurement is reasonable using math vocabulary.
I can describe the relationship between the size of the units used and the resulting measurements when measuring the same object.	I can explain why it takes more or less of a unit to measure the same object by pointing, using gestures or my native language	I can explain why it takes more or less of a unit to measure the same object by using simple sentences and/or sentence frames.	I can explain why it takes more or less of a unit to measure the same object by using math vocabulary and complete sentences.
I can represent and solve a variety of word problems using addition and subtraction.	I can solve addition and subtraction word problems and use simple words, pictures or gestures to explain my thinking.	I can solve addition and subtraction word problems and explain my thinking using simple sentences, sentence frames or some math vocabulary.	I can solve addition and subtraction word problems and explain my thinking using math vocabulary.
I can create line plots to display measurement data and use the data to solve problems.	I can create a line plot with measurement data and answer simple questions with support.	I can create a line plot with measurement data and answer simple questions about the data.	I can create a line plot with measurement data and use them to solve and explain problems.

Lesson Sequence	Learning Target and Success Criteria
Unit 3 Planning Map	
Section A	**Learning Targets:** *I can estimate and measure length using a variety of tools.* *I can represent and solve a variety of word problems using addition and subtraction.* **Success Criteria:** **Lesson 1** ☐ Use same-sized length units to measure the length of objects ☐ Express (orally) the length as the number of objects without gaps or overlaps. **Lesson 2** ☐ Choose tools and explain (orally) how to use them to measure the length of objects in centimeters. **Lesson 3** ☐ Create a centimeter ruler and describe (orally) how it represents lengths in centimeters. ☐ Explain (orally) how to determine how much longer one object is than another. **Lesson 4**

	☐ Explain (orally) how to estimate the length of an object. ☐ Use a ruler to measure the length of objects and express the length in centimeters. **Lesson 5** ☐ Use rulers and meter sticks to measure length in centimeters and meters. **Lesson 6** ☐ Create and solve (Compare, Larger Unknown and Compare, Smaller Unknown) story problems about length. ☐ Match (orally) tape diagrams and (Compare) story problems.
Section B	**Learning Targets:** I *can estimate and measure length using a variety of tools.* *I can describe the relationship between the size of the units used and the resulting measurements when measuring the same object.* *I can represent and solve a variety of word problems using addition and subtraction.* **Success Criteria:** **Lesson 8** ☐ Use a ruler to measure length in inches. **Lesson 9** ☐ Understand that it takes more smaller units than larger units to measure the same length. **Lesson 10** ☐ Explain how to measure an object when starting from a non-zero tick mark on a ruler. **Lesson 11** ☐ Interpret tape diagrams that represent (take from) problems about length. **Lesson 12** ☐ Explain strategies for representing and solving two-step (take from and compare) problems about length.
Section C	**Learning Targets:** *I can create line plots to display measurement data and use the data to solve problems.* **Success Criteria:** **Lesson 14** ☐ Interpret the features of a line plots to answer questions about measurement data. **Lesson 15** ☐ Create a line plot to represent measurement data. **Lesson 16** ☐ Interpret line plots with a scale that does not start at 0.

Unit Title:

Unit 4: Addition and Subtraction on a Number Line

Unit Narrative

In this unit, students are introduced to the number line, an essential representation that will be used throughout students’ K–12 mathematical experience. They learn to use number lines to represent whole numbers, sums, and differences. In a previous unit, students learned to measure length with rulers. Here, they see that the tick marks and numbers on the number line are like those on a ruler: both show equally spaced numbers that represent lengths from 0. Students use this understanding of structure to locate and compare numbers on number lines and to estimate numbers represented by points on number lines. Students then learn conventions for representing addition and subtraction on a number line: using arrows pointing to the right for adding and arrows pointing to the left for subtracting. Students also use number lines to represent addition and subtraction methods discussed in Number Talks, such as counting on, counting back by place, and decomposing a number to get to a ten. The reasoning here deepens students’ understanding of the relationship between addition and subtraction. The number lines in this unit show a tick mark for every whole number in the given range, though not all may be labeled with the numeral. As students become more comfortable with this representation, they may draw number lines that show only the numbers needed to solve the problems, which is acceptable.

Relevant Standards: Bold indicates priority

2.OA.A.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.
2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2.MD.B.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
2.MD.B.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

Essential Question(s):	**Enduring Understanding(s):**
• How do we decide what operation to use when solving a real-world problem? • How do we use tools like number lines to help solve math problems? • How can a number line be used to represent numbers and equations? • How are addition and subtraction connected? • What are other strategies we can use to add and subtract on the number line?	• Recognizing how a real-world situation fits into a common operation category helps to solve the problem. • An unknown can be in any position in a mathematical situation. • Skip counting by a specific number creates a repeating pattern. • Understanding place value enables us to represent, compare and order numbers and perform computations.

<table>
<tr><td></td><td>• Properties of operations allow us to reorder, decompose and/or compose numbers in order to make computation simpler.
• Students will understand that addition and subtraction are related operations
• Students will understand that drawings, equations, and symbols can represent mathematical thinking and help explain solutions.
• On a number line, the size of the part is measured by the distance from zero to the numbered point.</td></tr>
<tr><th>Demonstration of Learning:</th><th>Pacing for Unit</th></tr>
<tr><td>CFA 1: Lesson 3
CFA 2: Lesson 4
CFA 3: Lesson 5
CFA 4: Lesson 8
CFA 5: Lesson 9
CFA 6: Lesson 11
CFA 7: Lesson 13
Checkpoints
Unit Assessment</td><td>21 days (12 required lessons, 7 flex, 2 assessment and reaction)</td></tr>
<tr><th>Family Overview (link below)</th><th>Integration of Technology:</th></tr>
<tr><td>Unit 4 Family Support Video
Unit 4 Family Support Materials (all languages)</td><td><i>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</i></td></tr>
<tr><th>Unit-specific Vocabulary:</th><th>Aligned Unit Materials, Resources, and Technology (beyond core resources):</th></tr>
<tr><td>
<table>
<tr><td>addend</td><td>equation</td><td>number line</td></tr>
<tr><td>addition</td><td>estimate</td><td>more</td></tr>
<tr><td>arrow</td><td>expression</td><td>right</td></tr>
<tr><td>centimeter</td><td>fewer</td><td>subtract</td></tr>
<tr><td>compose</td><td>inch</td><td>sum</td></tr>
<tr><td>data</td><td>jump</td><td>tick mark</td></tr>
<tr><td>decompose</td><td>left</td><td>unknown</td></tr>
<tr><td>difference</td><td>length</td><td>value</td></tr>
<tr><td>diagram</td><td>line Plot</td><td></td></tr>
</table>
*Bold - Appears in student glossary for IM Unit 4</td><td>ST Math
District - approved online resources</td></tr>
</table>

Opportunities for Interdisciplinary Connections:	**Anticipated Conceptions:**
ELA Determine the meaning of words and phrases in word problems. Use these ideas to help solve the problem. **Social Studies** Create classroom timelines showing events in order and connect to number lines. "We went to the library 3 days ago" = jumping backward on a number line. **Physical Education** Measure how far students can jump, throw, or run, then use number lines to compare distances or show improvements.	● Students may incorrectly think that subtraction is commutative, i.e. 8-5=5-8. ● Students may think that the unknown in an equation has to fall after the equal sign. ● Students sometimes believe that the equal sign indicates the answer comes next or calls for doing the mathematical operation. ● Students may confuse the direction of the arrows when representing both addition and subtraction problems on the number line. ● Students might rely on a key word or phrase in a problem to suggest an operation that will lead to an incorrect solution. For example, they might think that the word left always means that subtraction must be used to find a solution.
Connections to Prior Units: Dependency Diagram	**Connections to Future Units:**
2.3 Measuring Length	2..5 Numbers to 1,000

Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement 7.2 Optimize relevance, value, and authenticity ● Vary activities and sources of information so they can be: ○ Personalized and contextualized to learners' lives ○ Culturally relevant and sustaining ○ Socially relevant ○ Age and ability appropriate ○ Appropriate for different racial, cultural, ethnic, and gender groups ● Design activities so learning outcomes are authentic, communicate to real audiences, and reflect a purpose that is clear to the participants. ● Provide tasks that allow for active participation, exploration, and experimentation. **Representation 3.1** Connect prior knowledge to new learning ● Anchor instruction by linking to and activating relevant prior knowledge (e.g., using visual imagery, concept anchoring, or concept mastery routines). ● Use advanced organizers (e.g., KWL methods, concept maps). ● Pre-teach critical prerequisite concepts through demonstration or models. **Action & Expression 5.2** Use multiple tools for construction, composition, and creativity ● Use sentence starters or sentence strips. ● Use virtual or concrete mathematics manipulatives (e.g., base-10 blocks, algebra blocks).	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Supporting Multilingual/English Learners

Related *CELP standards:*

Learning Target	Level 1/Level 2	Level 3	Level 4/Level 5
I can represent whole numbers within 100 as lengths from 0 on a number line.	I can explain that numbers show the distance from 0 with support.	I can explain that the number shows the distance from 0 using simple vocabulary.	I can explain that a number represents its distance from 0 using math vocabulary.
I can represent sums and differences on a number line.	I can represent addition on a number line by moving forward and subtraction by moving backward using simple gestures, pointing or my native language.	I can represent addition on a number line by moving forward and subtraction by moving backward using simple sentences and pictures.	I can represent sums and differences on a number line and explain how my jumps show the sum or difference.
I can represent and solve a variety of word problems using addition and subtraction.	I can solve addition and subtraction word problems and use simple words, pictures or gestures to explain my thinking.	I can solve addition and subtraction word problems and explain my thinking using simple sentences, sentence frames or some math vocabulary.	I can solve addition and subtraction word problems and explain my thinking using math vocabulary.

Lesson Sequence	**Learning Target and Success Criteria**
Unit 4 Planning Map	
Section A	**Learning Targets:** *I can represent whole numbers within 100 as lengths from 0 on a number line.* **Success Criteria:** **Lesson 1** ☐ Create a number line and describe (orally) its features. ☐ Represent whole numbers by drawing points and labeling tick marks on a number line. **Lesson 2** ☐ Describe (orally) the structure of a number line. ☐ Explain how to revise a number line. **Lesson 3** ☐ Explain (orally) how to locate a whole number on a number line that does not label each number. ☐ Interpret (orally) number lines with unlabeled tick marks, including those that do not start at 0. **Lesson 4** ☐ *Explain (orally) that on the number line numbers "to the right" represent values that are greater than numbers "to the left" represent values that are less than numbers "to the right"* ☐ Use a number line to compare two whole numbers and show the comparison using >,<, =. **Lesson 5** ☐ Explain (orally) strategies for estimating the location of whole numbers on a number line. **Lesson 6**

	☐ Identify (orally) and represent whole numbers on a number line.
Section B	**Learning Targets:** *I can represent sums and differences on a number line.* *I can represent and solve a variety of word problems using addition and subtraction.* **Success Criteria:** **Lesson 7** ☐ Match (orally and in writing) addition and subtraction expressions and number line diagrams. **Lesson 8** ☐ Create equations to represent number line diagrams that show addition and subtraction. ☐ Represent addition and subtraction on a number line diagram. **Lesson 9** ☐ Represent strategies for finding an unknown difference using a number line diagram. **Lesson 10** ☐ Use a number line to represent addition and subtraction strategies based on place value (that do not require composing or decomposing a ten). **Lesson 11** ☐ Explain (using words or other representations) addition and subtraction strategies that may involve composing or decomposing a ten. **Lesson 12** ☐ Represent addition and subtraction situations using the number line and equations with a symbol for the unknown. **Lesson 13** ☐ Represent and solve (Add To) story problems with an unknown in all positions. **Lesson 14** ☐ Represent addition and subtraction within 100 on a number line.

Unit Title:

Unit 5: Numbers to 1,000

Unit Narrative

In this unit, students extend their knowledge of the units in the base-ten system to include hundreds. In grade 1, students learned that a ten is a unit made up of 10 ones, and two-digit numbers are formed using units of tens and ones. In this unit, students learn that a hundred is a unit made up of 10 tens, and three-digit numbers are formed using units of hundreds, tens, and ones. To make sense of numbers in different ways and to build flexibility in reasoning with them, students work with a variety of representations: base-ten blocks, base-ten diagrams or drawings, number lines, expressions, and equations. At the start of the unit, students express a quantity in terms of the number of units represented by base-ten blocks (3 hundreds, 14 tens, 22 ones). They practice composing larger units from smaller units and representing the value using the fewest number of each unit (4 hundreds, 6 tens, 2 ones). They connect the number of units to three-digit numerals (462). Next, students make sense of three-digit numbers on the number line. In a previous unit, students learned about the structure of the number line by representing whole numbers within 100 as lengths from 0. They get a sense of the relative distance of whole numbers within 1,000 from 0. Students learn to count to 1,000 by skip-counting on a number line by 10 and 100. They also locate, compare, and order three-digit numbers on a number line. Throughout the unit, the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 are referred to as multiples of 100. The same is true for multiples of 10. “Multiple” is not a word that students are expected to understand or use in grade 2. Students can describe the numbers as a number of tens or hundreds, such as “20 tens” or “3 hundreds.”

Relevant Standards: Bold indicates priority

2.NBT.A.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.

- **a)100 can be thought of as a bundle of ten tens - called a “hundred.”**
- **b) The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).**

2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.

2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.B.8 Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.

2.MD.B.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

Essential Questions	Enduring Understanding(s):
• How is our number system organized? • How can understanding place value help us? • How can we compare numbers to understand which is greater or less?	• Our number system is a base-ten system. Any group of 10 in a given place value can be represented as one in the next greater place value (10 ones is 1 ten, 10 tens is 1 hundred). • Understanding place value enables us to represent, compare and order numbers and perform computations.

- The digit in the ones place will remain the same when finding 10 more or 10 less.

- The digits in the tens place and the ones place will remain the same when finding 100 more or 100 less.

- Number lines can help us visualize the magnitude of a number as the distance from zero.
- We can use symbols (<,>,=) to show relationships between numbers.

Demonstration of Learning:

CFA 1: **Lesson 3**
CFA 2: **Lesson 5**
CFA 3: **Lesson 6**
CFA 4: **Lesson 8**
CFA 5: **Lesson 11**
CFA 6**: Lesson 12**
Checkpoints
Unit Assessment

Pacing for Unit

Unit Pacing: 19 days (11 required lessons, 6 flex, 2 assessment and reaction)

Family Overview (link below)

Unit 5 Family Support Video
Unit 5 Family Support Materials (all languages)

Integration of Technology:

Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning

Unit-specific Vocabulary:

bar graph	equation	**ones**
centimeter	**expanded form**	**picture graph**
compare	**foot**	
compose	**hundred**	
data	**inch**	
decompose	**line plot**	
difference	**meter**	
digit	**number line**	

***Bold** - Appears in student glossary for IM Unit 5

Aligned Unit Materials, Resources, and Technology (beyond core resources):

ST Math
District - approved online resources

Opportunities for Interdisciplinary Connections:	**Anticipated Conceptions:**
ELA: Students can write numbers in word form and explain their thinking in math journals. Read math stories and review math vocabulary to strengthen students' understanding of vocabulary words. **Science:** Count animals in a habitat (bird counts, insect collections) and create story problems to solve. "If there are 243 birds in one forest and 156 in another, how many are there altogether?" Students can read and compare three-digit numbers while learning about ecosystems. **Social Studies:** Use three-digit numbers in a simple classroom store or market scenario. Price items in the hundreds (cents to dollars). **Art:** Create place value pictures using hundreds, tens, and ones. **PE:** Count and compare reps, steps, or scores. Compare numbers using the vocabulary terms “greater than, less than, or equal to. “	Some students may not move beyond thinking of the number 358 as 300 ones plus 50 ones plus 8 ones to the concept of 8 ones, 5 tens and 3 hundreds. Students may use place value blocks incorrectly assuming the value of each block is one instead of using the values hundreds, tens, or ones. Students may mistakenly use bigger than or smaller than rather than greater than or less than when comparing numbers. Students may count the lines on a number line instead of counting the spaces to represent a number.
Connections to Prior Units: Dependency Diagram	**Connections to Future Units:**
1.4 Numbers to 99	2.7 Adding and Subtracting within a 1,000
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement 8.3 Foster collaboration, interdependence, and collective learning • Create community agreements that emphasize learners’ ideas for fostering collaboration, interdependence, and collective learning. • Create teams with clear goals, roles, expectations, and responsibilities. • Encourage questions to more fully understand concepts, ideas, and perspectives. **Representation 3.3** Cultivate multiple ways of knowing and making meaning • Incorporate multiple ways of knowing, including storytelling, kinesthetics, problem solving, and relational learning through interpersonal experiences. • Use explicit prompts for each step in a sequential process to help learners develop a logical flow specific for their understanding and create a structure of complex tasks. • Use options for organizational methods and approaches (e.g., tables and	See Illustrative Math Teachers Guide for identified “Access for Students with Disabilities” by lesson and activity.

algorithms for processing mathematical operations), supporting the various cognitive approaches and enhancing comprehension .

- “Chunk” information into smaller elements, helping to prevent cognitive overload.

Action & Expression 5.2 Use multiple tools for construction, composition, and creativity

- Use sentence starters or sentence strips.
- Use virtual or concrete mathematics manipulatives (e.g., base-10 blocks, algebra blocks).

Supporting Multilingual/English Learners

Related ***CELP standards:***

Learning Target	Level 1/Level 2	Level 3	Level 4/Level 5
I can read, write and represent numbers to 1,000.	I can read, write and represent numbers to 1,000 using gestures, pictures or my native language.	I can read, write and represent numbers to 1,000 using pictures, simple words and sentences.	I can read, write and represent numbers to 1,000 using math vocabulary and sentences.
I can compare and order three-digit numbers.	I can compare three-digit numbers using gestures, pictures or my native language.	I can compare three-digit numbers using pictures, simple words and sentences.	I can compare three-digit numbers using math vocabulary and sentences.
I can represent whole numbers up to 1,000 as lengths from 0 on a number line.	I can explain that numbers show the distance from 0 with support.	I can explain that the number shows the distance from 0 using simple vocabulary.	I can explain that a number represents its distance from 0 using math vocabulary.

Lesson Sequence	Learning Target and Success Criteria
Unit 5 Planning Map	
Section A	**Learning Targets:** *I can read, write and represent numbers to 1,000.* **Success Criteria:** **Lesson 1** ☐ Explain (orally) strategies for representing 100 with the greatest and fewest number of tens and ones. **Lesson 2** ☐ Describe (orally) how tens and hundreds can represent the same number. ☐ Represent multiples of 10 and 100 using base-ten blocks and base-ten diagrams. **Lesson 3** ☐ Represent a number within 1,000 in different ways (using words, numbers, pictures). ☐ Represent a three-digit number using the fewest number of each unit.

	Lesson 4 ☐ Create a three-digit number given the number of hundreds, tens, and ones. ☐ Describe (orally) relationships between the amount of each unit and the value written as a three-digit number. **Lesson 5** ☐ Represent a three-digit number in expanded form. **Lesson 6** ☐ Represent the same three-digit number in multiple ways. (including number names, expanded form, base-ten numerals, and a base-ten diagram)
Section B	**Learning Targets:** *I can compare and order three-digit numbers.* *I can represent whole numbers up to 1,000 as lengths from 0 on a number line.* **Success Criteria:** **Lesson 8** ☐ Represent whole numbers up to 1,000 as lengths from 0 on a number line. **Lesson 9** ☐ Compare 2 three-digit numbers using a number line. ☐ Explain (orally) strategies for comparing three-digit numbers. ☐ Use the symbols, <, >, and = to compare three-digit numbers. **Lesson 10** ☐ Explain (orally) how to use base-ten diagrams to compare three-digit numbers. **Lesson 11** ☐ Explain (orally) methods for comparing three-digit numbers based on place value. **Lesson 12** ☐ Explain (orally) strategies for ordering three-digit numbers based on place value understanding and their location on the number line.

Unit Title:

Unit 6: Geometry, Time and Money

Unit Narrative

In this unit, students transition from place value and numbers to geometry, time, and money. In grade 1, students distinguished between defining and nondefining attributes of shapes, including triangles, rectangles, trapezoids, and circles. Here, they continue to look at attributes of a variety of shapes and see that shapes can be identified by the numbers of sides and vertices (corners). Students then study three-dimensional (solid) shapes, and identify the two-dimensional (flat) shapes that make up the faces of these solid shapes. Next, students look at ways to partition shapes and create equal shares. They extend their knowledge of halves and fourths (or quarters) from grade 1 to now include thirds. Students compose larger shapes from smaller equal-size shapes and partition shapes into two, three, and four equal pieces. As they develop the language of fractions, students also recognize that a whole can be described as two halves, three thirds, or four fourths, and that equal-size pieces of the same whole need not have the same shape. Later, students use their understanding of halves and fourths (or quarters) to tell time. In grade 1, they learned to tell time to the half hour. Here, they relate a quarter of a circle to the features of an analog clock. They use “quarter past” and “quarter till” to describe time, and skip-count to tell time in 5-minute intervals. They also learn to associate the notations “a.m.” and “p.m.” with their daily activities. To continue to build fluency with addition and subtraction within 100, students conclude the unit with a money context. They skip-count, count on from the greatest value, and group like coins, and then add or subtract to find the value of a set of coins. Students also solve one- and two-step story problems involving sets of dollars and different coins, and use the symbols $ and ¢.

Relevant Standards: Bold indicates priority

2.G.A.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.* Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

2.G.A.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

2.G.A.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

2.MD.C.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

2.MD.C.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.

2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Essential Question(s):	Enduring Understanding(s):
• How can polygons be described and classified? • How does partitioning help us reason about shapes? • How are clocks useful? • How can we determine the value of coins and bills? • How can we represent a given amount of money?	• Polygons can be described and classified using attributes, such as number of sides and angles. • Partitioning a shape into smaller parts allows us to describe the shape in different ways. • Clocks help us keep track of time and plan and sequence events. • Specific coins and bills each have a unique value that is determined by their markings. The size and color do not indicate a coin’s value.

- A given amount of money can often be generated using different combinations of coins and bills, but the value will remain the same.

Demonstration of Learning:

CFA 1: **Lesson 1**
CFA 2: **Lesson 3**
CFA 3: **Lesson 8**
CFA 4: **Lesson 9**
CFA 5: **Lesson 12**
CFA 6**: Lesson 13**
CFA 7**: Lesson 18**
CFA 8**: Lesson 19**
Checkpoints
Unit Assessment

Pacing for Unit

Unit Pacing: 26 days (16 required lessons, 6 optional lessons, 2 flex, 2 assessment and reaction)

Family Overview (link below)

Unit 6 Family Support Video
Unit 6 Family Support Materials (all languages)

Integration of Technology:

Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning

Unit-specific Vocabulary:

AM	equation	**pentagon**
A fourth of	estimate	penny
A third of	expression	place value
addition	**face**	**quadrilateral**
analog	**feet/foot**	rectangle
angle	**fourths**	relationship
attribute	**halves**	rhombus
centimeter	half of	row
circle	hands	ruler
clock	**hexagon**	skip count
column	hour	**subtraction**
compose	**inch**	symbols : $ ¢
cube	length	**thirds**
cents	measure	time
decompose	**meter**	triangles

Aligned Unit Materials, Resources, and Technology (beyond core resources):

ST Math
District - approved online resources

digital	minute	unit
dime	nickel	unknown
dollar	operations	whole
equal	PM	
equal shares	partition	

***Bold** - Appears in student glossary for IM Unit 6

Opportunities for Interdisciplinary Connections:

ELA
Read stories, such as *Alexander, Who Used to Be Rich Last Sunday*, and create/solve money story problems.

Connect *Flyleaf* and *Geode* texts to time (Garden Study, Seed Stash, Daytime Darkness, Finch Study) and geometric shapes found in nature

Science

Find shapes in flowers, snowflakes, spiderwebs, and honeycombs.

Identify solid shapes in nature (spheres, cubes, cylinders).

Check weather/temperature at different times of day

Social Studies
Identify shapes in community buildings and architecture.

Study geometric patterns in cultural quilts and textiles

Compare coins and currency from different countries.

Create timelines for school events and milestones.

Explore fair sharing: divide food, playground equipment, and class jobs equally

Art
Create tangram pictures and pattern block tessellations.

Create shape collages from magazines. Label sides and corners

Create rubbings of coins to notice details and symbols

Anticipated Conceptions:

Some students might confuse the hour and minute hands. For the time of 3:45, they may say the time is 9:15. Also, some students name the numeral closest to the hands, regardless of whether this is appropriate. For instance, for the time of 3:45 they say the time is 3:09 or 9:03.

Students may attempt to maneuver the minute or hour hands counterclockwise. An example would be rotating the minute hand from 12 to 9 to show the minute as :45 instead of going around completely.

Students might count coins as individual objects. Also some
students think that the value of a coin is directly related to its size, so the bigger the coin, the more it is worth.

The colors of the coins may confuse the students as well as any combination of older money vs the examples from the text. Examples to help would be to discuss the key features on each coin. Dime says ‘dime’ while the Nickel has a building on the back of it.

Students may confuse quarter hours with monetary quarters stating that there are either 100 minutes in an hour or 60 cents in a dollar.

Some students may think that a shape is named differently due to its orientation. They may see a rectangle with the longer side as the base, but claim that the same rectangle with the
shorter side as the base is a different shape.

Students may believe that a shape divided into three parts represents thirds even though
they are not equal parts.

Connections to Prior Units: Dependency Diagram	**Connections to Future Units:**
1.7 Geometry and Time 2.2 Adding and Subtracting within 100	3.5 Fractions as Numbers 3.7 Two-dimensional Shapes and Perimeter

Differentiation through *Universal Design for Learning*

UDL Indicator	**Teacher Actions:**
Engagement 8.5 Offer action-oriented feedback ● Offer feedback that encourages perseverance, focuses on development of efficacy and self-awareness, and encourages the use of specific supports and strategies in the face of challenge. ● Offer feedback that emphasizes effort, improvement, and achieving a goal rather than on relative performance.) **Representation 2.1** Clarify vocabulary, symbols, and language structures ● Pre-teach vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge. ● Offer graphic symbols with alternative text descriptions. ● Highlight how complex terms, expressions, or equations are composed of simpler words or symbols. **Action and Expression 6.3** Organize information and resources ● Use graphic organizers and templates for data collection and organizing information. ● Use prompts for categorizing, systematizing, and discovering themes and patterns. ● Use checklists and guides for note-taking.	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Supporting Multilingual/English Learners

Related *CELP standards:*

Learning Target	Level 1/Level 2	Level 3	Level 4/Level 5
I can identify and draw shapes with specific attributes.	I can name and draw shapes with specific attributes using gestures, sentence frames and/or my native language.	I can name and draw shapes with specific attributes using simple words.	I can name and draw shapes with specific attributes using math vocabulary.
I can partition shapes into halves, thirds and fourths.	I can partition shapes into equal parts and explain my thinking with prompting and support.	I can partition shapes into equal parts and explain my thinking using simple sentences and words.	I can partition shapes into equal parts and explain my thinking using math vocabulary.
I can identify and describe halves, thirds and fourths.	I can identify and describe halves, thirds and fourths and explain my thinking with prompting and support.	I can identify and describe halves, thirds and fourths and explain my thinking using simple sentences and words.	I can identify and describe halves, thirds and fourths and explain my thinking using math vocabulary.
I can tell time to the nearest five minutes.	I can tell time to the nearest 5 minutes using gestures, sentence frames and/or my native	I can tell time to the nearest 5 minutes using simple sentences and words.	I can tell time to the nearest 5 minutes using math vocabulary.

	language.		
I can determine the value of a collection of coins.	I can determine the value of a collection of coins with prompting and support.	I can determine the value of a collection of coins using simple words and sentences.	I can determine the value of a collection of coins using math vocabulary.
I can represent and solve a variety of word problems using addition and subtraction.	I can solve addition and subtraction word problems and use simple words, pictures or gestures to explain my thinking.	I can solve addition and subtraction word problems and explain my thinking using simple sentences, sentence frames or some math vocabulary.	I can solve addition and subtraction word problems and explain my thinking using math vocabulary.

Lesson Sequence	**Learning Target and Success Criteria**
Unit 6 Planning Map	
Section A	**Learning Targets:** *I can identify and draw shapes with specific attributes.* **Success Criteria:** **Lesson 1** ☐ Describe (orally) the attributes of triangles, quadrilaterals, pentagons and hexagons. **Lesson 2** ☐ Draw and identify (orally and in writing) shapes that have a given number of sides or corners. **Lesson 3** ☐ Describe (orally) the attributes of shapes and name (orally and in writing) quadrilaterals, pentagons, and hexagons. ☐ Identify (orally and in writing) shapes that have given side lengths and draw shapes with specific side lengths.
Section B	**Learning Targets:** *I can partition shapes into halves, thirds and fourths.* *I can identify and describe halves, thirds and fourths.* **Success Criteria:** **Lesson 6** ☐ Create a shape composed of equal sized smaller shapes and identify (orally and in writing) the shapes **Lesson 7** ☐ Partition rectangles and circles into halves, thirds, and fourths. ☐ Explain (orally) strategies for creating equal-sized parts. **Lesson 8** ☐ Partition circles and rectangles into "halves," "thirds," and "fourths" and name the equal-sized piece. ☐ Explain (orally) how equal parts of the same whole can look different but still be the same size and have the same name. **Lesson 9** ☐ Describe (orally) an equal sized piece using the phrases "half of," "a third of," and "a quarter

	of" a shape. ☐ Describe (orally) two halves, three thirds, and four fourths as one "whole".
Section C	**Learning Targets:** *I can tell time to the nearest five minutes.* **Success Criteria:** **Lesson 11** ☐ Determine (orally) the time shown on an analog clock (15- and 30-minute intervals). **Lesson 12** ☐ Determine (orally and in writing) the time on a clock to the nearest 5 minutes, and explain (orally) a strategy for telling time. **Lesson 13** ☐ Explain (orally) how to determine if a time should be labeled as "a.m." or "p.m."
Section D	**Learning Targets:** *I can determine the value of a collection of coins.* *I can represent and solve a variety of word problems using addition and subtraction.* **Success Criteria:** **Lesson 15** ☐ Identify the symbol "¢" for cents. ☐ Identify (orally and in writing) the names of coins and explain (orally) a strategy for finding the value of a collection of coins. **Lesson 16** ☐ Represent (using words or other formats) collections of coins that have the same value. **Lesson 17** ☐ Identify the symbol "$" for dollars. ☐ Recognize a dollar as a unit of money with the same value as 100 cents. ☐ Find the value of a collection of coins that has a value greater than 100 cents. ☐ Represent an amount of money given as a dollar and some cents by drawing collections of bills and coins. **Lesson 18** ☐ Explain (orally) strategies for solving (Add To and Take From) story problems involving money. **Lesson 19** ☐ Explain (orally) strategies for solving two-step (Put Together/Take Apart and Compare) story problems. ☐ Match (orally) diagrams and story problems **Lesson 20** ☐ Solve two-step story problems (within 100) and explain (orally) strategies for determining if an answer is reasonable.

Unit Title:

Unit 7: Adding and Subtracting within 1,000

Unit Narrative

In this unit, students add and subtract within 1,000, with and without composing and decomposing a base-ten unit. Previously, students added and subtracted within 100, using methods such as counting on, counting back, and composing or decomposing a ten. Here, they apply the methods they know and their understanding of place value and three-digit numbers to find sums and differences within 1,000. Initially, students add and subtract, without composing or decomposing a ten or a hundred. Instead, they rely on methods based on the relationship between addition and subtraction and the properties of operations. They make sense of sums and differences, using counting sequences, number relationships, and representations (number lines, base-ten blocks, base-ten diagrams, and equations). As the unit progresses, students work with numbers that prompt them to compose and decompose one or more units, eliciting strategies based on place value. When adding and subtracting by place, students first compose or decompose only a ten, then either a ten or a hundred, and finally both a ten and a hundred. They also make sense of and connect different ways to represent place-value strategies. For example, students make sense of a written method for subtracting 145 from 582 by connecting it to a base-ten diagram and their experiences with base-ten blocks. Students learn to recognize when composition or decomposition is a useful strategy for adding or subtracting by place. In the later half of the unit, they encounter lessons that encourage them to think flexibly and to use strategies that make sense to them, based on number relationships, properties of operations, and the relationship between addition and subtraction.

Relevant Standards: Bold indicates priority

2.NBT.A.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.
2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2.NBT.B.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.
2.NBT.B.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three- digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
2.NBT.B.8 Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
2.NBT.B.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.
2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Essential Question(s):	**Enduring Understanding(s):**
• How is our number system organized? • How can understanding place value help us?	• Our number system is a base-ten system. Any group of 10 in a given place value can be represented as one in the next greater place value (10 ones is 1 ten, 10 tens is 1 hundred).

<table>
<tr><td>How do the properties of operations make computation simpler?</td><td>Understanding place value enables us to represent, compare and order numbers and perform computations.
Properties of operations allow us to reorder, decompose and/or compose numbers in order to make computation simpler.
Subtraction is the opposite of or “undoes” addition.
The digit in the ones place will remain the same when finding 10 more or 10 less.
The digits in the tens place and the ones place will remain the same when finding 100 more or 100 less.</td></tr>
<tr><td>Demonstration of Learning:</td><td>Pacing for Unit</td></tr>
<tr><td>CFA 1: Lesson 2
CFA 2: Lesson 3
CFA 3: Lesson 10
CFA 4: Lesson 16
Checkpoints
Unit Assessment</td><td>Unit Pacing: 23 days (14 required lessons, 7 flex, 2 assessment and reaction)</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>Unit 7 Family Support Video
Unit 7 Family Support Materials (all languages)</td><td><i>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</i></td></tr>
<tr><td>Unit-specific Vocabulary:</td><td>Aligned Unit Materials, Resources, and Technology (beyond core resources):</td></tr>
<tr><td><table>
<tr><td>addition</td><td>equation</td><td>sum</td></tr>
<tr><td>addend</td><td>expression</td><td>symbol</td></tr>
<tr><td>compose</td><td>fewer</td><td>value</td></tr>
<tr><td>decompose</td><td>more</td><td></td></tr>
<tr><td>difference</td><td>subtract</td><td></td></tr>
</table>*Bold - Appears in student glossary for IM Unit 7</td><td>ST Math
District - approved online resources</td></tr>
<tr><td>Opportunities for Interdisciplinary Connections:</td><td>Anticipated Conceptions:</td></tr>
<tr><td>ELA
Students write and illustrate addition/subtraction word problems with real classroom contexts (pets, toys, siblings). Emphasize story problem language: "Add to," "Take from," "Compare."</td><td>Students may not have a conceptual understanding of place value so that they would think 234 is 2+3+4 rather than 200+30+4 and may not see the relevance of the zeros.

Students may not have a conceptual understanding of</td></tr>
</table>

Science Collect data from science experiments and solve addition and subtraction problems using the data. **Social Studies** Noticing years between events, identifying different historic dates and solving problems using this information. **PE** Keep track of the score in games (basketball, soccer) and create and solve story problems using the data.	place value so they would think 561 – 147 = 426, because they subtract the 7 in 147 from the 1 in 561 instead of regrouping. When adding three-digit numbers, students may not know what to do with newly composed tens or hundreds. They may try to write both digits in a single place or ignore the newly composed units. When subtracting three-digit numbers, students may not correctly decompose from a higher place value. When students are composing a new ten or hundred, students may miss the composed number when counting to get their final answer.
Connections to Prior Units: Dependency Diagram	**Connections to Future Units:**
2.2 Adding and Subtracting Within 100 2.5 Numbers to 1,000	3.3 Wrapping Up Addition and Subtraction Within a 1,000
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement 8,2 Optimize challenge and support ● Presume competence and nurture a belief in the capabilities of every learner. ● Offer options with varying modes of complexity or difficulty. ● Offer options for tools and scaffolds that align with the learning goal and promote agency. ● Emphasize process, effort, and progress in meeting standards as alternatives to external evaluation and competition. **Representation 2.1** Clarify vocabulary, symbols, and language structures ● Pre-teach vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge. ● Offer graphic symbols with alternative text descriptions. ● Highlight how complex terms, expressions, or equations are composed of simpler words or symbols **Action & Expression 5,4** Enhance capacity for monitoring progress ● Use prompts to guide self-monitoring and reflection. ● Use representations of progress (e.g., before-and-after photos, graphs and charts showing progress over time, process portfolios). ● Explore the different types of feedback that are most useful according to specific preferences, goals, and contexts. ● Use templates that guide self-reflection on quality and completeness.	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Supporting Multilingual/English Learners

Related *CELP standards:*

Learning Target	Level 1/Level 2	Level 3	Level 4/Level 5
I can add and subtract within 1,000 using a variety of strategies.	I can add and subtract within 1,000 and explain my thinking with support.	I can add and subtract within 1,000 and explain my thinking using simple words and sentences.	I can add and subtract within 1,000 and explain my thinking using math vocabulary.

Lesson Sequence	**Learning Target and Success Criteria**
Unit 7 Planning Map	
Section A	**Learning Targets:** *I can add and subtract within 1,000 using a variety of strategies.* **Success Criteria:** **Lesson 1** ☐ Identify (orally and in writing) unknown numbers that complete a count by 10 or 100. **Lesson 2** ☐ Represent adding and subtracting multiples of 10 or 100 with base-ten blocks, base-ten diagrams and equations. **Lesson 3** ☐ Explain (orally) strategies for finding the value of an unknown addend (within 1,000). **Lesson 4** ☐ Compare (orally) methods for adding and subtracting within 1,000 (that do not include composing or decomposing units when adding by place). ☐ Use different strategies to find sums and differences (within 1,000) and show your thinking.
Section B	**Learning Targets:** *I can add and subtract within 1,000 using a variety of strategies.* **Success Criteria:** **Lesson 6** ☐ Explain (orally) how to determine whether a ten will be composed when adding (a three-digit number and a two-digit number by place). ☐ Find sums within 1,000, and describe (orally) patterns in the digits when a ten is composed. **Lesson 7** ☐ Explain (orally and using other representations) how to determine whether a ten or a hundred will be composed when adding (within 1,000). ☐ Explain (orally) strategies for adding a three-digit number and a two-digit number. **Lesson 8** ☐ Compare (orally) strategies for adding within 1,000. ☐ Explain (orally) strategies for adding two-digit and three-digit numbers (including composing two units). **Lesson 9** ☐ Compare (orally and in writing) strategies for adding three-digit numbers. ☐ Explain (orally) strategies for adding two-digit and three-digit numbers (including composing two units). **Lesson 10**

	☐ Explain (orally) strategies for finding the value of an unknown addend (within 1,000). ☐ Explain (orally) strategies for adding two-digit and three-digit numbers (including composing two units).
Section C	**Learning Targets:** *I can add and subtract within 1,000 using a variety of strategies.* **Success Criteria:** **Lesson 12** ☐ Explain (orally) how to use base-ten blocks to represent subtraction (within 1,000, including when a unit will be decomposed). ☐ Explain (orally) strategies for subtracting within 1,000 (when a ten would be decomposed when subtracting by place). **Lesson 13** ☐ Interpret (orally) base-ten diagrams that represent subtraction strategies (based on place value). ☐ Use place-value strategies to subtract within 1,000 (when a ten or a hundred is decomposed), and explain (orally) the strategy. **Lesson 14** ☐ Explain (orally) strategies for subtracting (a two-digit number from a three-digit number, based on place value). ☐ Explain (orally) how to determine when one or more units will be decomposed when subtracting (by place). **Lesson 15** ☐ Explain (orally) strategies for subtracting 2 three-digit numbers (that include decomposing two units). ☐ Interpret (orally and using other representations) a written method for subtracting by place (that includes decomposing two units). **Lesson 16** ☐ Explain (orally) strategies for subtracting within 1,000 (based on place value or the properties of operations). ☐ Interpret (orally) subtraction strategies (based on place value and the properties of operations).

Unit Title:

Unit 8: Equal Groups

Unit Narrative

In this unit, students develop an understanding of equal groups, building on their experiences with skip-counting and with finding the sums of equal addends. The work here serves as the foundation for multiplication and division in grade 3 and beyond. Students begin by analyzing even and odd numbers of objects. They learn that any even number can be split into 2 equal groups or into groups of 2, with no objects left over. Students use visual patterns to identify whether numbers of objects are even or odd. Next, students learn about rectangular arrays. They describe arrays using mathematical terms, such as“rows” and “columns.” Students see the total number of objects as a sum of the objects in each row and as a sum of the objects in each column, which they express by writing equations with equal addends. Students also recognize that there are many ways of seeing the equal groups in an array. Later, students transition from working with arrays that contain discrete objects to equal-size squares within a rectangle. Students build rectangular arrays using inch tiles and partition rectangles into rows and columns of equal-size squares. The work here sets the stage for the concept of area in grade 3.

Relevant Standards: Bold indicates priority

2.OA.C.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
2.OA.C.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.
2.G.A.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
2.OA.B.2 Fluently add and subtract within 20 using mental strategies. nBy end of Grade 2, know from memory all sums of two one-digit numbers. See standard 1.OA.6 for a list of mental strategies.
2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.

Essential Question(s):	**Enduring Understanding(s):**
• Why is a group of objects odd or even? • How can I represent an array of objects using numbers and symbols? • How does partitioning a rectangle into rows and columns into equal size squares help us reason about shapes? • How can I represent the total number of objects in an array as a sum of equal addends?	• An even number is the sum of two equal addends. • A repeated addition problem can be represented by an array. • Partitioning a shape into smaller equal parts allows us to describe the shape in different ways. • Adding the same number repeatedly to find the total in an array.

Demonstration of Learning:	**Pacing for Unit**
CFA 1: **Lesson 3** CFA 2: **Lesson 4** CFA 3: **Lesson 9** CFA 4: **Lesson 11** Checkpoints Unit Assessment	Unit Pacing: 15 days (10 required lessons, 4 flex, 2 assessment and 1 reaction)

<table>
<tr><th>Family Overview (link below)</th><th>Integration of Technology:</th></tr>
<tr><td>Unit 8 Family Support Video
Unit 8 Family Support Materials (all languages)</td><td><i>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</i></td></tr>
<tr><th>Unit-specific Vocabulary:</th><th>Aligned Unit Materials, Resources, and Technology (beyond core resources):</th></tr>
<tr><td>
<table>
<tr><td>add</td><td>difference</td><td>parition</td><td></td></tr>
<tr><td>addend</td><td>equation</td><td>Rectangular arrays</td><td></td></tr>
<tr><td>array</td><td>equal</td><td>rows</td><td></td></tr>
<tr><td>column</td><td>even</td><td>sum</td><td></td></tr>
<tr><td>compose</td><td>fluently</td><td>strategies</td><td></td></tr>
<tr><td>decompose</td><td>object</td><td>subtract</td><td></td></tr>
</table>
*Bold - Appears in student glossary for IM Unit 8</td><td>ST Math
District - approved online resources</td></tr>
<tr><th>Opportunities for Interdisciplinary Connections:</th><th>Anticipated Conceptions:</th></tr>
<tr><td>ELA:
Students can read stories that include grouping, sharing, or arrays (e.g. equal groups in real-life contexts).

Science:
Students can use arrays and grouping when observing the natural world (e.g. count plant leaves, petals, or seeds in equal groups).

PE:
Students can form arrays with their bodies (e.g. rows and columns).
Students can skip count by clapping or jumping (by 2s, 5s, 10s).
Students can pair up to represent odd and even (who has a partner?) numbers.

Art:
Students can create array art using grids (coloring squares in rows and columns)
Students can design pictures using repeated patterns and equal groups.</td><td>Students might memorize that even numbers end in 0, 2, 4, 6, 8 or odd numbers end in 1, 3, 5, 7, and 9 but not understand the meaning of evenness. These students may not be able to use objects, drawings, or equations to show why a given amount is odd or even.

Students will determine whether a number is odd or even by the first digit in the number instead of the digit in the one's place.

Students may confuse the terms row and columns and interchange them when writing a repeated addition sentence. The focus should be on the repeated addition of the representation.

Students will create an equation that equals the sum without thinking about the rows and columns in the array.</td></tr>
<tr><th>Connections to Prior Units: Dependency Diagram</th><th>Connections to Future Units:</th></tr>
<tr><td>2.6 Geometry, Time</td><td>3.1 Multiplication</td></tr>
</table>

Differentiation through *Universal Design for Learning*

UDL Indicator	Teacher Actions:
Engagement 7.2 Optimize relevance, value, and authenticity ● Vary activities and sources of information so they can be: ○ Personalized and contextualized to learners' lives ○ Culturally relevant and sustaining ○ Socially relevant ○ Age and ability appropriate ○ Appropriate for different racial, cultural, ethnic, and gender groups ● Design activities so learning outcomes are authentic, communicate to real audiences, and reflect a purpose that is clear to the participants. ● Provide tasks that allow for active participation, exploration, and experimentation. ● Invite personal response, evaluation, and self-reflection to content and activities. **Representation 2.1** Clarify vocabulary, symbols, and language structures ● Pre-teach vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge. ● Offer graphic symbols with alternative text descriptions. ● Highlight how complex terms, expressions, or equations are composed of simpler words or symbols. **Action and Expression 6.3** Organize information and resources ● Use graphic organizers and templates for data collection and organizing information. ● Use prompts for categorizing, systematizing, and discovering themes and patterns. ● Use checklists and guides for note-taking.	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Supporting Multilingual/English Learners

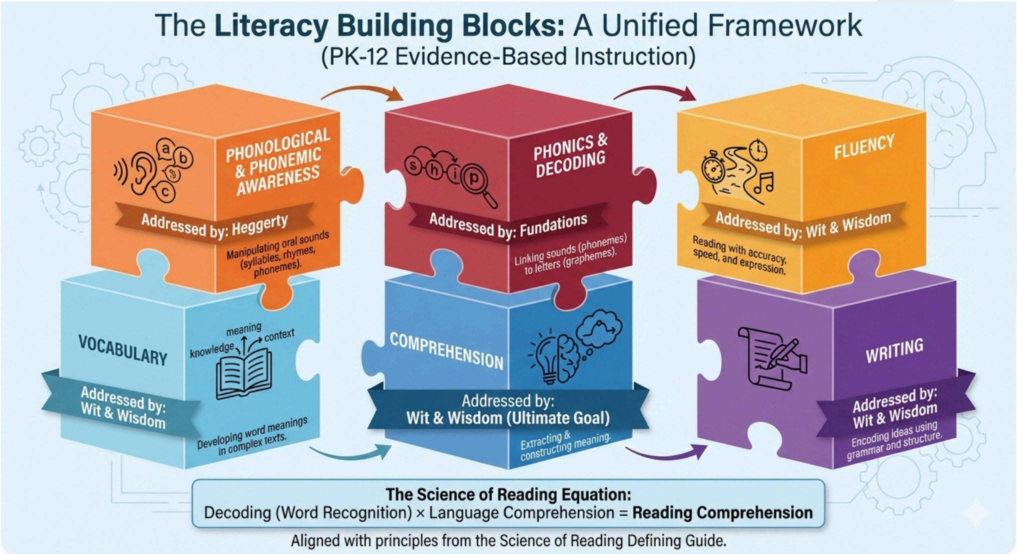
Related *CELP standards:*

Learning Target	Level 1/Level 2	Level 3	Level 4/Level 5
I can determine whether a number is even or odd and write an equation to justify my answer.	I can tell if a number is even or odd and explain my thinking using gestures, pictures or my native language.	I can tell if a number is even or odd and explain my thinking using simple sentences and words.	I can tell if a number is even or odd and explain my thinking using math vocabulary.
I can represent an array as the sum of equal addends and skip count to find the total.	I can use pictures, objects and numbers to show equal groups in an array and count by the same number to find the total.	I can describe an array using a word bank and explain how skip counting helps find the total.	I can explain how an array shows repeated addition and tell how I found the total.
I can partition a rectangle into rows and columns of same size squares and find the total number of squares in the array.	I can partition a rectangle and explain how to find the total number of squares with prompting and support.	I can partition a rectangle and explain how to find the total number of squares using. simple words and sentences.	I can partition a rectangle and explain how to find the total number of squares using math vocabulary.

Lesson Sequence	**Learning Target and Success Criteria**
Unit 8 Planning Map	
Section A	**Learning Targets:** *I can determine whether a number is even or odd and write an equation to justify my answer.* **Success Criteria:** **Lesson 1** ☐ Determine whether a collection of objects can be arranged into 2 equal groups (with “some leftovers” or “no leftovers”). ☐ Describe (orally) observations about each category. **Lesson 2** ☐ Determine whether a collection of objects can be arranged into groups of 2 (or “pairs) with “one leftover” or “no leftovers”. ☐ Describe (orally) observations about each category. **Lesson 3** ☐ Explain (orally) strategies for determining whether images show an even or odd number of objects. **Lesson 4** ☐ Create equations (with two addends) that represent different ways to decompose even and odd numbers.
Section B	**Learning Targets:** *I can represent an array as the sum of equal addends and skip count to find the total.* *I can partition a rectangle into rows and columns of same size squares and find the total number of squares in the array.* **Success Criteria:** **Lesson 7** ☐ Create an array and describe (orally) the “rows”. **Lesson 8** ☐ Create arrays and describe (orally) the “rows” and “columns”. **Lesson 9** ☐ Explain (orally) strategies for finding the total number of objects in an array. ☐ Match (orally) expressions and arrays that represent the same value. **Lesson 10** ☐ Create arrays and represent the objects in the array with an equation (with equal addends). **Lesson 11** ☐ Create rectangles composed of square tiles and describe (orally) the rectangles using math vocabulary. ☐ Partition rectangles into an array of equal-size squares. ☐ Explain (orally) how to determine the total number of equal-size squares that make up a rectangle. **Lesson 12** ☐ Describe (orally and using other representations) rectangles partitioned into equal-size squares using math vocabulary. ☐ Explain (orally) strategies for partitioning rectangles into arrays of equal-size squares.

Course Title:	**Content Area:**	**Grade Level:**	**Credit (if applicable)**
Kindergarten ELA	Literacy	**Kindergarten**	N/A

Course Description:



In Kindergarten, students participate in a structured literacy block that includes direct instruction in oral language, phonological awareness, phonics, fluency, vocabulary, comprehension, and writing.

Structured Literacy is a research-based, explicit, and systematic approach to reading instruction designed to ensure that every student becomes a proficient, confident reader. Many individuals often refer to the structured literacy approach as the Science of Reading (SOR).

This approach is grounded in **Scarborough's Reading Rope**, which explains that skilled reading is the result of two essential components working together: the ability to decode words (***Word Recognition***) and the ability to understand language (***Language Comprehension***).

Students study compelling topics through engaging texts. Teachers and students use the **Heggerty** program to build the foundational phonemic awareness students need to hear and manipulate sounds, a precursor to developing decoding skills. The **Fundations** program provides systematic instruction in phonics and spelling to master decoding.

These skills are then integrated with **Wit & Wisdom**, which develops rich comprehension, fluency, vocabulary, and writing. In conjunction with authentic core texts as well as Geodes decodables, Flyleaf & Heggerty readers build background knowledge around a diverse set of topics.

By utilizing this evidence-based framework, we provide a proactive pathway for all learners—improving student outcomes through early prevention of reading gaps and targeted intervention for those who need extra support.

Wit & Wisdom's integrated approach to learning enables students to activate and develop content and vocabulary knowledge while learning skills. In each module, students write about what they read, learn grammar, and then articulate the meaning of each text in formal and informal discussions with their peers. The Wit & Wisdom approach helps teachers celebrate the joy of reading and writing with students, while also supporting all learners in meeting the rigor of the ELA standards. By reading engaging texts and participating meaningfully in their learning, students develop the knowledge and skills they need to be successful readers, critical thinkers, and effective communicators who love to learn and can succeed in college and careers.

Through a rigorous and careful module design, students gain content knowledge and an awareness of how to read texts, write, speak, and listen. Each of the four modules in Kindergarten has a topical focus. For each module, students read or, in the case of younger students, read aloud a series of authentic texts on the topic and consider those texts critically and systematically. Frameworks of questioning, the Content Stages, and Content Framing Questions engage students in the content and in the process of reading complex texts. Content Framing Questions guide students' daily work of encountering, understanding, and analyzing complex texts. Students then distill each text's deeper meaning and, finally, articulate how the texts, individually and collectively, build their knowledge of the topic.

Throughout each module, standards are addressed in an integrated manner. Instead of addressing and assessing standards one by one, in isolation, the curriculum teaches reading, writing, speaking, listening, and language in an integrated manner so that students learn all skills in the context of module content. This integrated approach enables students to activate and build on their developing background and vocabulary knowledge of the module topic while learning skills in other areas.

In Kindergarten, students participate in four core modules centered around the five senses, studying farms, how America has changed over time, and the continents. In addition, students will participate in an introductory, abbreviated module to learn and experience the instructional routines used by teachers.

Finally, each module will also encompass the corresponding Fundations (phonics) unit as well as Heggerty pacing for phonemic awareness.

Aligned Core Resources:	**Connection to the *BPS Vision of the Graduate***
Wit & Wisdom Slide Decks **Level K Fundations, Second Edition** **Heggerty Kindergarten Curriculum 2022 Edition**	**Communication** • Articulates thoughts and ideas effectively using oral, written, and nonverbal communication skills in a variety of forms and contexts. • Utilize multiple media and technologies, and learn how to judge their effectiveness as well as assess their impact. • Listen effectively to decipher meaning, including knowledge, values, attitudes, and intentions. • Use communication for a range of purposes (e.g., to inform, instruct, motivate, and persuade).
Additional Course Information:	**Link to *Completed Equity Audit***

Knowledge/Skill Dependent courses/prerequisites	
No prerequisites.	2025 Wit & Wisdom Equity Curriculum Review
Standard Matrix	

District Learning Expectations and Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
Reading Literature Standards				
CCSS.ELA-Literacy.RL.K.1- With prompting and support, ask and answer questions about key details in a text.	X	X	X	X
CCSS.ELA-Literacy.RL.K.2- With prompting and support, retell familiar stories, including key details.	X	X	X	X
CCSS.ELA-Literacy.RL.K.3- With prompting and support, identify characters, settings, and major events in a story.	X	X	X	X
CCSS.ELA-Literacy.RL.K.4.- Ask and answer questions about unknown words in a text.	X	X	X	X
CCSS.ELA-Literacy.RL.K.5- Recognize common types of text (e.g., storybooks, poems).	X	X	X	X
CCSS.ELA-Literacy.RL.K.6- With prompting and support, name the author and illustrator of a story and define the role of each in telling the story.	X	X		
CCSS.ELA-Literacy.RL.K.7- With prompting and support, describe the relationship between illustration and the story in which they appear (e.g., what moment in a story an illustration depicts).				X
CCSS.ELA-Literacy.RL.K.9- With prompting and support, compare and contrast the adventures and experiences of characters in familiar stories.		X		
CCSS.ELA-Literacy.RL.K.10- Actively engage in group reading activities with purpose and understanding.	X	X	X	X
Reading Informational Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RI.K.1- With prompting and support, ask and answer questions about key details in a text.	X	X	X	X
CCSS.ELA-Literacy.RI.K.2- With prompting and support, identify the main topic and retell key details of a text.	X	X	X	X
CCSS.ELA-Literacy.RI.K.3- With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.	X	X	X	X
CCSS.ELA-Literacy.RI.K.4- With prompting and support, ask and answer questions about unknown words in a text.	X	X	X	X
CCSS.ELA-Literacy.RI.K.5- Identify the front cover, back cover, and title page of a book.	X	X	X	
CCSS.ELA-Literacy.RI.K.6- Name the author and illustrator of a text and define the role of each in presenting the ideas or information of a text.	X		X	
CCSS.ELA-Literacy.RI.K.7-With prompting and support, describe the	X	X	X	X

relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).				
CCSS.ELA-Literacy.RI.K.8- With prompting and support, identify the reasons an author gives to support points in a text.			**X**	**X**
CCSS.ELA-Literacy.RI.K.9- With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RI.K.10- Actively engage in group reading activities with purpose and understanding.	**X**	**X**	**X**	**X**
Speaking & Listening Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.SL.K.1- Participate in collaborative conversations with diverse partners about Kindergarten topics and texts with peers and adults in small and larger groups.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.SL.K.1a- Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.SL.1b- Continue a conversation through multiple exchanges.	**X**			
CCSS.ELA-Literacy.SL.K.2- Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.SL.K.3-Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	**X**		**X**	**X**
CCSS.ELA-Literacy.SL.K.4- Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.	**X**	**X**		**X**
Speaking & Listening Standards (continued)	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.SL.K.5- Add drawings or other visual displays to descriptions as desired to provide additional detail.			**X**	
CCSS.ELA-Literacy.SL.K.6- Speak audibly and express thoughts, feelings, and ideas clearly.	**X**	**X**		**X**
Writing Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.W.K.1- Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., My favorite book is….).		**X**	**X**	**X**
CCSS.ELA-Literacy.W.K.2- Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.W.K.3- Use a combination of drawing, dictating, and	**X**	**X**	**X**	**X**

writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction.				
CCSS.ELA-Literacy.W.K.5- With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.		**X**		**X**
CCSS.ELA-Literacy.W.K.6- With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers.		**X**		
CCSS.ELA-Literacy.W.K.7- Participate in a shared research and writing project (e.g., explore several books by a favorite author and express opinions about them).			**X**	**X**
CCSS.ELA-Literacy.W.K.8- With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	**X**	**X**	**X**	**X**
Language Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.L.K.1- Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.K.1a- Print many upper and lowercase letters.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.K.1b- Use frequently occurring nouns and verbs.		**X**	**X**	**X**
CCSS.ELA-Literacy.L.K.1c-Form regular plural nouns orally by adding /s/ or /es/ (e.g., dog, dogs; wish, wishes).		**X**	**X**	
CCSS.ELA-Literacy.L.K.1d-Understand and use question words (interrogatives) (e.g., who, what, where, when, why, how).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.K.1e- Use the most frequently occurring prepositions (e.g., to, from, in, out, on, off, for, of, by, with).	**X**	**X**		**X**
CCSS.ELA-Literacy.L.K.1f- Produce and expand complete sentences in shared language activities.	**X**	**X**	**X**	**X**
Language Standards (continued)	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.L.K.2- Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.K.2a- Capitalize the first word in a sentence and the pronoun.			**X**	**X**
CCSS.ELA-Literacy.L.K.2b- Recognize and name end punctuation.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.K.2c- Write a letter or letters for most consonant and short-vowel sounds (phonemes).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.K.2d- Spell simple words phonetically, drawing on knowledge of sound-letter relationships.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.K.4- Determine or clarify the meaning of unknown	**X**	**X**	**X**	**X**

and multiple-meaning words and phrases based on Kindergarten reading and content.				
CCSS.ELA-Literacy.L.K.4a- Identify new meanings for familiar words and apply them accurately (e.g., knowing a duck is a bird and learning the verb to duck).	X	X	X	X
CCSS.ELA-Literacy.L.K.4b-Use the most frequently occurring inflections and affixes (e.g., -ed, -s, re-, un-, -ful, -less) as a clue to the meaning of an unknown word.	X	X	X	X
CCSS.ELA-Literacy.L.K.5-With guidance and support from adults, explore word relationships and nuances in word meanings.	X	X	X	X
CCSS.ELA-Literacy.L.K.5a- Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent.	X	X	X	X
CCSS.ELA-Literacy.L.K.5b- Demonstrate understanding of frequently occurring verbs and adjectives by relating them to their opposites (antonyms).		X	X	X
CCSS.ELA-Literacy.L.K.5c- Identify real-life connections between words and their use (e.g., note places at school that are colorful).	X	X	X	X
CCSS.ELA-Literacy.L.K.5d- Distinguish shades of meaning among verbs describing the same general action (e.g., walk, march, strut, prance) by acting out the meanings.	X	X	X	X
CCSS.ELA-Literacy.L.K.6- Use words and phrases acquired through conversations, reading, and being read to, and responding to texts.	X	X	X	X
Reading: Foundational Skills- Print Concepts	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.K.1- Demonstrate understanding of the organization and basic features of print.	X	X	X	X
CCSS.ELA-Literacy.RF.K.1a- Follow words from left to right, top to bottom, and page by page.	X	X	X	X
CCSS.ELA-Literacy.RF.K.1b- Recognize that spoken words are represented in written language by specific sequences of letters.	X	X	X	X
Reading: Foundational Skills- Print Concepts (continued)	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.K.1c- Understand that words are separated by spaces in print.	X	X	X	X
CCSS.ELA-Literacy.RF.K.1d- Recognize and name all upper and lowercase letters of the alphabet.	X	X	X	X
Reading: Foundational Skills- Phonological Awareness	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.K.2- Demonstrate understanding of spoken words, syllables, and sounds (phonemes).	X	X	X	X
CCSS.ELA-Literacy.RF.K.2a-Recognize and produce rhyming words.	X	X	X	X

CCSS.ELA-Literacy.RF.K.2b-Count, pronounce, blend, and segment syllables in spoken words.	**X**	**X**	**X**	**X**
Reading: Foundational Skills- Phonological Awareness (continued)	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.K.2c-Blend and segment onsets and rimes of single-syllable spoken words.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.K.2d-Isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phoneme (consonant-vowel-consonant or CVC) words not including CVCs ending with /l/, /r/, or /x/.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.K.2e-Add or substitute individual sounds (phonemes) in simple, one-syllable words to make new words.	**X**	**X**	**X**	**X**
Reading: Foundational Skills- Phonics, Word Recognition & Fluency	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.K.3-Know and apply grade-level phonics and word analysis skills in decoding words.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.K.3a- Demonstrate basic knowledge of one-to-one letter sound correspondence by producing the primary sound or many of the most frequent sounds for each consonant.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.K.3b-Associate the long and short sounds with the common spellings (graphemes) for the five major vowels.		**X**	**X**	**X**
CCSS.ELA-Literacy.RF.K.3c-Read common high frequency words by sight (e.g., the, of, to, you, she, my, is, are, do, does).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.K.3d-Distinguish between similarly spelled words by identifying the sounds of the letters that differ..	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.K.4- Read emergent-reader texts with purpose and understanding.	**X**	**X**	**X**	**X**

Standards Alignment Resources:

- Wit & Wisdom Standards Alignment.pdf
- Fundations Standards Alignment.pdf
- Heggerty Standards Alignment.pdf

Unit Links

Module 0: Building Readers!
Module 1: The Five Senses
Module 2: Once Upon a Farm
Module 3: America, Then and Now
Module 4: The Continents

Module 0: Building Readers!

Relevant Standards: Bold indicates priority

See above.

Essential Question(s):

How does reading help us learn?

Enduring Understanding(s):

Students in Kindergarten will understand the following concepts as a result of this module:

- Reading a book multiple times for different purposes helps readers better understand and enjoy the story.
- Different readers enjoy different types of books.

Demonstration of Learning:

Students at the end of this introductory module participate in a visual art analysis and discussion about a text. The goal of this unit is to introduce and teach routines that will be essential for the remainder of this course rather than creating a final learning product.

Pacing for Unit

6 school days

Family Overview (link below)

WW_Family_Letter_English.pdf
WW_Family_Letter_Spanish.pdf

Integration of Technology:

Videos and digital visual art displays listed below.

Unit-specific Vocabulary:

Content Vocabulary

Stampeding	Wild	Bookmobile
Librarian		

Academic Vocabulary

Text	Knowledge	Echo Read
Notice	Wonder	Sentence Frame
tableaux	Socratic Seminar	

Aligned Unit Materials, Resources, and Technology (beyond core resources):

Module 0 Teacher Edition (Digital)
Wild about Books, Judy Sierra
I and the Village, Marc Chagall

Visual Art Vocabulary

Color	Shape	Line

Opportunities for Interdisciplinary Connections:

Science: Students engage with various animals through the text sources, allowing them to discuss real-world animal behaviors, habitats, and physical traits. They can even identify unfamiliar animals like the “oryx” or “giant eland.” The module also emphasizes the scientific habit of “noticing” details in the natural world and illustrations. Students practice close observation using tools like a magnifying glass.

Social Studies: Students delve into the role of the librarian as a community helper who shares knowledge and enthusiasm, and explore the significance of a “bookmobile” in providing community access to resources. In Lesson 6, students utilize a world map to locate Belarus and employ a timeline to place the year 1911, thereby connecting Marc Chagall’s painting to a specific historical and geographic context.

Social Emotional Learning: The primary objective of this module is to foster a “knowledge-building, text-focused community” where students engage in collaborative routines such as Think-Pair-Share and Socratic Seminars. Through “tableauxx,” students physically embody characters to empathize with their emotions, while art serves as a medium for expressing their own feelings and “wild” interests. Finally, students reflect on how characters, like Molly the librarian, manage mistakes and practice giving and receiving polite peer feedback to enhance their work.

Art: This introductory module naturally invites students into the world of visual art analysis. In addition to examining Marc Chagall’s painting *I and the Village* to explore how artists use color, shape, and line to tell a story, students can engage in a hands-on art-making activity that reflects their own "wild" reading interests. Following their reading of Judy Sierra’s *Wild about Books*, students can create mixed-media collages representing their favorite real or imaginary animals reading books in a habitat they design. Utilizing visual art vocabulary like "line" and "shape", children can use crayons to outline their animals and tissue paper layers for textured backgrounds. This allows them to

Anticipated misconceptions:

Students may have misconceptions of:

- Students may struggle to distinguish between the fantasy elements (animals reading) and the realistic elements of a story.
- Students may think they know a word because they can say it or decode it. True knowledge of a word involves understanding its meaning in different contexts. (E.g., *wild,* acting crazy, undomesticated animals, deeply enthusiastic, excited.)
- Visual art is more than pretty or weird shapes. Artists use specific elements like line, shape, and color to communicate an idea or feeling.

physically practice the scientific habit of "noticing" details in text illustrations and transferring that observation skill into their own creative work.	
Connections to Prior Units:	**Connections to Future Units:**
This is the first unit of the course.	This unit provides the opportunity for classrooms to establish the routines necessary for future work in preceding Wit & Wisdom units.

Differentiation through *Universal Design for Learning*

UDL Indicator & Teacher Actions:

Engagement
- Connect the “Essential Question” to students’ personal interests by allowing them to bring a favorite book or object from home to share during the “Welcome” routine.
- During the Socratic Seminar, provide “talking chips” or “equity sticks” to ensure equitable participation and reduce the social anxiety of speaking in a large group.
- Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class.

Representation
- Pair written observations with matching drawings or icons to increase accessibility for non-readers.
- Use a word wall with visual anchors (pictures) next to key terms so students can refer to them independently during the unit.
- Use echo reading for the Essential and Focusing Questions, providing a clear vocal model and physical tracking of the text to help students connect spoken words to print.

Action & Expression
- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.

Supporting Multilingual/English Learners
Related *CELP standards:* and differentiated Learning Targets:

Standards	**Emerging**	**Expanding**	**Bridging**
LT 1 CELP 1	With heavy support (gestures, native language, or pictures), I can point to or name one thing I notice in a picture from a text.	I can use the sentence frame, "I notice…" to describe a specific detail I see in an illustration.	I can explain how a detail I noticed in the pictures helps me understand a specific word or event in the story.
LT 2 CELP 2	I can echo read the Essential Question by repeating the words the teacher says while pointing to the text.	During a Socratic seminar, I can use a sentence starter to agree or disagree with a classmate's idea about the story.	I can use a talking chip to share one idea on how the librarian makes reading fun during a small-group discussion.
LT 3 CELP 3	I can communicate an idea about a story by drawing a picture.	I can write a complete sentence to explain the essential meaning or a lesson I learned from the book.	I can use a combination of drawings and a complete sentence to identify an animal and what it likes to read.
LT 4 CELP 10	I can find a word on the Word Wall by looking for its matching picture.	I can use domain-specific art vocabulary, such as color, shape, or line, to describe how a painting tells a story.	I can use the word "knowledge" in a sentence to tell my partner one thing I learned from the text.

Lesson Sequence	**Learning Target**	**Success Criteria/ Assessment**	**Resources**
1	I can make observations about a text.	I used sentence frames to make observations about a text.	*Wild about Books* WW_Nat_GK2_M0_L01_...
2	I can make observations about a text.	I can show how my character changes to demonstrate a key event in a text.	*Wild about Books*

3	I can identify how words and pictures work together to communicate key details and meaning.	I used evidence from the pictures and words to explain what is happening in the text.	*Wild about Books*
4	I can determine the essential meaning of a text. I can explain how a character's actions impact others in a text.	I explained that the essential meaning of *Wild about Books* is that books are for everyone and used details to support my thinking.	*Wild about Books*
5	I can discuss how a text builds our knowledge. I can improve my writing by responding to peer feedback.	I participated in a Socratic Seminar to share my ideas and listen to my classmates.	*Wild about Books*
6	I can describe how an artist uses color and shape to tell a story in a painting.	I explained how an artist uses colors and shapes to tell a story in a painting.	*I and the Village* WW_Nat_GK2_M0_Obse...

Fundations			
Wit & Wisdom Lessons	**Fundations Lessons**	**Lesson Targets**	**Success Criteria**
Lessons 1-6	Orientation Unit, Days 1-5	I can use my tools to help me recognize letters and sounds in order to say, read, and write them.	With and without prompting, I can recognize taught letters and sounds. I can use proper pencil grip and scaffolds (Fundations lines) to form letters. With adult support, I can track text with one-to-one correspondence. I can act out a part of a story or draw a picture.
Heggerty			
Week 1/2 (Sessions 1-6)	**Sound Awareness Foundations ~ 45 sessions** **Learning Targets:** • I can hear and repeat words that rhyme. • I can isolate the initial and final sounds in a spoken word. • I can blend two small words into a spoken compound word. • I can segment a spoken compound word into two smaller words. • I can manipulate words by adding, deleting, and substituting a part of a compound word to make a new word.	**Sound Awareness Foundations ~ 45 sessions Success Criteria:** *Identifying the first sound* • I listened carefully to the whole word. • I held the first sound in my mind • I said only the first sound I heard *Identifying the last sound* • I listened to the whole word. • I let the word finish and held the ending sound. • I said only the last sound I heard. *Blending compound words* • I listened to both separate words. • I put the two words together in my head. • I said the new compound word. *Blending & counting syllables*	

		• I listened to the syllable chunks. • I used my choppers to feel each part. • I blended the parts and said the whole word. • I counted how many claps I made. *Recognizing rhyming words* • I listened to both words all the way through. • I compared the middle and ending sounds. • I showed thumbs up if they matched, thumbs down if they didn't. *Letter names & sounds* • I looked at the letter card. • I said the letter name. • I said the sound that letter makes.

Module 1: The Five Senses

Relevant Standards: Bold indicates priority

See above.

Essential Question(s):

How do our senses help us learn?

Enduring Understanding(s):

Students in Kindergarten will understand the following concepts as a result of this module:

- We have five senses: smell, taste, touch, hearing, and sight.
- Our senses take in information and make us aware of the world around us.
- People use their senses to learn about the world and to learn from books.
- Details in illustration, speech, and text provide more information for readers.
- Words and illustrations work together to tell a story and present information.

Demonstration of Learning:

Students may demonstrate their learning within this unit in a variety of ways. At the end of this module, students will craft a narrative text about how the five senses helped a character and themselves learn about the world . In addition, students will participate in a socratic seminar and participate in several assessments throughout the unit such as vocabulary and “New Read” assessments demonstrating their comprehension skills on new texts

Pacing for Unit

40 school days

Family Overview (link below)

WW_GK_M1_FamilyTipSheet_English.pdf
WW_GK_M1_FamilyTipSheet_Spanish.pdf

Integration of Technology:

Videos and digital visual art displays are listed below.

Unit-specific Vocabulary:

Content Vocabulary

city	shadow	piano
garbage	Fire engine	rabbit
bananas	perfume	medicine

Aligned Unit Materials, Resources, and Technology (beyond core resources):

Module 1-Teacher Edition- Lessons 1-5
Module 1-Teacher Edition- Lessons 6-10
Module 1-Teacher Edition- Lessons 11-16
Module 1-Teacher Edition- Lessons 17-22
Module 1-Teacher Edition- Lessons 23-28
Module 1-Teacher Edition- Lessons 29-31
Fundations Unit 1
Heggerty

coin	knit	freedom
trick	palm	tuning
curlers	curb	rhythm
graffiti	witness	Soup kitchen
familiar	wipers	freckled
duck	daydream	tangled
knotted	stooped	greet
art	folks	boom

Academic Vocabulary

senses	notice	wonder
tableaux	reveal	author
respond	prompt	Essential meaning
enjoy	learn	whenever
whatever	every	aware
adjectives	Socratic seminar	enough
alphabet	preposition	checklist

Core Texts

- *My Five Senses,* Aliki
- *My Five Senses,* Margaret Miller
- *Rap a Tap Tap,* Leo Dillon and Diane Dillon
- *Chicka Chicka Boom Boom,* Bill Martin Jr. and John Archambault
- *Last Stop on Market Street,* Matt de la Peña

Supplementary Texts

- "Great Depression," Children's Encyclopedia
- "The Harlem Renaissance," Britannica Kids

Multimedia

- *Flower Day,* Diego Rivera
- *Le Gourmet*, Pablo Picasso
- "Bojangles Step Dance"
- "Eight-Year Old Tap Prodigy Little Luke"

Opportunities for Interdisciplinary Connections:

Science: This module directly teaches students about the anatomy and functions of the five senses, fostering early scientific inquiry and observation skills. It introduces the idea that our senses help us make sense of the world, and it explores sensory adaptation and environmental interactions.

Social Studies: This module connects to social studies by discussing how senses are involved in social interactions, how they help us navigate our communities, and how different cultures use sensory experiences. Additionally, it may touch on how community helpers rely on their senses in their work.

Anticipated misconceptions:

Students may have misconceptions of:

- The differences between the five senses.
- Being able to use more than one sense at a time.
- All people experience the same sensory stimuli in the same way.
- My senses always work the same way all the time.
- Touching can only be done with the hands.
- I can only taste with my mouth.

Social Emotional Learning: This module not only introduces foundational science concepts but also promotes essential social-emotional skills. By reflecting on their own sensory experiences, students develop self-awareness and begin to recognize the connection between their senses and emotions. Activities that focus on regulating sensory input foster self-regulation skills, while group work and discussions encourage social awareness and the development of relationship skills. Through these activities, students learn to empathize with others, share their experiences, and collaborate effectively, all of which are key elements of social-emotional learning. **Art:** This module deeply explores how our senses make us aware of the world, utilizing core texts like Aliki's *My Five Senses* alongside masterpieces like Diego Rivera's *Flower Day* and Pablo Picasso's *Le Gourmet*. To maximize interdisciplinary art opportunities, teachers can introduce a "Sensory Texture Rubbing and Paint-Resist" project. Students can use their sense of touch to explore various textured surfaces (such as burlap, corrugated cardboard, or leaves), capturing these textures on paper using the side of a wax crayon. Afterward, they can brush a watercolor wash over the top to reveal the patterns, mirroring the concept of "revealing" details as discussed in their academic vocabulary. This project beautifully bridges scientific inquiry regarding touch and environmental interaction with artistic expression through texture, color blending, and contrast.	
Connections to Prior Units:	**Connections to Future Units:**
In Module 0, students learn the routines and procedures for building knowledge through a variety of texts. In Module 1, this is furthered and deepened through an extensive study of how the five senses impact our daily lives.	In Kindergarten, Module 1 on The Five Senses, there are many potential connections that can be made to future lessons. These connections help students build a foundation for understanding the world around them and expand on this knowledge as they progress. By connecting sensory exploration to a variety of subjects, you help students build an interconnected understanding of the world, making future learning more meaningful and engaging.
Differentiation through *Universal Design for Learning*	
UDL Indicator & Teacher Actions:	
Engagement • Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class. • Allow students to choose which sense they want to focus on for their personal reflections or which part of	

the text they want to illustrate.

- During the Socratic Seminar, provide "response cards," so students can choose how to participate- either by speaking, holding up a card, or using a gesture.

Representation

- Use echo reading for the Essential and Focusing Questions, providing a clear vocal model and physical tracking of the text to help students connect spoken words to print.
- Include tactile objects to support student learning around their senses. For example, in *My Five Senses*, offer actual objects to touch (sandpaper, silk), smell (cinnamon, lavender), or taste (pretzels, lemons) while reading.
- Create a sensory word wall with physical objects attached next to the words (e.g., the word buzzy next to a picture of a bee).

Action & Expression

- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.

Supporting Multilingual/English Learners

Related *CELP standards* and differentiated Learning Targets:

Standards	**Emerging**	**Expanding**	**Bridging**
LT 1 CELP 1	I can use illustrations to identify the main topic of a book about the senses.	I can ask "who" and "what" questions about the text using key details.	I can use both the text and illustrations to explain a complex idea from the book.
LT 2 CELP 2	I can use gestures and single words to participate in a sensory "Notice and Wonder" discussion.	I can contribute to a group discussion by using short phrases and taking turns.	I can sustain a conversation by responding to my partner's ideas during a Socratic Seminar.
LT 3 CELP 3	I can draw a picture and dictate a label to show how a character uses a sense.	I can use a sentence frame (e.g., "CJ sees...") to describe a character's sensory experience.	I can write a complete sentence and draw a detailed picture to explain a text-based idea.
LT 4 CELP 8	I can point to a picture to show I understand a sensory word (E.g., "buzzy," "stinky").	I can ask a question when I encounter an unknown word in the text.	I can use context clues from the illustrations to explain what a new word means.
LT 5 CELP 10	I can use basic nouns (eye, ear, hand) and verbs (see, hear, touch) to communicate.	I can produce a sentence that includes a subject and a verb (e.g., "The bell rings."	I can expand my sentences by adding "where" or "how" details (e.g., "The bell rings loudly at the school.")

Lesson Sequence	**Learning Targets**	**Success Criteria**	**Resources**
Focusing Question 1: Lessons 1-5 **What are our five senses?**			
1	**Content Learning Target:** I can identify the five senses. **Literacy Learning Target:** I can use what I notice about text features (front cover, back cover, title page, pictures) to make observations and ask questions about a text.	• I can point to and name the front cover, back cover, and title page of a book. • I can share something I notice in the pictures. • I can ask a question that starts with who, what, where, when, why, or how. • I can draw or dictate something I notice in my Response Journal.	*My Five Senses,* Margaret Miller Lesson 1 Materials
2	**Content Learning Target:** I can identify the five senses. **Literacy Learning Target:** I can identify the main topic and key details of a section of text by acting out and talking about what I read.	• I can name a key detail from the book using a sentence frame. • I can act out a scene using my senses (see, hear, smell, taste, touch). • I can read with a partner and take turns. • I can organize my drawing and labels in my Response Journal.	*My Five Senses,* Margaret Miller World Map *Le Gourmet*, Pablo Picasso Lesson 2 Materials

3	**Content Learning Target:** I can identify the five senses. **Literacy Learning Target:** I can use the words and pictures together to communicate key details about a text.	• I can point to a picture and tell what I see. • I can match the words to what is happening in the picture. • I can talk about how the colors in a picture make me feel. • I can answer a question with information from the book.	*My Five Senses,* Margaret Miller *Le Gourmet*, Pablo Picasso Lesson 3 Materials
4	**Content Learning Target:** I can identify the five senses. **Literacy Learning Target:** I can use the words and pictures in a text to find the most important idea.	• I can use the pictures and words to share the big idea of the book. • I can answer a Text-Dependent Question with a complete sentence frame. • I can begin my Focusing Question Task by responding to the prompt. • I can use a new sensory word to describe something.	*My Five Senses,* Margaret Miller *Le Gourmet*, Pablo Picasso Lesson Materials *Handout 4A should be saved and used for later lessons.
5 ✔FQT	**Content Learning Target:** I can identify the five senses. **Literacy Learning Target:** I can show what I learned from a book by responding to a prompt with words and pictures.	• I can name all five senses (see, hear, smell, taste, touch). • I can match a body part to its sense (e.g.--nose to smell) • I can finish my Focusing Question Task with a drawing and dictation. • I can add something I learned to our class Knowledge Journal.	*My Five Senses,* Margaret Miller *Le Gourmet*, Pablo Picasso Lesson Materials

Focusing Question 2: Lessons 6-10
How do people use their senses to learn about the world?

6	**Content Learning Target:** I can explain how my senses help me gather information. **Literacy Learning Target:** I can ask questions about a text using question words from the Wonder Wheel.	• I can share an observation about the pictures or words. • I can ask a question using a who, what, where, when, why, or how word • I can listen carefully when one person is speaking. • I can take turns talking with a partner.	*My Five Senses,* Aliki Lesson Materials
7	**Content Learning Target:** I can explain how my senses help me gather information. **Literacy Learning Target:** I can ask questions about a text using question words from the Wonder Wheel.	• I can identify the main topic and a key detail. • I can point to a place in the book that shows my answer. • I can use one voice at a time when we talk as a class. • I can answer a classmate's question with evidence from the text.	*My Five Senses,* Aliki Lesson Materials
8	**Content Learning Target:** I can explain how my senses help me gather information. **Literacy Learning Target:** I can show how words and pictures work together to tell about a topic.	• I can annotate (mark up) a picture to show what I notice. • I can use a sentence frame with text evidence to answer a question. • I can match a word in the text to a detail in the picture. • I can describe something using a sense word (like	*My Five Senses,* Aliki Lesson Materials

		soft, loud, sweet).	
9 ✔FQT	**Content Learning Target:** I can explain how my senses help me gather information. **Literacy Learning Target:** I can use the pictures and words to find the most important idea of a text.	• I can share an example of how a sense helps us learn. • I can complete Focusing Question Task 2 with a drawing and dictation. • I can label the front cover, back cover, and title page of a book. • I can read aloud in a group with fluency.	*My Five Senses,* Aliki Lesson Materials
10	**Content Learning Target:** I can explain how my senses help me gather information. **Literacy Learning Target:** I can use text evidence to express what I learned from a book.	• I can share an example of how a sense helps us learn. • I can complete Focusing Question Task 2 with a drawing and dictation. • I can label the front cover, back cover, and title page of a book. • I can read aloud in a group with fluency.	*My Five Senses,* Aliki *My Five Senses,* Margaret Miller Lesson Materials
Focusing Question 3: Lessons 11-16 **How does CJ use his senses to learn about the world in *Last Stop on Market Street?***			
11	**Content Learning Target:** I can use details from words and pictures to describe how a character uses their senses. **Literacy Learning Target:** I can listen with all my senses to a text and ask questions about what I notice.	• I can share an observation from a Question Corner. • I can ask a question using a question word. • I can explain what it means to listen with my senses. • I can read with fluency (smooth voice).	*Last Stop on Market Street,* Matt de Peña Lesson Materials

12	**Content Learning Target:** I can use details from words and pictures to describe how a character uses their senses. **Literacy Learning Target:** I can use my senses (eyes and ears) to listen carefully and identify key events in a story.	• I can name a key event from the beginning, middle, and end. • I can retell the story in order. • I can listen with my senses while my partner reads. • I can tell why adding details helps me understand a story.	*Last Stop on Market Street,* Matt de Peña Lesson Materials
13	**Content Learning Target:** I can use details from words and pictures to describe how a character uses their senses. **Literacy Learning Target:** I can use the words and pictures in a story to answer questions about a character.	• I can name a sense CJ is using and show where in the book. • I can collect evidence for my Focusing Question Task. • I can add a detail to my Response Journal drawing. • I can use sensory words to describe what CJ notices.	*Last Stop on Market Street,* Matt de Peña Lesson Materials
14	**Content Learning Target:** I can use details from words and pictures to describe how a character uses their senses. **Literacy Learning Target:** I can interpret descriptive words (action verbs and sense words) to learn more about a character.	• I can find a strong action word or describing word in the text. • I can act out a descriptive word from the book. • I can add a new detail to the Evidence Organizer Chart. • I can add a detail to my Response Journal drawing using the text.	*Last Stop on Market Street,* Matt de Peña Lesson Materials
15 ✔FQT	**Content Learning Target:**	• I can name something beautiful CJ might have missed at first.	*Last Stop on Market Street,* Matt de Peña

	I can use details from words and pictures to describe how a character uses their senses. **Literacy Learning Target:** I can use the words and pictures to find the most important idea of a story.	• I can answer a Text-Dependent Question with a sentence. • I can begin my Focusing Question Task 3 with details. • I can add to the class Graffiti Wall.	Lesson Materials
16 ✔VOC	**Content Learning Target:** I can use details from words and pictures to describe how a character uses their senses. **Literacy Learning Target:** I can speak one voice at a time and use formal language to share my ideas in a Socratic Seminar.	• I can use formal language (school voice) when I share an idea. • I can take a turn in a Socratic Seminar. • I can complete Focusing Question Task 3 with details. • I can add what I learned to our class Knowledge Journal.	*Last Stop on Market Street,* Matt de Peña Lesson Materials
Focusing Question 4: Lessons 17-22 **How do our senses help us learn from *Chicka Chicka Boom Boom?***			
17	**Content Learning Target:** I can use my senses to help me learn from a story. **Literacy Learning Target:** I can use the Wonder Wheel question words to share observations and ask questions about a text or picture.	• I can share what I notice about the painting Flower Day. • I can ask a question using a Wonder Wheel question word. • I can help label details from Flower Day during shared writing. • I can hear the first sound in a word.	*Chicka Chicka Boom Boom,* Bill Martin Jr., and John Archambault *Flower Day,* Diego Rivera Lesson Materials
18	**Content Learning Target:** I can use my senses to help me learn	• I can share what I notice about the painting Flower Day.	*Chicka Chicka Boom Boom,* Bill Martin Jr., and John Archambault

	from a story. **Literacy Learning Target:** I can label a picture using the first letter sound I hear.	• I can ask a question using a Wonder Wheel question word. • I can help label details from Flower Day during shared writing. • I can hear the first sound in a word.	*Flower Day,* Diego Rivera Lesson Materials
19	**Content Learning Target:** I can use my senses to help me learn from a story. **Literacy Learning Target:** I can use what I read to create an illustration with labels.	• I can draw a picture based on words from the text. • I can label parts of my drawing using initial letter sounds. • I can compare my illustration with the one in the book. • I can describe the colors I see in Flower Day.	*Chicka Chicka Boom Boom,* Bill Martin Jr., and John Archambault *Flower Day,* Diego Rivera *Le Gourmet*, Pablo Picasso Lesson Materials
20	**Content Learning Target:** I can use my senses to help me learn from a story. **Literacy Learning Target:** I can notice when words are repeated and tell why the author used them.	• I can point to a word or phrase that repeats. • I can read a repeated phrase with feeling. • I can collect evidence for my Focusing Question Task 4. • I can find symmetry (a balanced pattern) in Flower Day.	*Chicka Chicka Boom Boom,* Bill Martin Jr., and John Archambault *Flower Day,* Diego Rivera Lesson Materials
21 ✔FQT ✔VOC	**Content Learning Target:** I can use my senses to help me learn from a story. **Literacy Learning Target:** I can notice when words are repeated and tell why the author used them.	• I can share the big idea of Chicka Chicka Boom Boom. • I can answer a Text-Dependent Question with text evidence. • I can begin Focusing Question Task 4 with labels.	*Chicka Chicka Boom Boom,* Bill Martin Jr., and John Archambault Chicka Chicka Boom Boom Alphabet Song *Flower Day,* Diego Rivera Lesson Materials

		• I can use initial letter sounds in my labels.	
22	**Content Learning Target:** I can use my senses to help me learn from a story. **Literacy Learning Target:** I can label a drawing using letters and sounds to add details to my writing.	• I can share the big idea of Chicka Chicka Boom Boom. • I can answer a Text-Dependent Question with text evidence. • I can begin Focusing Question Task 4 with labels. • I can use initial letter sounds in my labels.	*Chicka Chicka Boom Boom,* Bill Martin Jr., and John Archambault *Flower Day,* Diego Rivera Lesson Materials
Focusing Question 5: Lessons 23-28 **How do our senses help us learn from *Rap a Tap Tap?***			
23	**Content Learning Target:** I can explain how our five senses can help us learn. **Literacy Learning Target:** I can ask questions about the key events, details, and words in a text.	• I can share an observation from a Question Corner. • I can ask a question about Rap a Tap Tap. • I can help label a class drawing using initial letter sounds. • I can tell why labeling pictures with letters helps readers.	*Rap a Tap Tap,* Leo and Diane Dillon "Eight-Year-Old Tap Prodigy Little Luke" Lesson Materials
24	**Content Learning Target:** I can explain how our five senses can help us learn. **Literacy Learning Target:** I can use my body and labels to show key details from a text.	• I can name a key detail about Bojangles. • I can act out a scene using a Moving tableaux. • I can label a drawing from the text using initial letter sounds. • I can use context to figure out what a new word means.	*Rap a Tap Tap,* Leo and Diane Dillon "Great Depression," Children's Encyclopedia Lesson Materials

25	**Content Learning Target:** I can explain how our five senses can help us learn. **Literacy Learning Target:** I can use my body and labels to show key details from a text.	• I can answer a Text-Dependent Question about an illustration. • I can share why having good conversations helps us learn. • I can collect evidence for the Focusing Question Task. • I can label a detail in a picture using letters.	*Rap a Tap Tap,* Leo and Diane Dillon "The Harlem Renaissance," Britannica Kids Lesson Materials
26 ✔FQT	**Content Learning Target:** I can explain how our five senses can help us learn. **Literacy Learning Target:** I can use my body and labels to show key details from a text.	• I can find two words that rhyme. • I can point out words that repeat in the text. • I can begin Focusing Question Task 5 using my Evidence Organizer. • I can use a preposition (in, on, under) to tell where something is.	*Rap a Tap Tap,* Leo and Diane Dillon "Bojangles Step Dance" Lesson Materials
27	**Content Learning Target:** I can explain how our five senses can help us learn. **Literacy Learning Target:** I can use the words and pictures to find the most important idea of a text.	• I can share the big idea of Rap a Tap Tap. • I can have a conversation by listening and adding on to a partner's idea. • I can add labels with letters to my Focusing Question Task. • I can answer a Text-Dependent Question.	*Rap a Tap Tap,* Leo and Diane Dillon "Bojangles Step Dance" Lesson Materials
28	**Content Learning Target:** I can explain how our five senses can	• I can complete Focusing Question Task 5.	*Rap a Tap Tap,* Leo and Diane Dillon

	help us learn. **Literacy Learning Target:** I can use labels and complete sentences to share what I learned from a text.	• I can add labels using initial letter sounds. • I can use a preposition to describe where Bojangles is. • I can add what I learned to our class Knowledge Journal.	"Bojangles Step Dance" Lesson Materials
Focusing Question 6: Lessons 29-31 **How do our senses help us learn?**			
29 ✔VOC	**Content Learning Target:** I can share my knowledge about the senses by discussing and writing about them. **Literacy Learning Target:** I can have a conversation in a Socratic Seminar by listening and building on others' ideas.	• I can share an idea about how our senses help us learn. • I can listen and add on to a classmate's idea. • I can use a Module 1 vocabulary word correctly. • I can complete a Vocabulary check.	*My Five Senses,* Aliki *My Five Senses,* Margaret Miller Lesson Materials
30 ✔EOM	**Content Learning Target:** I can share my knowledge about the senses by discussing and writing about them. **Literacy Learning Target:** I can use sensory words, labels, and complete sentences to share what I learned across many texts.	• I can sort our Module 1 texts. • I can begin my End-of-Module Task with a drawing. • I can use complete sentences to share my reflection. • I can use sensory words and labels with initial letter sounds in my work.	All Module Texts Lesson Materials

31 ✔EOM	**Content Learning Target:** I can share my knowledge about the senses by discussing and writing about them. **Literacy Learning Target:** I can finish a book that shows what I learned from many texts, using complete sentences and labels.	• I can sort our Module 1 texts. • I can begin my End-of-Module Task with a drawing. • I can use complete sentences to share my reflection. • I can use sensory words and labels with initial letter sounds in my work.	All Module Texts Lesson Materials Mid-Unit Fundations Checkup

Fundations

As part of Module 1, students will be instructed using Fundations Level K, Unit 1. This unit must be well-paced and not rushed or condensed, as it lays the foundations for later phonics instruction.

Teachers should consider beginning-of-year benchmark assessments, such as DIBELS Letter Naming Fluency (LNF), to determine students' prior knowledge. By the end of Module 1, you will be completing the Fundations Mid-Unit Checkup and determining if intervention is required. Teachers may consider implementing formative assessment checks every 1-2 weeks to determine mastery of taught letters. 80% of students should master when advancing instruction.

Fundations Lessons	**Lesson Targets**	**Success Criteria**
Unit 1, Week 1- Unit 1, Week 6 Mid-Unit Fundations Checkup	I can identify, say, and write the lowercase letters *t, b, f, n, m, i, u, c, o, a, g, and d, s.* I can segment words in an oral sentence. I can recognize the components of a sentence (Capital letter at the beginning and end punctuation). I can recognize that sentences are made up of different words. I can retell parts of a story.	With and without prompting, I can recognize taught letters and sounds. I can use proper pencil grip and scaffolds (Fundations lines) to form letters. With adult support, I can track text with one-to-one correspondence. I can act out a part of a story or draw a picture.

Heggerty	
Sound Awareness Foundations ~ 45 sessions **Learning Targets:** • I can hear and repeat words that rhyme. • I can isolate the initial and final sounds in a spoken word. • I can blend two small words into a spoken compound word. • I can segment a spoken compound word into two smaller words. • I can manipulate words by adding, deleting, and substituting a part of a compound word to make a new word.	**Sound Awareness Foundations ~ 45 sessions** **Success Criteria:** ***Identifying the first sound*** • I listened carefully to the whole word. • I held the first sound in my mind • I said only the first sound I heard ***Identifying the last sound*** • I listened to the whole word. • I let the word finish and held the ending sound. • I said only the last sound I heard. ***Blending compound words*** • I listened to both separate words. • I put the two words together in my head. • I said the new compound word. ***Blending & counting syllables*** • I listened to the syllable chunks. • I used my choppers to feel each part. • I blended the parts and said the whole word. • I counted how many claps I made. ***Recognizing rhyming words*** • I listened to both words all the way through. • I compared the middle and ending sounds. • I showed thumbs up if they matched, thumbs down if they didn't. ***Letter names & sounds*** • I looked at the letter card. • I said the letter name. • I said the sound that letter makes.

Module 2: Once Upon a Farm

Relevant Standards: Bold indicates priority

See above.

Essential Question(s):

What makes a good story?

Enduring Understanding(s):

Students in Kindergarten will understand the following concepts as a result of this module:
- Authors of informational texts teach us about real life through their books.
- Authors of narrative texts use their imaginations to tell fictional stories that entertain and teach us.
- In real life, farm animals live on farms and help people in different ways.
- Life on a farm and the animals' behavior change with the seasons.
- Informational texts and fictional stories are structurally different. Fictional stories have characters, setting, problems, and resolutions Informational texts tell facts about a topic.

Demonstration of Learning

Students may demonstrate their learning within this unit in a variety of ways. At the end of this module, students will craft a narrative text featuring a farm animal they learned about throughout the module. In addition, students will participate in a socratic seminar and participate in several assessments throughout the unit such as vocabulary and "New Read" assessments demonstrating their comprehension skills in new texts.

Pacing for Unit

40 school days

Family Overview (link below)

WW_GK_M2_FamilyTipSheet_English.pdf
WW_GK_M2_FamilyTipSheet_Spanish.pdf

Integration of Technology:

Videos and digital visual art displays are listed below.

Unit-specific Vocabulary:

Content Vocabulary

farm	thresh	knead

Aligned Unit Materials, Resources, and Technology (beyond core resources):

WW_Nat_GK_M2_TE_Lesson01-06_v2.pdf
WW_Nat_GK_M2_TE_Lesson07-12_v2.pdf
WW_Nat_GK_M2_TE_Lesson13-17_v2.pdf
WW_Nat_GK_M2_TE_Lesson18-23_v2.pdf
WW_Nat_GK_M2_TE_Lesson24-28_v2.pdf

roar	meadow	valley
Winter	spring	summer
autumn	Lazy	playful
smartest	thresh	trip
trap	roar	tiny
heavy	loud	meadow
valley	content	jam

Academic Vocabulary

roll	scratch	leap
sneak	strut	gallop
waddle	rise	lurk
creep	snip	chop
lazy	playful	smartest
simplest	safe	tiny
heavy	loud	greedy
neighbors		

WW_Nat_GK_M2_TE_Lesson29-32_v2.pdf
Fundations Unit 1
Heggerty

Core Texts

- *Farm Animals,* Wade Cooper
- *The Year at Maple Hill Farm,* Alice and Martin Provensen
- *The Little Red Hen,* Jerry Pinkney
- *The Three Billy Goats Gruff,* Paul Galdone
- *Three Little Pigs,* (adaptation)- Raina Moore

Supplementary Texts

- “Morning is Come” BBC Publications

Multimedia

- *American Gothic,* Grant Wood
- *The Cornell Farm,* Edward Hicks
- “Old McDonald Had a Farm”
- “Making Bread” PBS Kids
- “Seasons Song” Have Fun Teaching

Opportunities for Interdisciplinary Connections:	Anticipated misconceptions:
Science: Students explore the natural world by investigating the characteristics of real farm animals and how they differ from fictional characters. The curriculum integrates Earth Science concepts as students study the changing seasons, observing weather patterns like “cold and windy snowstorms” or “hot and sunny days” impact the farm environment and the behavior of its inhabitants Additionally, students learn to categorize types of weather and understand the rhythmic cycle of the year. **Social Studies:** The lessons emphasize emotional awareness and social dynamics by asking students to identify and act out character traits such as being "lazy," "playful," or "strong" . Students practice empathy and perspective-taking by discussing how	• Distinguish between the human-like behaviors of characters in fables (like the *Little Red Hen* talking or the *Three Little Pigs* building houses) and the biological realities of farm animals. • Students might believe that weather patterns are absolute and unchanging based on the calendar (e.g., "it only snows in winter" or "it is always hot in summer"). • When analyzing fine art like *American Gothic* or stylized illustrations, students may misinterpret the artist's use of expression or symbolism.

characters feel in different settings and evaluating the fairness of a character's decisions, such as whether the Little Red Hen should have shared her bread . Collaborative activities like "Mix and Mingle" and "Think-Pair-Share" further develop their communication and active listening skills **Social Emotional Learning:** Students gain an understanding of community and labor by examining the roles and responsibilities of farmers and the animals that help them . By analyzing artwork like Grant Wood's *American Gothic*, they explore historical perspectives on farm life and the idea that "farmers are sad but strong" . The curriculum also touches on basic economic concepts through discussions about the value of work and the "essential meaning" of stories that reflect societal values. **Art:** Centered around the topic of studying farms, Module 2 provides an excellent opportunity to bridge science, literacy, and the visual arts through three-dimensional modeling or farm landscape painting. Students can learn basic printmaking techniques, using sliced vegetables (like potatoes, celery, or apples) dipped in tempera paint to stamp and construct farm scenes, animals, and crops. Alternatively, they can use clay or playdough to sculpt farm animals, reinforcing their spatial awareness and understanding of animal physical traits. By creating their own farmyard artwork, students visually represent the settings and characters they encounter in their texts, helping them synthesize their growing knowledge of agricultural life and ecosystems while practicing fine motor coordination.	
Connections to Prior Units:	**Connections to Future Units:**
In Module 2, students continue building their knowledge and skills of applying decoding skills and focusing on a blend of narrative and informational texts. Students build on their writing skills by crafting a narrative using information they learn about farm animals.	This unit is focused on narrative types of writing–part of a cycle structure throughout the Wit & Wisdom curricular resource. Students will leverage skills taught in this unit in later units with different genres of text.

Differentiation through *Universal Design for Learning*

UDL Indicator & Teacher Actions:

Engagement
- Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class.
- Connect the study of farm animals to students' own lives by having them bring a photo or drawing of a "job" they do at home (e.g, feeding a pet, cleaning up toys).

- During the Socratic Seminar, provide “response cards,” so students can choose how to participate- either by speaking, holding up a card, or using a gesture.

Representation

- Use echo reading for the Essential and Focusing Questions, providing a clear vocal model and physical tracking of the text to help students connect spoken words to print.
- Provide a visual storyboard or a set of “Seasons cards” that students can hold up as they hear specific weather words or seasonal changes mentioned in the lyrics of the “The Seasons Song” or “Morning is Come” throughout the unit.
- Create a sensory word wall with physical objects attached next to the words..

Action & Expression

- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.

Supporting Multilingual/English Learners

Related *CELP standards* and differentiated Learning Targets:

Standards	**Emerging**	**Expanding**	**Bridging**
LT 1 CELP 1	I can identify a few key words or attributes of farm animals from a read-aloud using pictures.	I can identify the main topic of a text and retell one or two key details about what a real farm animal does.	I can retell a story or informational text about a farm in order, including key details and the main idea with prompting and support.
LT 2 CELP 2	I can respond to questions about character traits with prompting and support.	I can participate in “Think-Pair-Share” by using short phrases to express an opinion about a character’s actions with prompting and support.	I can participate in extended conversations, asking and answering questions to clarify why a character made a specific choice with prompting and support.
LT 3 CELP 3	I can draw a picture and dictate a label of a farm setting using single words or initial sounds learned from the alphabet strip with prompting and support.	I can dictate or write a short sentence using a preposition to describe where an animal is with prompting and support.	I can write a complete sentence and that uses several descriptive words to explain a farm setting with prompting and support.

Lesson Sequence	Learning Target	Success Criteria/ Assessment	Resources
Focusing Question 1: Lessons 1-6 **What is true about real farm animals?**			
1	**Content Learning Target:** I can explain what makes a good story. **Literacy Learning Target:** I can ask questions about a story using many question words.	• I can share what I noticed about the pictures or the words. • I can use a question word (who, what, where, when, why, how) to ask a question. • I can use the Question Cube to ask a new kind of question. • I can join a Gallery Walk and notice things about Module 2 books.	*The Three Little Pigs* Lesson Materials
2	**Content Learning Target:** I can identify facts about real farm animals. **Literacy Learning Target:** I can ask questions and share observations about key details in an informational book.	• I can share an observation about a key detail in the book. • I can ask a question using the Question Cube. • I can tell why a strong voice helps people hear me. • I can practice reading aloud with a strong voice.	*The Three Little Pigs* *Farm Animals* Lesson Materials
3	**Content Learning Target:** I can identify facts about real farm animals. **Literacy Learning Target:** I can identify the main topic and retell key details from sections of an informational text.	• I can name the main topic of a section. • I can retell a key detail from the text. • I can collect evidence for my Focusing Question Task.	*Farm Animals* Lesson Materials

		• I can read aloud using a strong voice.	
4	**Content Learning Target:** I can identify facts about real farm animals. **Literacy Learning Target:** I can use illustrations and words together to find factual information in a text.	• I can answer a Text-Dependent Question about a real farm animal. • I can match a picture with a fact in the text. • I can rehearse a sentence for my Focusing Question Task using a strong voice. • I can collect new evidence on the Evidence Organizer.	*Farm Animals* Lesson Materials
5 ✔FQT	**Content Learning Target:** I can identify facts about real farm animals. **Literacy Learning Target:**. I can use the words and illustrations to find the most important idea in an informational text.	• I can share the big idea of Farm Animals. • I can think about the author's purpose for writing the book. • I can rehearse a complete sentence for Focusing Question Task 1. • I can begin my Focusing Question Task with a drawing and a fact.	*Farm Animals* Lesson Materials

6	**Content Learning Target:** I can identify facts about real farm animals. **Literacy Learning Target:** I can use a strong voice and complete sentences to express what I learned from a text.	• I can complete Focusing Question Task 1. • I can present my work using a strong voice. • I can use the alphabet strip to help me spell. • I can add what I learned to our class Knowledge Journal.	*Farm Animals* Lesson Materials
Focusing Question 2: Lessons 7-12 **How do authors create settings?**			
7	**Content Learning Target:** I can ask and answer questions about *The Year at Maple Hill Farm.* **Literacy Skills Learning Target:** I can ask questions about a new book using question words from the Question Cube.	• I can share an observation about the pictures or words. • I can ask a question using the Question Cube. • I can draw and label what I noticed in my Response Journal. • I can read aloud with fluency.	*The Year at Maple Hill Farm* "The Seasons Song" Lesson Materials
8	**Content Learning Target:** I can ask and answer questions about *The Year at Maple Hill Farm.* **Literacy Skills Learning Target:** I can identify key details for a given main topic in an informational text.	• I can share an observation about the pictures or words. • I can ask a question using the Question Cube. • I can draw and label what I noticed in my Response Journal. • I can read aloud with fluency.	*The Year at Maple Hill Farm* "The Seasons Song" Lesson Materials

9	**Content Learning Target:** I can ask and answer questions about *The Year at Maple Hill Farm.* **Literacy Skills Learning Target:** I can identify the setting of a text by using words and illustrations.	• I can name a key detail from a section. • I can identify the setting in a part of the book. • I can describe what season is shown in a picture. • I can use a vocabulary word to describe the farm.	*The Year at Maple Hill Farm* *The Cornell Farm* Lesson Materials
10	**Content Learning Target:** I can ask and answer questions about *The Year at Maple Hill Farm.* **Literacy Skills Learning Target:** I can expand a sentence by adding a prepositional phrase that tells where or when.	• I can add evidence to my Evidence Organizer. • I can expand a simple sentence by telling where or when. • I can describe the colors and repetition I see in The Cornell Farm. • I can collect evidence for the Focusing Question Task.	*The Year at Maple Hill Farm* *The Cornell Farm* Lesson Materials

11 ✔FQT	**Content Learning Target:** I can ask and answer questions about *The Year at Maple Hill Farm.* **Literacy Skills Learning Target:** I can use the words and pictures to find the most important idea about a setting.	• I can answer a Text-Dependent Question about the seasons. • I can sort pictures of the farm by season. • I can begin Focusing Question Task 2 with an expanded sentence. • I can interpret the essential meaning of The Cornell Farm.	*The Year at Maple Hill Farm* *The Cornell Farm* Lesson Materials
12	**Content Learning Target:** I can ask and answer questions about *The Year at Maple Hill Farm.* **Literacy Skills Learning Target:** I can use expanded sentences (with prepositional phrases) to write about a setting.	• I can complete Focusing Question Task 2. • I can act out a season from the book. • I can use a preposition (in, on, under, after) to expand my sentence. • I can share my work using a strong voice.	*The Year at Maple Hill Farm* *The Cornell Farm* Lesson Materials

Focusing Question 3: Lessons 13-17
How do authors create characters?

13	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can use Story Stones to track the characters in a story.	• I can name each character in Three Little Pigs. • I can record the characters in my Response Journal. • I can act out a character trait and give a real-life example. • I can tell why describing a character helps a story.	*The Three Little Pigs* "Old McDonald Had a Farm" Lesson Materials
14	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can use adjectives and text evidence to describe a character.	• I can use Story Stones to label the settings. • I can describe Mother Pig in a sentence with an adjective. • I can write and illustrate a sentence about a character. • I can use a resource (alphabet strip) to help me spell a word.	*The Three Little Pigs* *American Gothic* "Old McDonald Had a Farm" Lesson Materials

15	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can use adjectives and text evidence to describe a character.	• I can name an adjective that describes a character. • I can act out a character from the story. • I can describe a character in American Gothic. • I can collect evidence for the Focusing Question Task.	*The Three Little Pigs* *American Gothic* "Old McDonald Had a Farm" Lesson Materials
16 ✔FQT	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can compare and contrast two characters in a story.	• I can compare two pigs in the story. • I can share the big idea of Three Little Pigs. • I can interpret the essential meaning of American Gothic. • I can begin Focusing Question Task 3 with a character description.	*The Three Little Pigs* *American Gothic* "Old McDonald Had a Farm" Lesson Materials
17	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can describe a character using complete sentences and details from the text.	• I can complete Focusing Question Task 3. • I can tell the difference between hearing and active listening. • I can use adjectives in my character description. • I can add what I learned to our class Knowledge Journal.	*The Three Little Pigs* *American Gothic* "Old McDonald Had a Farm" Lesson Materials

Focusing Question 4: Lessons 18-23 **How do authors create problems and resolutions?**			
18 ✔NR	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can identify the characters and setting in a new story.	• I can complete New-Read Assessment 1. • I can share an observation about the characters or setting. • I can ask a question using a question word. • I can record observations in my Response Journal.	“Morning is Come” *The Little Red Hen* Lesson Materials
19	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can write about characters and a setting to begin a narrative story.	• I can name and describe a character in the story. • I can act out part of the story. • I can begin writing a class narrative with characters and a setting. • I can show the meaning of action words like cut, snip, and chop.	“Morning is Come” *The Little Red Hen* Lesson Materials
20	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can write a problem for a narrative story.	• I can name the problem in the story. • I can name the resolution in the story. • I can write a problem for our class narrative. • I can show I am actively listening to a partner.	“Morning is Come” *The Little Red Hen* *The Year at Maple Hill Farm* Lesson Materials

21	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can write a resolution for a narrative story.	• I can find lines that repeat in the story. • I can act out a repeated line with feeling. • I can create a resolution for our class narrative. • I can name the problem and resolution in Three Little Pigs.	“Morning is Come” *The Little Red Hen* *The Three Little Pigs* Lesson Materials
22 ✔FQT ✔VOC	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can write a new problem for a character to show I understand problems and resolutions.	• I can answer a Text-Dependent Question about the story. • I can retell the story in order. • I can begin Focusing Question Task 4 with a new problem for the hen. • I can use sight words I know in my writing.	“Morning is Come” “Making Bread” *The Little Red Hen* Lesson Materials
23	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can use active listening in a Socratic Seminar to share ideas about characters.	• I can take a turn in a Socratic Seminar. • I can listen carefully and add on to a friend's idea. • I can complete Focusing Question Task 4 with a new problem. • I can add what I learned to our class Knowledge Journal.	“Morning is Come” *The Little Red Hen* *The Three Little Pigs* Lesson Materials

Focusing Question 5: Lessons 24-28 **How do authors sequence events?**			
24 ✔NR	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can identify characters, setting, problem, and resolution in a new story.	• I can complete New-Read Assessment 2. • I can listen actively as the text is read. • I can identify the characters and setting. • I can sort story elements (characters, setting, problem, resolution).	*Three Billy Goats Gruff* *Farm Animals* *The Three Little Pigs* Lesson Materials
25	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can tell the difference between a resolution and a response to a problem.	• I can name a response to the problem in the story. • I can tell the difference between a resolution and a response. • I can record a response in my Response Journal. • I can act out part of the story.	*Three Billy Goats Gruff* *The Three Little Pigs* Lesson Materials
26	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can write a response to the problem to add to a narrative story.	• I can put the events of the story in order. • I can find size words (little, medium, big) in the text. • I can write a response to the problem for our class narrative.	*Three Billy Goats Gruff* Lesson Materials

		• I can act out part of the story.	
27 ✔FQT	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can use the events of a story to find its most important idea.	• I can answer a Text-Dependent Question about the story. • I can compare the Troll and the wolf from Three Little Pigs. • I can write two events in order for our class narrative. • I can begin Focusing Question Task 5 with sequenced events.	*Three Billy Goats Gruff* Lesson Materials
28	**Content Learning Target:** I can identify and describe the elements of a story. **Literacy Skills Learning Target:** I can write and illustrate an event in order to add to a story.	• I can complete Focusing Question Task 5. • I can write a second event for the Billy Goats Gruff story. • I can use the text to help me spell content words. • I can share my work using active listening with a partner.	*Three Billy Goats Gruff* Lesson Materials
Focusing Question 6: Lessons 29-32 **What makes a good story?**			

29	**Content Learning Target:** I can explain what makes a good story. **Literacy Skills Learning Target:** I can participate in a Socratic Seminar using active listening to synthesize ideas.	• I can sort our Module 2 texts. • I can share an idea in a Socratic Seminar. • I can listen with my senses and add on to a friend's idea. • I can use a Module 2 vocabulary word correctly.	All module texts Lesson Materials
30 ✔EOM	**Content Learning Target:** I can explain what makes a good story. **Literacy Skills Learning Target:** I can participate in a Socratic Seminar using active listening to synthesize ideas.	• I can complete a Story Map for my EOM Task. • I can name the characters and setting of my story. • I can name a problem and a resolution for my story. • I can verbally rehearse my story with a partner.	All module texts Lesson Materials
31 ✔EOM	**Content Learning Target:** I can explain what makes a good story. **Literacy Skills Learning Target:** I can write a narrative with a problem and a response in the correct order.	• I can verbally rehearse my story with a partner. • I can write and illustrate the problem in my story. • I can write and illustrate a response to the problem.	All module texts Lesson Materials

		• I can use complete sentences to reflect on my writing.	
32 ✔EOM	**Content Learning Target:** I can explain what makes a good story. **Literacy Skills Learning Target:** I can perform a fluent read and share my story with a strong voice.	• I can complete my EOM Task story. • I can perform a fluent read of a favorite passage. • I can share my story with the class using a strong voice. • I can reflect on what I did well in the module.	All module texts Lesson Materials

Fundations

As part of Module 2, students will continue to be instructed using Fundations Level K, Unit 1. This unit must be well-paced and not rushed or condensed, as it lays the foundations for later phonics instruction.

At the start of Module 2, teachers should have administered the Mid-Unit Fundations Checkup to determine if students need additional reteaching of previously taught letters. By the end of Module 2, you will be completing the Fundations Unit 1 Assessment. Teachers may consider implementing formative assessment checks every 1-2 weeks to determine mastery of taught letters. **80% of students should master the unit assessment with a score of 80% or more when determining to advance instruction.**

Fundations Lessons	**Lesson Targets**	**Success Criteria**
Unit 1, Week 7- Unit 1, Week 12	I can identify, say, and write the lowercase letters of the alphabet. I can segment words in an oral sentence. I can recognize the components of a sentence (Capital letter at the beginning and end punctuation). I can recognize that sentences are made up of different words. I can retell parts of a story.	With and without prompting, I can recognize taught letters and sounds. I can use proper pencil grip and scaffolds (Fundations lines) to form letters. With adult support, I can track text with one-to-one correspondence. I can act out a part of a story or draw a picture.
Unit 2– Starts in Module 2, finishes in Module 3.	I can identify, say, and write the uppercase letters of the alphabet. I can blend and read three-sound short vowel or CVC words. I can recognize the components of a sentence (Capital letter at the beginning and end punctuation). I can recognize that sentences are made up of different words. I can retell parts of a story.	With and without prompting, I can recognize taught letters and sounds. I can use proper pencil grip and scaffolds (Fundations lines) to form letters. With adult support, I can track text with one-to-one correspondence. I can act out a part of a story or draw a picture. I can order my letters in alphabetic order.

Heggerty	
Onset-Rime/Early Phoneme Work ~40 sessions Learning Targets: ● I can blend an onset and rime into a word ● I can segment a word into onset and rime ● I can produce a rhyming word when given a word ● I can blend 2–3 phonemes into a spoken word ● I can isolate the medial vowel sound in a CVC word ● I can add or delete a sound to make a new word.	**Onset-Rime/Early Phoneme Work ~40 sessions Success Criteria:** ***Blending onset and rime*** ● I listened to the first sound and the rest of the word. ● I put those two parts together in my head. ● I said the whole word. ***Segmenting onset and rime*** ● I listened to the whole word. ● I pulled off the first sound. ● I said the first sound, then said what was left. ***Producing a rhyming word*** ● I listened to the word and held the middle and ending sounds. ● I kept those sounds the same. ● I changed the first sound to make a new rhyming word. ● I said my new rhyming word. ***Blending 2–3 phonemes*** ● I listened to each sound separately. ● I held all the sounds in order in my head. ● I slid the sounds together and said the word. ***Isolating the medial vowel*** ● I listened and heard the middle sound in the word. ● I let the first and last sounds go. ● I said only the middle sound I heard. ***Adding or deleting a sound*** ● I listened to the word and held it in my head. ● I added the new sound or removed the sound I was told. ● I said the new word that was left.

Module 3: America, Then and Now

Relevant Standards: Bold indicates priority

See above.

Essential Question(s):

How has life in America changed over time?

Enduring Understanding(s):

Students in Kindergarten will understand the following concepts as a result of this module:

- Authors of informational texts teach us information about real life through their books.
- Informational texts have main topics supported by key details that tell readers more about a topic.
- Life at home and life at school in America have changed over time.
- Modes of transportation and communication in America have changed over time.
- Inventions make life easier and help people do things in new ways.

Demonstration of Learning:

Students may demonstrate their learning within this unit in a variety of ways. At the end of this module, students will create a poster about how life has changed in America to present to their classmates. In addition, students will participate in a socratic seminar and participate in several assessments throughout the unit such as vocabulary and "New Read" assessments demonstrating their comprehension skills in new texts.

Pacing for Unit

40 school days.

Family Overview (link below)

WW_GK_M3_FamilyTipSheet_English.pdf
WW_GK_M3_FamilyTipSheet_Spanish.pdf

Integration of Technology:

Videos and digital visual art displays are listed below.

Unit-specific Vocabulary:

Content Vocabulary

photographs	when	Close up
background	enough	change
wave	forever	plural
American flag	event	echo

Aligned Unit Materials, Resources, and Technology (beyond core resources):

WW_Nat_GK_M3_TE_Lesson01-06_v2.pdf
WW_Nat_GK_M3_TE_Lesson07-11_v2.pdf
WW_Nat_GK_M3_TE_Lesson12-17_v2.pdf
WW_Nat_GK_M3_TE_Lesson18-21_v2.pdf
WW_Nat_GK_M3_TE_Lesson22-26_v2.pdf
WW_Nat_GK_M3_TE_Lesson27-30_v2.pdf
Fundations Unit 2-3
Heggerty

Topic statement	Long ago	now
Retell	then	map
illustration	glossary	punctuation
order	old	clean
dirty	young	fill
awake	Long ago	now
then	retell	

Academic Vocabulary

Swimming hole	American flag	Bifocal lens
measure	odometer	device
distance	postal	routes
sanitation	voyage	Grand emblem
City scene	Country scene	burst
transportation	communication	inventions
Little house		

Core Texts

- *Communication Then and Now,* Robin Nelson
- *Home Then and Now,* Robin Nelson
- *Now & Ben: The Modern Inventions of Benjamin Franklin,* Gene Barretta
- *School Then and Now,* Robin Nelson
- *Transportation Then and Now,* Robin Nelson
- *When I Was Young in the Mountains,* Cynthia Rylant
- *The Little House,* Virginia Lee Burton

Supplementary Texts

- "Now We Are Six"- A.A. Milne
- "About Cynthia Rylant"- Cynthia Rylant

Multimedia

- *Washington Crossing the Delaware,* Emanuel Leutze
- "Betsy Ross and the American Flag"
- Old Hand Water Pump, Judson McCranie
- "Then & Now: The Stunning Speed of Urban Development" S.A. Rogers
- "Engine on the Track" Gayle's Preschool Rainbow
- "This Is Your Land" Woody Guthrie
- "You're a Grand Old Flag" George M. Cohan
- "Sounds of a Glass Armonica"- Toronto Star

Opportunities for Interdisciplinary Connections:

Science: Students can explore concepts of growth and transportation by observing the progression of seasons, which helps them describe how living things and the environment change over time. These observations allow students to practice scientific inquiry by asking "what" and "how" questions about the physical world, creating a foundation for understanding the predictable and unpredictable shifts in nature.

Social Studies: Social studies integration centers on the history of innovation and evolution of communities in America. Students examine how life at home, school, and in transportation has changed, specifically looking at how inventions like those of Benjamin Franklin–such as the lightning rod or bifocals-made life easier and safer. By comparing "then" and "now," students learn to identify the impact of human creativity on the

Anticipated misconceptions:

Students may have misconceptions of:

- The concept of time: students may not fully grasp the concept of "then" and "now."
- Distinguishing between historical figures and fictional characters.
- The belief that all technology such as modern tools has always existed.
- A narrow view of American history, only focusing on well-known events or figures.
- They may think that certain traditions or celebrations have been celebrated the same way across time.
- They may believe that things in the past were "old-fashioned" and everything today is better or more advanced and does not present its own challenges.
- They may think that everyone in the past had the

development of cities and the transformation of rural landscapes into urban environments. **Social Emotional Learning:** Social-emotional learning is woven through the curriculum by helping students process the internal impact of external changes. As they read about characters experiencing transitions, students learn to identify complex feelings like happiness, sadness, nostalgia, and discuss how to manage those emotions in their own lives. Furthermore, SEL is practiced through collaborative routines such as “Think-Pair-Share” and “Mix and Mingle,” which build communication skills, empathy, and the ability to work respectfully with peers to solve problems. **Art:** Module 3 focuses on how America has changed over time, inviting students to think critically about history and change through texts and fine art masterpieces like Grant Wood's *American Gothic*. A powerful art opportunity for this module is a "Then and Now Split-Screen Drawing" or a collaborative "Quilt of Change." Students can look at historical photographs or paintings of communities from the past and compare them to modern landscapes. Using oil pastels, students can create a side-by-side drawing depicting a household item, schoolroom, or transportation method from "then" versus "now." This artistic exercise directly supports their content learning targets of using key details and evidence to describe change over time, allowing them to utilize drawings as a primary tool to support their historical understanding.	same roles or jobs.
Connections to Prior Units:	**Connections to Future Units:**
In Module 3, students continue building their knowledge and skills of applying decoding skills and focusing on a blend of narrative and informational texts. Students build on their writing skills by creating an informational poster on how life changed in America to share with their peers.	This unit is focused on informational types of writing–part of a cycle structure throughout the Wit & Wisdom curricular resource. Students will leverage skills taught in this unit in later units with different genres of text.

Differentiation through Universal Design for Learning

UDL Indicator & Teacher Actions:

Engagement

- Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class.
- Connect observations (like the growth of baby flowers) to students’ personal lives by having them bring in a photo or drawing of a plant from their own neighborhood.
- During the Socratic Seminar, provide “response cards,” so students can choose how to participate- either by speaking, holding up a card, or using a gesture.

Representation

- Use echo reading for the Essential and Focusing Questions, providing a clear vocal model and physical tracking of the text to help students connect spoken words to print.
- Include tactile objects to support student learning around inventions. For example, provide video clips of some of the songs presented in the unit and physical artifacts such as a real pair of glasses or a lightbulb.
- Offer echo reading to ensure that all students who are still developing decoding skills can still access the rich social studies and science content.

Action & Expression

- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.
- Provide checklists with visuals to help students self-evaluate their work and plan their next steps in writing.

Supporting Multilingual/English Learners

Related *CELP standards* and differentiated Learning Targets:

Standards	Emerging	Expanding	Bridging
LT 1 CELP 1	I can identify a few key words or attributes from a read-aloud by pointing.	I can identify some key words, phrases, and details from texts about how things change with prompting and support.	I can answer questions about key details and retell main topics with prompting and support.
LT 2 CELP 2	I can participate in short conversations using a limited number of words, responding to simple yes/no or choice questions.	I can participate in conversations using words acquired in the module, responding to wh- questions during Think-Pair-Share.	I can participate in extended discussions, ask and answer questions, and contribute to a group discussion.
LT 3 CELP 9	I can communicate basic information or feelings using gestures or single words/labels for drawings of inventions or nature.	I can compose short oral or written messages using phrases like “I see..” or “The car goes…” to describe transportation.	I can make short oral responses or compose written texts with illustrations to recount a sequence of changes.
LT 4 CELP 10	I can recognize and repeat frequently occurring words.	I can use some of the words I learned through reading and begin simple sentences.	I can use a variety of words learned in the modules and demonstrate an awareness of “classroom language” vs. social language.

Lesson Sequence	Learning Target	Success Criteria	Resources

Focusing Question 1: Lessons 1-6 **How was Cynthia Rylant's life different from your life?**			
1	**Content Learning Target:** I can describe differences on how school was different then and now. **Literacy Skills Learning Target:** I can use many question words to ask questions about a new book.	• I can share an observation about the pictures or words. • I can ask a question using a question word (who, what, where, when, why, how). • I can take a Gallery Walk of the Module 3 books. • I can record my observations in my Response Journal.	All Module Texts "Now We are Six" Lesson Materials
2 ✔NR	**Content Learning Target:** I can describe how Cynthia Rylant's life was different then from now. **Literacy Skills Learning Target:** I can identify the author and illustrator of a book and tell their jobs.	• I can complete New-Read Assessment 1. • I can share an observation about the book. • I can ask a question using the Question Cube. • I can name the author and the illustrator of the book.	*Old Hand Water Pump* *When I Was Young in the Mountains* *Washington Crossing the Delaware* "Now We are Six" Lesson Materials
3	**Content Learning Target:** I can describe how Cynthia Rylant's life was different then from now. **Literacy Skills Learning Target:** I can use repeated language and illustrations to find the main topic and key details of a text.	• I can name the main topic of the book. • I can record a key detail on a large sticky note. • I can act out the meaning of a verb (like stopped, fill, awoke, leave). • I can tell why people write about the past.	"Now We are Six" *When I Was Young in the Mountains* *Washington Crossing the Delaware* "About Cynthia Rylant" Lesson Materials

4	**Content Learning Target:** I can describe how Cynthia Rylant's life was different then from now. **Literacy Skills Learning Target:** I can use illustrations and words to define new vocabulary and write about my past.	• I can use a picture to figure out the meaning of a new word. • I can collect evidence for the Focusing Question Task. • I can describe a special memory from my past. • I can write about my memory in my Response Journal.	"Now We are Six" *When I Was Young in the Mountains* Lesson Materials
5 ✔FQT	**Content Learning Target:** I can describe how Cynthia Rylant's life was different then from now. **Literacy Skills Learning Target:** I can use words and illustrations to find the most important idea in a text.	• I can annotate (mark up) one illustration in the book. • I can answer a Text-Dependent Question about the text. • I can use text evidence to compare Cynthia Rylant's life to my life. • I can begin Focusing Question Task 1.	"Now We are Six" *When I Was Young in the Mountains* Lesson Materials
6 ✔FQT	**Content Learning Target:** I can describe how Cynthia Rylant's life was different then from now. **Literacy Skills Learning Target:** I can use the word I correctly with a capital letter in my writing.	• I can complete Focusing Question Task 1. • I can capitalize the word I every time I use it. • I can use the ending -ed as a clue to figure out a word's meaning. • I can add something I learned to our class Knowledge Journal.	"Now We are Six" *When I Was Young in the Mountains* Lesson Materials
Focusing Question 2: Lessons 7-11 **How has life at home and at school changed in America?**			
7	**Content Learning Target:**	• I can share an observation	*Home Then and Now*

	I can describe how life at home and school changed in America. **Literacy Skills Learning Target:** I can ask and answer questions about the words and pictures in an informational text.	about a picture in the book. • I can ask a question and add it to the class Wonder Chart. • I can answer a classmate's question using the book. • I can capitalize the first word of a sentence.	"You're a Grand Old Flag" Lesson Materials
8	**Content Learning Target:** I can describe how life at home and school changed in America. **Literacy Skills Learning Target:** I can use Nonverbal Signals to show how key details match the main topic.	• I can name the main topic of School Then and Now. • I can record a key detail from the text. • I can sort examples of home and school correctly. • I can tell why authors write informative texts.	*Home Then and Now* *School Then and Now* "You're a Grand Old Flag" Lesson Materials
9	**Content Learning Target:** I can describe how life at home and school changed in America. **Literacy Skills Learning Target:** I can use the TopIC writing model to create a piece of informative writing.	• I can name the main topic of Home Then and Now. • I can annotate and record a key detail. • I can collaborate to write an informative piece about how home has changed. • I can use a Nonverbal Signal to show a detail that matches the main topic.	*Home Then and Now* "You're a Grand Old Flag" "Betsy Ross and the American Flag" Lesson Materials
10 ✔FQT	**Content Learning Target:** I can describe how life at home and school changed in America. **Literacy Skills Learning Target:** I can use the TopIC writing model to create a piece of informative writing.	• I can identify connections between two photos in the book. • I can use a text feature (bold print or glossary) to learn a new word. • I can verbally rehearse a sentence for Focusing Question Task 2.	*Home Then and Now* *School Then and Now* "You're a Grand Old Flag" Lesson Materials

		• I can describe how school has changed over time.	
11 ✔FQT	**Content Learning Target:** I can describe how life at home and school changed in America. **Literacy Skills Learning Target:** I can write an informative paragraph that tells how something has changed over time.	• I can complete Focusing Question Task 2. • I can write about how school has changed in America. • I can identify a connection between two pieces of information in the texts. • I can add what I learned to our class Knowledge Journal.	*Home Then and Now* *School Then and Now* “You’re a Grand Old Flag” Lesson Materials
Focusing Question 3: Lessons 12-17 **What changes does the Little House see in her neighborhood?**			
12	**Content Learning Target:** I can describe changes that occur in a neighborhood over time. **Literacy Skills Learning Target:** I can ask and answer questions about a story using question words.	• I can share an observation about The Little House. • I can ask a question using the Question Cube. • I can use a new vocabulary word in my Response Journal entry. • I can show I understand a vocabulary word by acting it out.	*The Little House* Lesson Materials
13	**Content Learning Target:** I can describe changes that occur in a neighborhood over time. **Literacy Skills Learning Target:** I can use nouns and verbs from a text to write a sentence.	• I can describe the setting in the first half of the story. • I can act out a key detail from the story. • I can use a noun and a verb from the text to make a sentence. • I can explain why a topic statement is important.	*The Little House* Lesson Materials

14	**Content Learning Target:** I can describe changes that occur in a neighborhood over time. **Literacy Skills Learning Target:** I can write a topic statement for an informative paragraph.	• I can retell the story in order. • I can use manipulatives to show how the setting changes. • I can collaborate to write a topic statement. • I can share a topic statement with a partner.	*The Little House* Lesson Materials
15	**Content Learning Target:** I can describe changes that occur in a neighborhood over time. **Literacy Skills Learning Target:** I can use text evidence to write detail sentences that support a topic statement.	• I can describe how the Little House feels using her expressions. • I can analyze the composition of Washington Crossing the Delaware. • I can find evidence that supports my topic statement. • I can verbally create a detail sentence using text evidence.	*The Little House* *Washington Crossing the Delaware* Lesson Materials
16 ✔VOC ✔FQT	**Content Learning Target:** I can describe changes that occur in a neighborhood over time. **Literacy Skills Learning Target:** I can write detail sentences that support a topic statement in an informative paragraph.	• I can share the big idea of The Little House. • I can interpret the essential meaning of Washington Crossing the Delaware. • I can begin Focusing Question Task 3 with a topic statement. • I can write a detail sentence that supports my topic statement.	*The Little House* *Washington Crossing the Delaware* Lesson Materials
17 ✔FQT ✔SS	**Content Learning Target:** I can describe changes that occur in a neighborhood over time.	• I can complete Focusing Question Task 3. • I can take a turn asking a	“Then & Now: The Stunning Speed of Urban Development”

	Literacy Skills Learning Target: I can ask and answer questions in a Socratic Seminar about a story.	question in a Socratic Seminar. • I can answer a friend's question using the book. • I can add what I learned to our class Knowledge Journal.	*The Little House* *Washington Crossing the Delaware* Lesson Materials
Focusing Question 4: Lessons 18-21 **How have transportation and communication changed in America?**			
18	**Content Learning Target:** I can describe how transportation and communication changed in America over time. **Literacy Skills Learning Target:** I can ask and answer questions about the words and pictures in informational texts.	• I can share an observation about transportation or communication. • I can ask a question using the Question Grab Bag. • I can name a period, question mark, and exclamation point. • I can tell why listening for order is important.	*Transportation Then and Now* *Communication Then and Now* “Engine on the Track” Lesson Materials
19 ✔NR	**Content Learning Target:** I can describe how transportation and communication changed in America over time. **Literacy Skills Learning Target:** I can listen for the order of events and explain why a conclusion sentence is important.	• I can complete New-Read Assessment 2. • I can name the main topic and retell a key detail. • I can listen carefully to find the order of events. • I can tell why a paragraph needs a conclusion sentence.	*Transportation Then and Now* *Communication Then and Now* “Engine on the Track” Lesson Materials
20	**Content Learning Target:** I can describe how transportation and communication changed in America over time. **Literacy Skills Learning Target:**	• I can analyze text features in Transportation Then and Now. • I can identify connections between two photos in Communication Then and	*Transportation Then and Now* *Communication Then and Now* “Engine on the Track”

	I can describe how related photographs are connected and write detail sentences with nouns and verbs.	Now. • I can verbally produce a detail sentence using nouns and verbs. • I can write a conclusion sentence for an informative paragraph.	Lesson Materials
21 ✔FQT	**Content Learning Target:** I can describe how transportation and communication changed in America over time. **Literacy Skills Learning Target:** I can write an informative paragraph with a topic statement, detail sentences, and end punctuation.	• I can complete Focusing Question Task 4. • I can produce and expand a detail sentence. • I can use the correct end punctuation (. ? !) in my sentences. • I can add what I learned to our class Knowledge Journal.	*Transportation Then and Now* *Communication Then and Now* “Engine on the Track” Lesson Materials
Focusing Question 5: Lessons 22-26 **How did Benjamin Franklin’s inventions make life in America easier?**			
22	**Content Learning Target:** I can describe how Benjamin Franklin's inventions made life in America easier. **Literacy Skills Learning Target:** I can ask and answer questions about the words and pictures in an informational text.	• I can share an observation about Benjamin Franklin's inventions. • I can ask a question and add it to the class Wonder Chart. • I can answer a friend's question using the book. • I can act out the meaning of invented, created, and designed.	*Now & Ben: The Modern Inventions of Benjamin Franklin* “This is Your Land” Lesson Materials
23	**Content Learning Target:** I can describe how Benjamin Franklin's inventions made life in America easier. **Literacy Skills Learning Target:**	• I can name the main topic of Now & Ben. • I can record a key detail. • I can draw one invention	*Now & Ben: The Modern Inventions of Benjamin Franklin* “This is Your Land”

	I can use illustrations and words to find key details that support a main topic.	from the book. • I can tell why adding drawings makes informative writing stronger.	“Sounds of a Glass Armonica” Lesson Materials
24	**Content Learning Target:** I can describe how Benjamin Franklin's inventions made life in America easier. **Literacy Skills Learning Target:** I can use drawings to add more detail to my informative writing.	• I can analyze a picture in the book. • I can collect evidence for the Focusing Question Task. • I can add a drawing to my Key Details Chart. • I can use my drawing to show a detail I wrote about.	*Now & Ben: The Modern Inventions of Benjamin Franklin* “This is Your Land” Lesson Materials
25 ✔FQT	**Content Learning Target:** I can describe how Benjamin Franklin's inventions made life in America easier. **Literacy Skills Learning Target:** I can use informative writing to describe how Benjamin Franklin's inventions are used today.	• I can share the essential meaning of Now & Ben. • I can find evidence on an Essential Meaning Scavenger Hunt. • I can begin Focusing Question Task 5 with a topic statement. • I can use a drawing to add detail to my writing.	*Now & Ben: The Modern Inventions of Benjamin Franklin* “This is Your Land” Lesson Materials
26 ✔FQT	**Content Learning Target:** I can describe how Benjamin Franklin's inventions made life in America easier. **Literacy Skills Learning Target:** I can write an informative piece with a drawing that adds detail.	• I can complete Focusing Question Task 5. • I can describe how an invention is used today. • I can compare illustrations in the book. • I can add what I learned to our class Knowledge Journal.	*Now & Ben: The Modern Inventions of Benjamin Franklin* “This is Your Land” Lesson Materials
Focusing Question 6: Lessons 27-30 **How has life in America changed over time?**			

27 ✔SS	**Content Learning Target:** I can describe how life in America has changed over time using key details and evidence. **Literacy Skills Learning Target:** I can use drawings to support and enhance a group conversation.	• I can sort our Module 3 texts. • I can take a Gallery Walk of the texts and artifacts. • I can participate in a Socratic Seminar about my EOM Task. • I can use the ending -ful as a clue to figure out a word.	All Module Texts “This is Your Land” Lesson Materials
28 ✔VOC ✔EOM	**Content Learning Target:** I can describe how life in America has changed over time using key details and evidence. **Literacy Skills Learning Target:** I can begin writing an informative poster about how something has changed.	• I can sort our Module 3 texts. • I can take a Gallery Walk of the texts and artifacts. • I can participate in a Socratic Seminar about my EOM Task. • I can use the ending -ful as a clue to figure out a word.	All Module Texts “This is Your Land” Lesson Materials
29 ✔EOM	**Content Learning Target:** I can describe how life in America has changed over time using key details and evidence. **Literacy Skills Learning Target:** I can write two detail sentences with illustrations to support a topic statement.	• I can verbally rehearse my detail sentences. • I can add two more detail sentences to my EOM Task poster. • I can add drawings that help explain my details. • I can evaluate my writing and share reflections.	All Module Texts “This is Your Land” Lesson Materials

30 ✔EOM	**Content Learning Target:** I can describe how life in America has changed over time using key details and evidence. **Literacy Skills Learning Target:** I can present an informative poster using complete sentences and a strong voice.	• I can present my EOM Task poster to the class. • I can use my drawings to help explain my writing. • I can perform a fluent read. • I can reflect on what I did well in my EOM Task.	All Module Texts “This is Your Land” Lesson Materials

<table>
<tr><th colspan="3">Fundations</th></tr>
<tr><td colspan="3">80% of students should master the unit assessment with a score of 80% or more when determining to advance instruction.</td></tr>
<tr><td>Fundations Lessons</td><td>Lesson Targets</td><td>Success Criteria</td></tr>
<tr><td>Unit 2– Starts in Module 2, finishes in Module 3.</td><td>I can identify, say, and write the uppercase letters of the alphabet.
I can blend and read three-sound short vowel or CVC words.
I can recognize the components of a sentence (Capital letter at the beginning and end punctuation).
I can recognize that sentences are made up of different words.
I can retell parts of a story.</td><td>With and without prompting, I can recognize taught letters and sounds.
I can use proper pencil grip and scaffolds (Fundations lines) to form letters.
With adult support, I can track text with one-to-one correspondence.
I can act out a part of a story or draw a picture.
I can order my letters in alphabetic order.</td></tr>
<tr><td>Unit 3</td><td>I can blend and read three-sound short vowel or CVC words.
I can segment and spell three-sounds short vowel or CVC words.
I can distinguish between long and short vowel sounds.</td><td>With and without prompting, I can write taught letters and produce the corresponding sound.
With and without prompting, I can write three-sound short vowel or CVC words.
I can use proper pencil grip and scaffolds (Fundations lines) to form letters.</td></tr>
</table>

Heggerty	
Phoneme Blending & Segmenting ~45 sessions Learning Targets: ● I can blend 3 phonemes to say a CVC word. ● I can segment a CVC word into 3 individual sounds. ● I can isolate initial and final phonemes with automaticity. ● I can add or delete initial and final phonemes. ● I can match phonemes to graphemes. ● I can identify how many sounds are in a word.	**Phoneme Blending & Segmenting ~45 sessions Success Criteria:** ***Blending 3 phonemes (CVC)*** ● I listened to each of the three sounds ● I held all three sounds in order ● I slid the sounds together smoothly ● I said the whole CVC word ***Segmenting a CVC word*** ● I listened to the whole word. ● I chopped it into its separate sounds. ● I said each sound one at a time in order. ● I counted to check I said three sounds. ***Phoneme isolation (initial & final)*** ● I listened to the word. ● I quickly found the first or last sound. ● I said that sound right away without going through the whole word. ***Adding or deleting initial/final phonemes*** ● I listened to the word and held it in my mind. ● I added the new sound to the beginning or end, or I removed the sound I was told. ● I blended what was left and said the new word. ***Matching phonemes to graphemes*** ● I listened to the sound. ● I thought about which letter makes that sound. ● I said or pointed to the matching letter. ***Counting sounds in a word*** ● I listened to the word and segmented it into sounds. ● I tracked each sound with a chop or a chip. ● I counted my chops and said the number of sounds.

Module 4: The Continents

Relevant Standards: Bold indicates priority

See above.

Essential Question(s):

What makes the world fascinating?

Enduring Understanding(s):

Students in Kindergarten will understand the following concepts as a result of this module:

- The world is a large place with diverse people and places.
- Each continent is characterized by its own animals, natural features, and things to do.
- Maps and photographs can visually transport viewers to different locations around the world.
- Stories can transport readers to another place through language and illustrations.
- Collecting and reflecting upon information allows a person to make and support an informed opinion with reasons.

Demonstration of Learning:

Students may demonstrate their learning within this unit in a variety of ways. At the end of this module, students will create a travel brochure inviting readers to travel to a country and reasons why. In addition, students will participate in a socratic seminar and participate in several assessments throughout the unit such as vocabulary and "New Read" assessments demonstrating their comprehension skills in new texts.

Pacing for Unit

36 school days

Family Overview (link below)

WW_GK_M4_FamilyTipSheet_English.pdf
WW_GK_M4_FamilyTipSheet_Spanish.pdf

Integration of Technology:

Videos and digital visual art displays are listed below.

Unit-specific Vocabulary:

Content Vocabulary

continents	Asia	Europe
spherical	monsoon	North America

Aligned Unit Materials, Resources, and Technology (beyond core resources):

WW_Nat_GK_M4_TE_Lesson01-08_v2.pdf
WW_Nat_GK_M4_TE_Lesson09-15_v2.pdf
WW_Nat_GK_M4_TE_Lesson16-21_v2.pdf
WW_Nat_GK_M4_TE_Lesson22-27_v2.pdf
WW_Nat_GK_M4_TE_Lesson28-31_v2.pdf

South America	Africa	Australia
Antarctica	dunes	mountain
Natural feature	atlas	transport
cartographer	folktale	scale
Origin story	island	add
Coral reef	caption	pouch
waterfall	restate	culture
shadow		

Academic Vocabulary

world	map	oceans
land	fascinating	north
south	opinion	opposite
east	west	topic
details	heading	modern
marvel	interesting`	language
custom	stick	horns
enough	point	touch
poke	feature	few
action	giant	thick
blow	swirl	flow
amazing	describing	proud
bobbing	bear	lumber
slide	glide	crawl
mischief	fetch	timid
respond	compliment	scurried
leap	creep	heap

WW_Nat_GK_M4_TE_Lesson32-36_v2.pdf

Fundations Units 4 & 5
Heggerty

Core Texts

- *Africa,* Rebecca Hirsch
- *Antarctica,* Rebecca Hirsch
- *Asia,* Rebecca Hirsch
- *Australia,* Rebecca Hirsch
- *Europe,* Rebecca Hirsch
- *Introducing North America,* Rebecca Hirsch
- *South America,* Rebecca Hirsch
- *World Atlas,* Nick Crane
- *Moon Rope,* Lois Ehlert
- *The Story of Ferdinand,* Munro Leaf
- *Why Mosquitoes Buzz in People's Ears: A West African Tale,* Verna Aardema

Supplementary Texts/Articles

- "5 Reasons Why Animal Moms Are Awesome"
- *When I Was Young in the Mountains,* Cynthia Rylant
- *"Lions Roar"* CanTeach
- What is Life? Crowfoot

Multimedia

- *Carta Marina,* Olaus Magnus
- *Cornell Farm*, Edward Hicks
- *Washington Crossing the Delaware*, Emmanuel Leutze
- *Earth from Space,* Stöckli, Reto, et al.
- *Grand Canyon Scenic Splendor*, National Park Service
- *Patterns of Chinchero*, Descendants of the Incas
- "Penguin Song"
- "Where in the World is Carmen Sandiego?"
- "Antarctica Sights and Sounds"
- "Burkina Faso: Music"
- "Explore Views of the Burj Khalifa with Google Maps"
- "The Seven Continents Song"
- "Storm-Proofing the World's Biggest Mud Building"
- "Traditional Chinese Dance- 'Flowers Contend in Beauty"
- "Americas-Fact Files"
- "Moles"- DK Find Out

slithering	imaginary	uncertainly
unkind	unwilling	snap
mind	unusual	uneven
uncommon	hitch	hang
visit	introduce	quote
quotation	flat	

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
Science: Students engage with Earth and physical science concepts by exploring the spherical shape of the planet through globes and satellite imagery. They investigate various natural features such as mountains, rivers, and deserts, learning how environmental factors like rainfall create diverse ecosystems including rainforests and savannas. Additionally, the curriculum covers life science by studying the unique habitats, physical traits, and behaviors of animals across the seven continents. **Social Studies:** The lessons focus heavily on geography and mapping skills as students identify major oceans and continents using world maps and a compass rose. They examine how human understanding of the world has evolved by comparing historical maps with modern data. The curriculum also explores human culture and activity, showing how different populations adapt to their environments through unique architecture, sports, and traditional storytelling. **Social Emotional Learning:** The curriculum emphasizes collaborative communication through structured routines like "Think–Pair–Share" and "Mix and Mingle," which teach students to listen actively and express their ideas respectfully. Students also practice giving and receiving constructive feedback by offering compliments on peer work and participating in Socratic Seminars. These activities foster self-reflection and a sense of wonder, encouraging students to stay curious about their own learning process and the world around them. **Art:** In this final module, students travel the globe to discover what makes the world fascinating, exploring the diverse people, animals, and natural features that	Students may have misconceptions of: ● All continents are similar in size and shape. ● All countries and cultures on a continent are the same. ● All continents have the same climate or weather. ● People from other continents live in exactly the same way as people in their own country. ● Antarctica is a developed continent. ● There is only one climate on each continent. ● Continents are unchangeable and have always been the same. ● The continents are the same distance apart from each other. ● People live in every part of each continent. ● All people on a continent speak the same language.

characterize each continent. Art functions as a perfect vehicle for this global exploration through a "World Passport Art Portfolio." As students learn about a new continent, they can engage in a culturally inspired or geographically focused art project, such as painting African savanna silhouettes using warm twilight gradients, crafting clay Australian coral reefs, or making multimedia collages of South American rainforest layers. This integration transforms abstract maps and photographs into tangible, creative landmarks, allowing students to express informed opinions about their favorite places through a combination of vibrant visual art and emergent writing.	
Connections to Prior Units:	**Connections to Future Units:**
In Module 4, students continue building their knowledge and skills of applying decoding skills and focusing on a blend of narrative and informational texts. Students build on their writing skills by creating an opinion-based writing piece responding to the question, “Which continent do you think people should visit?”	This is the final unit for K ELA. This will connect to work done in later grades as Wit & Wisdom utilizes a spiral approach in deepening student understanding of genre and building the comprehension skills of readers as well as writing skills.

Differentiation through *Universal Design for Learning*

UDL Indicator & Teacher Actions:

Engagement
- Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class.
- Allow students to choose which sense they want to focus on for their personal reflections or which part of the text they want to illustrate.
- During the Socratic Seminar, provide “response cards,” so students can choose how to participate- either by speaking, holding up a card, or using a gesture.

Representation
- Use echo reading for the Essential and Focusing Questions, providing a clear vocal model and physical tracking of the text to help students connect spoken words to print.
- Include tactile objects to support student learning around their senses.
- Create a sensory word wall with physical objects attached next to the words.

Action & Expression
- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.

Supporting Multilingual/English Learners

Related CELP standards and differentiated Learning Targets:

Standards	**Emerging**	**Expanding**	**Bridging**
LT 1 CELP 1	I can answer simple "yes/no" or "what" questions about continents and animals using gestures or single words.	I can participate in a "Think-Pair-Share" by using short phrases to describe a natural feature or animal behavior.	I can contribute relevant comments to a Socratic Seminar and build on a peer's idea using complete sentences.
LT 2 CELP 2	I can identify a few key words (e.g., "ice," "hot," "ocean") from a read-aloud when supported by pictures	I can identify the main topic of an informational text and answer "where" questions about different continents.	I can use strategies like looking at illustrations and word parts (prefixes/suffixes) to determine the meaning of new words.
LT 3 CELP 9	I can draw a picture and label it with a single word or initial letter.	I can dictate or write a simple sentence about a topic with teacher support.	I can write and expand a complete sentence by adding a prepositional phrase to tell *where* or *when*.

Lesson Sequence	**Learning Target**	**Success Criteria**	**Resources**
Focusing Question 1: Lessons 1-8 What interesting things can people do in Europe and Asia?			
1	**Content Learning Target:** I can name interesting things people can do in Europe and Asia. **Literacy Skills Learning Target:** I can use a variety of question words to ask questions about a new topic.	• I can record my wonders in my Response Journal. • I can list question words (who, what, where, when, why). • I can point out continents on a map.	Earth from Space The Seven Continents Songs Where in the World is Carmen Sandiego? Asia Europe Lesson Materials

2	**Content Learning Target:** I can name interesting things people can do in Europe and Asia. **Literacy Skills Learning Target:** I can use informational text features like headings to find information.	• I can state the main topic of a section. • I can identify key details about Asia. • I can complete a sentence frame about an interesting activity.	The Seven Continents Song Asia "Traditional Chinese Dance-Flowers Contend in Beauty" Lesson Materials
3	**Content Learning Target:** I can name interesting things people can do in Europe and Asia. **Literacy Skills Learning Target:** I can use a Table of Contents to navigate an informational text.	• I can find page numbers using the Table of Contents. • I can state the main topic of a section in Europe. • I can actively follow along while listening.	The Seven Continents Song Europe The Story of Ferdinand Lesson Materials
4	**Content Learning Target:** I can name interesting things people can do in Europe and Asia. **Literacy Skills Learning Target:** I can use photographs and text together to understand new details.	• I can match text details with a photo. • I can share an observation with a partner. • I can expand a simple sentence using a describing word.	The Seven Continents Song Asia Lesson Materials
5	**Content Learning Target:** I can name interesting things people can do in Europe and Asia. **Literacy Skills Learning Target:** I can use illustrations and text details to describe a setting.	• I can find facts about activities in Europe. • I can describe a scene from The Story of Ferdinand. • I can gather evidence for my Focusing Question Task.	The Seven Continents Song Europe The Story of Ferdinand Lesson Materials

6	**Content Learning Target:** I can name interesting things people can do in Europe and Asia. **Literacy Skills Learning Target:** I can compare information from a video map tool to an informational text.	• I can find landmarks on a digital map video. • I can list unique activities in Europe and Asia. • I can practice reading lines fluently.	The Seven Continents Song Asia When I Was Young in the Mountains The Story of Ferdinand Explore Views of the Burj Khalifa Lesson Materials
7 ✔FQT	**Content Learning Target:** I can name interesting things people can do in Europe and Asia. **Literacy Skills Learning Target:** I can use text-based evidence to answer questions about a continent.	• I can state an author's main point. •I can draw and label a learning entry in my Passport Journal. • I can support my answer with a text detail.	The Seven Continents Song Europe Asia Lesson Materials
8	**Content Learning Target:** I can name interesting things people can do in Europe and Asia. **Literacy Skills Learning Target:** I can state a clear preference and support it with reasons.	• I can complete entries in my Passport Journal. • I can write and illustrate an opinion poster. • I can speak clearly during a class discussion.	The Seven Continents Song Earth from Space Asia Europe World Atlas Explore Views of the Burj Khalifa Lesson Materials
Focusing Question 2: Lessons 9-15 **What interesting natural features can people see in Africa and Antarctica?**			
9	**Content Learning Target:** I can name interesting natural features	• I can share an observation about photos.	Antarctica Sights and Sounds

	in Africa and Antarctica. **Literacy Skills Learning Target:** I can generate question words to ask about natural features.	• I can record questions in my Response Journal. • I can locate Africa and Antarctica on a globe.	Where in the World is Carmen Sandiego? Africa Antarctica Penguin Song Lesson Materials
10	**Content Learning Target:** I can name interesting natural features in Africa and Antarctica. **Literacy Skills Learning Target:** I can use bold text and headers to identify key topics.	• I can name a key natural feature in Africa. • I can use nonverbal signals to track key details. • I can use new vocabulary words like savanna.	Africa Antarctica Penguin Song Lesson Materials
11	**Content Learning Target:** I can name interesting natural features in Africa and Antarctica. **Literacy Skills Learning Target:** I can determine how a section's text matches its photographs.	• I can state why Antarctica is unique. • I can pick out key details about ice and climate. • I can complete a sentence about an Antarctic detail.	Penguin Song Africa Storm-Proofing the World's Biggest Mud Building Lesson Materials
12	**Content Learning Target:** I can name interesting natural features in Africa and Antarctica. **Literacy Skills Learning Target:** I can look at maps and labels to gather information.	• I can name a specific landform or river in Africa. • I can talk about my observations with a partner. • I can expand an informative sentence.	Penguin Song Antarctica Lesson Materials
13 ✔NR ✔FQT	**Content Learning Target:**	• I can use evidence to describe an Antarctic feature.	Penguin Song Africa

	I can name interesting natural features in Africa and Antarctica. **Literacy Skills Learning Target:** I can describe the relationship between illustrations and the text.	• I can illustrate an Antarctic landscape. • I can find facts to support my upcoming writing task.	5 Reasons Why Animal Moms are Awesome Lesson Materials
14 ✔FQT	**Content Learning Target:** I can name interesting natural features in Africa and Antarctica. **Literacy Skills Learning Target:** I can compare and contrast two informational texts.	• I can list differences between a hot and cold continent. • I can work in a group to sort natural features. • I can read a short fluency passage out loud.	Penguin Song Africa 5 Reasons Why Animal Moms are Awesome World Atlas Lesson Materials
15 ✔FQT ✔SS	**Content Learning Target:** I can name interesting natural features in Africa and Antarctica. **Literacy Skills Learning Target:** I can explain my ideas clearly using complete sentences.	• I can describe interesting natural features in a sentence. • I can write and illustrate an informative chart. • I can identify words with the suffix -less.	Penguin Song Africa Antarctica Lesson Materials
Focusing Question 3: Lessons 16-21 **How can a story transport you to a different place?**			
16	**Content Learning Target:** I can explain how a story can transport me to a different place. **Literacy Skills Learning Target:** I can use story clues to define unknown words.	• I can make observations about the story's artwork. • I can ask a question about the setting. • I can define the word burrow using clues.	Why Mosquitoes Buzz in People's Ears Carta Marina Lesson Materials

17	**Content Learning Target:** I can explain how a story can transport me to a different place. **Literacy Skills Learning Target:** I can identify the characters, setting, and main events.	• I can use story illustrations to retell what happened. • I can track the sequence of animal actions. • I can explain how the setting changes.	Why Mosquitoes Buzz in People's Ears Carta Marina Lions Roar Burkina Faso: Music Lesson Materials
18	**Content Learning Target:** I can explain how a story can transport me to a different place. **Literacy Skills Learning Target:** I can use illustrations to describe a character's feelings.	• I can point to text details that show how an animal feels. • I can roleplay an animal character's actions. • I can write a sentence about a character using details.	Why Mosquitoes Buzz in People's Ears Carta Marina Lions Roar Lesson Materials
19 ✔FQT	**Content Learning Target:** I can explain how a story can transport me to a different place. **Literacy Skills Learning Target:** I can explain how one event leads to another in a plot.	• I can sequence a chain of events with picture cards. • I can explain why the sun did not rise in the story. • I can add details to my notes for my task.	Why Mosquitoes Buzz in People's Ears Lions Roar Lesson Materials
20 ✔FQT	**Content Learning Target:** I can explain how a story can transport me to a different place. **Literacy Skills Learning Target:** I can explain the moral or essential message of a traditional tale.	• I can share what the story teaches us about community. • I can talk with a group about how stories transport us. • I can practice reading dialogue fluently.	Why Mosquitoes Buzz in People's Ears Carta Marina Lions Roar Burkina Faso: Music Earth from Space Lesson Materials

21 ✔FQT	**Content Learning Target:** I can explain how a story can transport me to a different place. **Literacy Skills Learning Target:** I can write an expanded descriptive sentence about a story setting.	• I can draw a picture of a story scene. • I can write an expanded sentence. • I can use descriptive words and prepositions correctly.	Why Mosquitoes Buzz in People's Ears Carta Marina Lions Roar Earth from Space Lesson Materials
Focusing Question 4: Lessons 22-27 **What amazing animals can people see in South America and Australia?**			
22	**Content Learning Target:** I can name different animals that people can see in South America and Australia. **Literacy Skills Learning Target:** I can use a prefix clue to find word meanings.	• I can write down my wonders about foreign animals. • I can name animals unique to these continents. • I can define words using the prefix un-.	Where in the World is Carmen Sandiego? South America Australia Lesson Materials
23 ✔NR	**Content Learning Target:** I can name different animals that people can see in South America and Australia. **Literacy Skills Learning Target:** I can use a glossary to find definitions of text words.	• I can name three animals that live in South America. • I can use the glossary to look up canopy. • I can talk about key facts with a partner.	Americas- Fact Files Moon Rope South America Moles, DK Find Out! Lesson Materials
24	**Content Learning Target:** I can name different animals that people can see in South America and Australia. **Literacy Skills Learning Target:** I can track facts about unique animals across sections.	• I can list facts about marsupials. • I can state the main topic of an animal section. • I can complete an options sentence frame.	Moon Rope Australia Lesson Materials

25	**Content Learning Target:** I can name different animals that people can see in South America and Australia. **Literacy Skills Learning Target:** I can integrate text details with photographic evidence.	• I can point out an animal feature in a photo. • I can describe a rain forest animal's behavior. • I can add animal facts to my drafting sheet.	Moon Rope Earth from Space South America Patterns of Chinchero Lesson Materials
26 ✔FQT ✔VOC	**Content Learning Target:** I can name different animals that people can see in South America and Australia. **Literacy Skills Learning Target:** I can identify specific reasons an author gives to support a point.	• I can state why Australian animals are unique. • I can sketch an Australian animal in its home. • I can write down an interesting fact about a kangaroo.	Moon Rope Australia South America Lesson Materials
27 ✔FQT	**Content Learning Target:** I can name different animals that people can see in South America and Australia. **Literacy Skills Learning Target:** I can write an informative text that starts with a capital letter.	• I can complete my Passport Journal entry for animals. • I can draft a complete sentence with a capital letter. • I can write and illustrate an animal profile card.	Moon Rope Australia South America World Atlas Lesson Materials
Focusing Question 5: Lessons 28-31 **Why might people want to visit North America?**			
28	**Content Learning Target:** I can explain why people want to visit North America. **Literacy Skills Learning Target:** I can identify ending punctuation marks in a sentence.	• I can share a wonder about my home continent. • I can find a landmark on a video tour. • I can identify periods and question marks.	Where in the World is Carmen Sandiego? Introducing North America Grand Canyon Scenic Splendor What is Life? Crowfoot Lesson Materials

29	**Content Learning Target:** I can explain why people want to visit North America. **Literacy Skills Learning Target:** I can use index pages to locate key terms in a book.	• I can look up topics using an index. • I can list reasons why people visit North America. • I can speak clearly in a think-pair-share.	Introducing North America What is Life? Crowfoot Lesson Materials
30 ✔FQT	**Content Learning Target:** I can explain why people want to visit North America. **Literacy Skills Learning Target:** I can connect text information with structural diagrams or maps.	• I can spot a mountain range or desert on a map. • I can write a sentence about a national park. • I can select evidence for a travel page.	Introducing North America What is Life? Crowfoot Lesson Materials
31 ✔FQT ✔NR	**Content Learning Target:** I can explain why people want to visit North America. **Literacy Skills Learning Target:** I can organize and match natural features with their correct names.	• I can describe activities people can do in North America. • I can write down my favorite North American features. • I can design a travel advertisement page.	Introducing North America What is Life? Crowfoot World Atlas Lesson Materials
Focusing Question 6: Lessons 32-36 **What makes the world fascinating?**			
32 ✔EOM	**Content Learning Target:** I can explain what makes the world fascinating. **Literacy Skills Learning Target:** I can sort and classify books across an entire module.	• I can classify texts by continent or theme. • I can choose my favorite part of the world to write about. • I can describe my project idea out loud.	All Module Texts The Seven Continents Song Lesson Materials

33 ✔VOC ✔EOM	**Content Learning Target:** I can explain what makes the world fascinating. **Literacy Skills Learning Target:** I can write a clear topic sentence about an informative subject.	• I can outline my project page. • I can write a strong topic statement. • I can verbally practice my sentences before writing.	All Module Texts The Seven Continents Song Lesson Materials
34 ✔EOM	**Content Learning Target:** I can explain what makes the world fascinating. **Literacy Skills Learning Target:** I can use drawings to explain or support my written words.	• I can add two detailed sentences to my project. • I can draw an informative picture with labels. • I can check my spelling and capital letters.	All Module Texts The Seven Continents Song Lesson Materials
35 ✔EOM ✔SS	**Content Learning Target:** I can explain what makes the world fascinating. **Literacy Skills Learning Target:** I can speak audibly and use complete sentences during a presentation.	• I can present my project page to the class. • I can share a takeaway during a Socratic Seminar. • I can answer questions about my chosen place.	All Module Texts The Seven Continents Song Lesson Materials
36	**Content Learning Target:** I can explain what text interested me the most this school year. **Literacy Skills Learning Target:** I can select and evaluate a detail that sparked my curiosity.	• I can draw a topic that I still wonder about. • I can share advice with future students. • I can complete a self-reflection checklist.	All Module 0-4 Core Texts The Cornell Farm Washington Crossing the Delaware Carta Marina Lesson Materials

Fundations

Fundations Lessons	**Lesson Targets**	**Success Criteria**
Unit 4	I can identify, say, and write the digraphs *wh, ch, sh, th,* and *ck.* I can decode three sound words with digraphs. I can spell three sound words with digraphs. I can recognize that sentences are made up of different words. I can retell parts of a story.	With and without prompting, I can recognize taught letters and sounds. I can use proper pencil grip and scaffolds (Fundations lines) to form letters. With adult support, I can track text with one-to-one correspondence. I can act out a part of a story or draw a picture.
Unit 5	I can read and write sentences. I can proofread my writing to check for punctuation, capitalization, and spelling.	With and without prompting, I can recognize taught letters and sounds. I can use proper pencil grip and scaffolds (Fundations lines) to form letters. With adult support, I can track text with one-to-one correspondence. I can act out a part of a story or draw a picture.

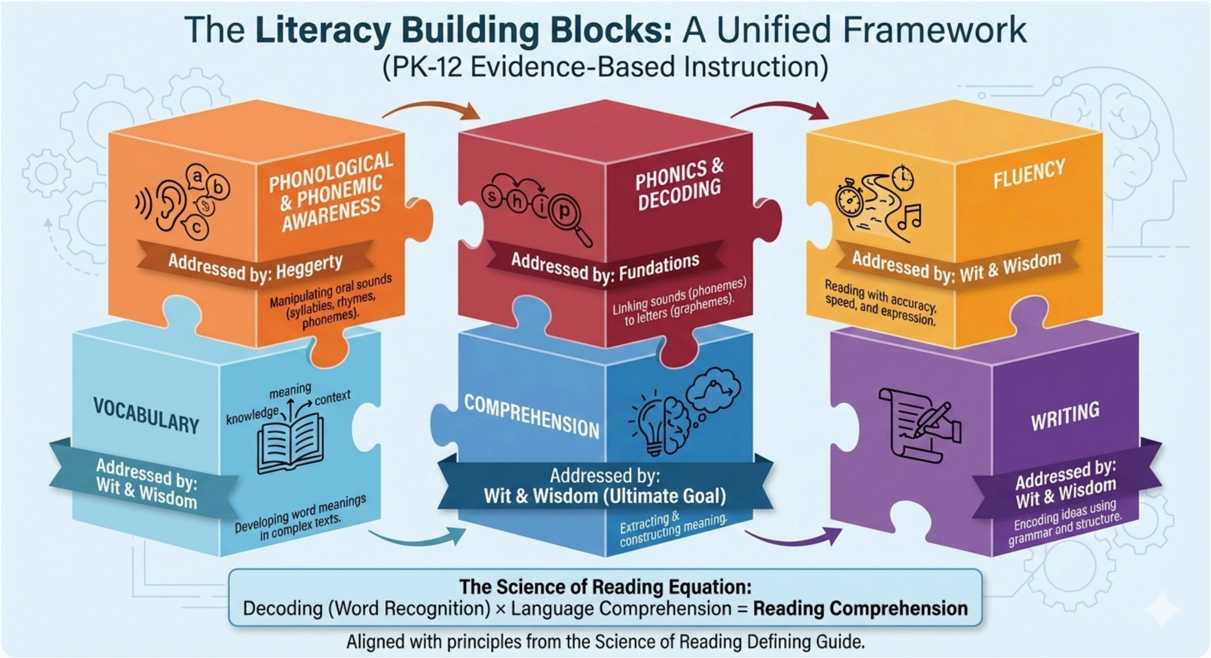
Heggerty	
Phoneme Manipulation & Transfer to Print **~45 sessions** **Learning Targets:** ● I can substitute the initial sound in a word to make a new word. ● I can substitute the final sound in a word to make a new word. ● I can substitute the vowel sound in a word to make a new word. ● I can blend and segment words with 4+ phonemes. ● I can add or delete final phonemes. ● I can connect phoneme manipulation to reading and spelling.	**Phoneme Manipulation & Transfer to Print** **~45 sessions** **Success Criteria:** ***Substituting the initial sound*** ● I listened to the word and identified the first sound. ● I removed the first sound in my head. ● I added the new first sound I was given. ● I blended the new sound with the rest and said the new word. ***Substituting the final sound*** ● I listened to the word and identified the last sound. ● I removed the last sound in my head. ● I added the new ending sound I was given. ● I blended the word with the new ending and said it. ***Substituting the vowel sound*** ● I listened to the word and heard the middle vowel sound. ● I removed the middle sound in my head. ● I put the new vowel sound in its place. ● I blended all three sounds and said the new word. ***Blending & segmenting 4+ phonemes*** ● I listened to all the sounds or the whole word. ● I held each sound in order in my head. ● I blended or chopped every sound including blends. ● I said the full word or all the separate sounds. ***Adding or deleting final phonemes*** ● I listened to the word and held it in my mind. ● I added the new sound to the end, or I removed the final sound I was told. ● I blended what was left and said the new word.

	Connecting manipulation to print - I heard or said the sounds in a word. - I matched each sound to the letter or letters that spell it. - I used what I know about sounds to help me read or spell the word.

Grade 1 ELA

Course Title:	Content Area:	Grade Level:	Credit (if applicable)
Grade 1 ELA	Literacy	**Grade 1**	N/A

Course Description:



In Grade 1, students participate in a structured literacy block that includes direct instruction in oral language, phonological awareness, phonics, fluency, vocabulary, comprehension, and writing.

Structured Literacy is a research-based, explicit, and systematic approach to reading instruction designed to ensure that every student becomes a proficient, confident reader. Many individuals often refer to the structured literacy approach as the Science of Reading (SOR).

This approach is grounded in **Scarborough's Reading Rope**, which explains that skilled reading is the result of two essential components working together: the ability to decode words (***Word Recognition***) and the ability to understand language (***Language Comprehension***).

Students study compelling topics through engaging texts. Teachers and students use the **Heggerty** program to build the foundational phonemic awareness students need to hear and manipulate sounds, a precursor to developing decoding skills. The **Fundations** program provides systematic instruction in phonics and spelling to master decoding.

These skills are then integrated with **Wit & Wisdom**, which develops rich comprehension, fluency, vocabulary, and writing. In conjunction with authentic core texts as well as Geodes decodables, Flyleaf & Heggerty readers build background knowledge around a diverse set of topics.

By utilizing this evidence-based framework, we provide a proactive pathway for all learners—improving student outcomes through early prevention of reading gaps and targeted intervention for those who need extra support.

Wit & Wisdom's integrated approach to learning enables students to activate and develop content and vocabulary knowledge while learning skills. In each module, students write about what they read, learn grammar, and then articulate the meaning of each text in formal and informal discussions with their peers. The Wit & Wisdom approach helps teachers celebrate the joy of reading and writing with students, while also supporting all learners in meeting the rigor of the ELA standards. By reading engaging texts and participating meaningfully in their learning, students develop the knowledge and skills they need to be successful readers, critical thinkers, and effective communicators who love to learn and can succeed in college and careers.

Through a rigorous and careful module design, students gain content knowledge and an awareness of how to read texts, write, speak, and listen. Each of the four modules in Grade 1 has a topical focus. For each module, students read or, in the case of younger students, hear read aloud a series of authentic texts on the topic and consider those texts critically and systematically. Frameworks of questioning, the Content Stages, and Content Framing Questions engage students in the content and in the process of reading complex texts. Content Framing Questions guide students' daily work of encountering, understanding, and analyzing complex texts. Students then distill each text's deeper meaning and, finally, articulate how the texts, individually and collectively, build their knowledge of the topic.

Throughout each module, standards are addressed in an integrated manner. Instead of addressing and assessing standards one by one, in isolation, the curriculum teaches reading, writing, speaking, listening, and language in an integrated manner so that students learn all skills in the context of module content. This integrated approach enables students to activate and build on their developing background and vocabulary knowledge of the module topic while learning skills in other areas.

In Grade 1, students participate in four core modules centered around how books expand our knowledge of the world, studying animals, how people respond to the powerful force of the wind, and end the year studying the story of *Cinderella* throughout various cultures. In addition, students will participate in an introductory, abbreviated module to learn and experience the instructional routines used by teachers. Please see the module overview below.

Finally, each module will also encompass the corresponding Fundations (phonics) unit as well as Heggerty pacing for phonemic awareness.

Aligned Core Resources:	**Connection to the *BPS Vision of the Graduate***
Wit & Wisdom Slide Decks	**Communication** ● Articulates thoughts and ideas effectively using oral, written, and nonverbal communication skills in a variety of forms and contexts. ● Utilize multiple media and technologies, and learn how to judge their effectiveness as well as assess their impact. ● Listen effectively to decipher meaning, including knowledge, values, attitudes, and intentions. ● Use communication for a range of purposes (e.g., to inform, instruct, motivate, and persuade).
Additional Course Information: ***Knowledge/Skill Dependent courses/prerequisites***	**Link to *Completed Equity Audit***
	2025 Wit & Wisdom Equity Curriculum Review

Standard Matrix

District Learning Expectations and Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
Reading Literature Standards				
CCSS.ELA-Literacy.RL.1.1- Ask and answer questions about key details in a text.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RL.1.2- Retell stories, including key details, and demonstrate understanding of their central message or lesson.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RL.1.3- Describe characters, settings, and major events in a story, using key details.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RL.1.4.- Identify words and phrases in stories and poems that suggest feelings or appeal to the senses.			**X**	**X**
CCSS.ELA-Literacy.RL.1.5- Explain major differences between books that tell stories and books that give information, drawing on a wide reading of a range of text types.			**X**	
CCSS.ELA-Literacy.RL.1.6- Identify who is telling the story at various points in a text.	**X**			X
CCSS.ELA-Literacy.RL.1.7- Use illustrations and details in a story to describe its characters, setting, or events.	X	X	X	**X**
CCSS.ELA-Literacy.RL.1.9- Compare and contrast the adventures and experiences of characters in stories.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RL.1.10- With prompting and support, read prose and	**X**	**X**	**X**	**X**

poetry of appropriate complexity for Grade 1.				
Reading Informational Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RI.1.1- Ask and answer questions about key details in a text.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RI.1.2- Identify the main topic and retell key details of a text.	**X**	**X**	**X**	
CCSS.ELA-Literacy.RI.1.3- Describe the connection between two individuals, events, ideas, or pieces of information in a text.	**X**	**X**	**X**	
CCSS.ELA-Literacy.RI.1.4- Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.	**X**	**X**	**X**	
CCSS.ELA-Literacy.RI.1.5- Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RI.1.6- Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.			**X**	**X**
CCSS.ELA-Literacy.RI.1.7-Use the illustrations and details in a text to describe its key ideas.	**X**	**X**	**X**	
CCSS.ELA-Literacy.RI.1.8- Identify the reasons an author gives to support points in a text.		**X**	**X**	
CCSS.ELA-Literacy.RI.1.9- Identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).		**X**	**X**	**X**
CCSS.ELA-Literacy.RI.1.10- With prompting and support, read informational texts appropriately complex for Grade 1.	**X**	**X**	**X**	**X**
Speaking & Listening Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.SL.1.1- Participate in collaborative conversations with diverse partners about Grade 1 topics and texts with peers and adults in small and larger groups.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.SL.1.1a- Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.SL.1b- Build on others' talk in conversations by responding to the comments of others through multiple exchanges.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.SL.1c- Ask questions to clear up any confusion about the topics or texts under discussion.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.SL.1.2- Ask and answer questions about key details in a text read aloud or information presented orally or through other media.	**X**	**X**	**X**	**X**

CCSS.ELA-Literacy.SL.1.3-Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.	X	X	X	X
Speaking & Listening Standards (continued)	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.SL.1.4- Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.	X	X	X	X
CCSS.ELA-Literacy.SL.1.5- Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, or feelings.	X	X	X	X
CCSS.ELA-Literacy.SL.1.6- Produce complete sentences when appropriate to the task and situation.	X	X	X	X
Writing Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.W.1.1- Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure.		X		X
CCSS.ELA-Literacy.W.1.2- Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.	X	X	X	
CCSS.ELA-Literacy.W.1.3- Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.	X		X	
CCSS.ELA-Literacy.W.1.5- With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.	X	X	X	X
CCSS.ELA-Literacy.W.1.6- With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.		X		
CCSS.ELA-Literacy.W.1.7- Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions).		X	X	X
CCSS.ELA-Literacy.W.1.8- With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	X	X	X	X
Language Standards	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.L.1.1- Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	X	X	X	X
CCSS.ELA-Literacy.L.1.1a- Print all upper and lowercase letters.	X	X	X	X
CCSS.ELA-Literacy.L.1.1b- Use common, proper, and possessive nouns.	X	X	X	X

CCSS.ELA-Literacy.L.1.1c-Use singular and plural nouns with matching verbs in basic sentences (e.g., He hops; we hop.)	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.1d-Use personal, possessive, and indefinite pronouns (e.g., I, me, my; they, them, their, anyone, everything).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.1e- Use verbs to convey a sense of past, present, and future.	**X**	**X**	**X**	**X**
Language Standards (continued)	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.L.1.1f- Use frequently occurring adjectives.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.1g- Use frequently occurring conjunctions.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.1h- Use determiners (articles, demonstratives).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.1i- Use frequently occurring prepositions.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.1j- Produce and expand complete simple, compound declarative, interrogative, imperative, and exclamatory sentences in response to prompts.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.2- Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.2a- Capitalize dates and names of people.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.2b- Use end punctuation for sentences.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.2c- Use commas in dates and to separate single words in a series.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.2d- Use conventional spelling for words with common spelling patterns and for frequently occurring irregular words.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.2e- Spell untaught words phonetically, drawing on phonemic awareness and spelling conventions.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.4- Determine or clarify the meaning of unknown words and multiple-meaning words and phrases based on grade 1 reading and content, choosing flexibly from an array of strategies.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.4a- Use sentence-level context as a clue to the meaning of a word or phrase.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L. 1.4b- Use frequently occurring affixes as a clue to the meaning of a word.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.4c- Identify frequently occurring root words (look) and their inflectional forms (looks, looked, looking).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.5- With guidance and support from adults, demonstrate understanding of word relationships and nuances in word meanings.	**X**	**X**	**X**	**X**

CCSS.ELA-Literacy.L.1.5a- Sort words into categories to gain a sense of the concepts the categories represent.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.5b- Define words by category and by one or more key attributes.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.5c- Identify real-life connections between words and their use (e.g., note places at school that are colorful).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.L.1.5d- Distinguish shades of meaning among verbs differing in manner and adjectives differing in intensity by defining them or choosing them or by acting out their meanings.	**X**	**X**	**X**	**X**
Language Standards (continued)	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.L.1.6- Use words and phrases acquired through conversations, reading, and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships.	**X**	**X**	**X**	**X**
Reading: Foundational Skills- Print Concepts	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.1.1- Demonstrate understanding of the organization and basic features of print.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.1a-Recognize the distinguishing features of a sentence (e.g., first word, capitalization, ending punctuation).	**X**	**X**	**X**	**X**
Reading: Foundational Skills- Phonological Awareness	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.1.2- Demonstrate understanding of spoken words, syllables, and sounds (phonemes).	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.2a-Distinguish long from short vowel sounds in spoken single-syllable words.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.2b-Orally produce single-syllable words by blending sounds (phonemes), including consonant blends.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.2c-Isolate and pronounce initial, medial vowel, and final sounds in spoken single-syllable words.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.2d-Segment spoken single-syllable words into their complete sequence of individual sounds (phonemes).	**X**	**X**	**X**	**X**
Reading: Foundational Skills- Phonics & Word Recognition	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.1.3-Know and apply grade-level phonics and word analysis skills in decoding words.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.3a- Know the spelling-sound correspondence from common consonant digraphs.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.3b- Decode regularly spelled one-syllable words.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.3c- Know final -e and common vowel team	**X**	**X**	**X**	**X**

conventions for representing long vowel sounds.				
CCSS.ELA-Literacy.RF.1.3d- Use knowledge that every syllable must have a vowel sound to determine the number of syllables in a printed word.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF. 1.3e- Decode two-syllable words following basic patterns by breaking the words into syllables.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.3f- Read words with inflectional endings.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.3g- Recognize and read grade-appropriate irregularly spelled words.	**X**	**X**	**X**	**X**
Reading: Foundational Skills- Fluency	**Module 1**	**Module 2**	**Module 3**	**Module 4**
CCSS.ELA-Literacy.RF.1.4- Read with sufficient accuracy and fluency to support comprehension.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.4a- Read grade-level text with purpose and understanding.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.4b- Read grade-level text orally with accuracy, appropriate rate, and expression on successive readings.	**X**	**X**	**X**	**X**
CCSS.ELA-Literacy.RF.1.4c- Use context to confirm or self-correct word recognition and understanding, rereading as necessary.	**X**	**X**	**X**	**X**

Standards Alignment Resources:

Wit & Wisdom Standards Alignment.pdf
Fundations Standards Alignment.pdf
Heggerty Standards Alignment.pdf

Unit Links

Module 0: Building Readers!
Module 1: A World of Books
Module 2: Creature Features
Module 3: Powerful Forces
Module 4: Cinderella Stories

Module 0: Building Readers!

<table>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">Module 0: Building Readers!</td></tr>
<tr><td colspan="2">Relevant Standards: Bold indicates priority</td></tr>
<tr><td colspan="2">See above.</td></tr>
<tr><td>Essential Question(s):</td><td>Enduring Understanding(s):</td></tr>
<tr><td>How does reading help us learn?</td><td>Students in Grade 1 will understand the following concepts as a result of this module:
Reading a book multiple times for different purposes helps readers better understand and enjoy the story.
Different readers enjoy different types of books.</td></tr>
<tr><td>Demonstration of Learning:</td><td>Pacing for Unit</td></tr>
<tr><td>Students at the end of this introductory module participate in a visual art analysis and discussion about a text. The goal of this unit is to introduce and teach routines that will be essential for the remainder of this course rather than creating a final learning product.</td><td>6 school days</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>WW_Family_Letter_English.pdf
WW_Family_Letter_Spanish.pdf</td><td>Videos and digital visual art displays are listed below.</td></tr>
<tr><td>Unit-specific Vocabulary:</td><td>Aligned Unit Materials, Resources, and Technology (beyond core resources):</td></tr>
<tr><td>Content Vocabulary
<table>
<tr><td>scales</td><td>glide</td><td>beauty</td></tr>
<tr><td>octopus</td><td>shimmery</td><td></td></tr>
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Academic Vocabulary
<table>
<tr><td>Text</td><td>Knowledge</td><td>Echo Read</td></tr>
<tr><td>Notice</td><td>Wonder</td><td>Sentence Frame</td></tr>
</table></td><td>Module 0 Teacher Edition (Digital)
<i>Rainbow Fish</i>, Marcus Pfister
<i>The Goldfish</i>, Henri Matisse</td></tr>
</table>

tableaux	Socratic Seminar	

Visual Art Vocabulary

Color	Shape	Line

Opportunities for Interdisciplinary Connections:

Science: In this module, students explore the intersection of marine biology and visual arts through the lens of Henri Matisse’s vibrant aesthetic and the iconic imagery of *The Rainbow Fish*. By engaging with these stylized depictions of aquatic life, students analyze real-world animal behaviors, habitats, and physical traits, practicing the scientific habit of "noticing" how bold colors and fluid shapes represent diverse species and their environmental adaptations. Using tools like a magnifying glass, students conduct close observations of the book's intricate textures and patterns, moving beyond literal realism to identify the essential characteristics of the natural world. This integrated approach encourages students to synthesize artistic interpretation with biological inquiry, fostering a deeper appreciation for the biodiversity and unique traits found within a reef ecosystem.

Social Studies: In this module, students explore the social and ethical dimensions of community and sharing through the narrative of *The Rainbow Fish*, viewed through the lens of Henri Matisse’s expressive artistic style. By analyzing the fish’s journey, students engage with Social Studies concepts such as citizenship, cooperation, and the balance between individual identity and collective identity.

Social Emotional Learning: Using the vibrant lens of Henri Matisse, students explore the social-emotional themes of identity, empathy, and belonging within *The Rainbow Fish*. This module emphasizes the habit of "noticing" emotional cues and shifts in mood, using tools like a magnifying glass to examine how artistic details reflect feelings such as pride, loneliness, and joy. By analyzing the protagonist’s journey from isolation to community, students develop self-awareness and relationship skills, learning how sharing their unique "inner light" fosters both personal growth and collective harmony.

Anticipated misconceptions:

Students may have misconceptions of:

- Students may struggle to distinguish between the fantasy elements (animals reading) and the realistic elements of a story.
- Students may think they know a word because they can say it or decode it. True knowledge of a word involves understanding its meaning in different contexts. (E.g., *wild,* acting crazy, undomesticated animals, deeply enthusiastic, excited.)
- Visual art is more than pretty or weird shapes. Artists use specific elements like line, shape, and color to communicate an idea or feeling.

Connections to Prior Units:	**Connections to Future Units:**
This is the first unit of the course. Students in Grades K-2 will participate in this routines-oriented unit to re-establish expectations for the literacy block and as an introduction to students new to the district. **The core text was substituted based on recommendations by the publisher.**	This unit provides the opportunity for classrooms to establish the routines necessary for future work in preceding Wit & Wisdom units.

Differentiation through *Universal Design for Learning*

UDL Indicator & Teacher Actions:

Engagement
- Connect the "Essential Question" to students' personal interests by allowing them to bring a favorite book or object from home to share during the "Welcome" routine.
- During the Socratic Seminar, provide "talking chips" or "equity sticks" to ensure equitable participation and reduce the social anxiety of speaking in a large group.
- Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class.

Representation
- Pair written observations with matching drawings or icons to increase accessibility for non-readers.
- Use a word wall with visual anchors (pictures) next to key terms so students can refer to them independently during the unit.
- Use echo reading for the Essential and Focusing Questions, providing a clear vocal model and physical tracking of the text to help students connect spoken words to print.

Action & Expression
- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.

Supporting Multilingual/English Learners

Related *CELP standards:* and differentiated Learning Targets:

Standards	**Emerging**	**Expanding**	**Bridging**
LT 1 CELP 1	With heavy support (gestures, native language, or pictures), I can point to or name one thing I notice in a picture from a text.	I can use the sentence frame, "I notice…" to describe a specific detail I see in an illustration.	I can explain how a detail I noticed in the pictures helps me understand a specific word or event in the story.
LT 2 CELP 2	I can echo read the Essential Question by repeating the words the teacher says while pointing to the text.	During a Socratic seminar, I can use a sentence starter to agree or disagree with a classmate's idea about the story.	I can use a talking chip to share one idea on how the librarian makes reading fun during a small-group discussion.

LT 3 CELP 3	I can communicate an idea about a story by drawing a picture.	I can write a complete sentence to explain the essential meaning or a lesson I learned from the book.	I can use a combination of drawings and a complete sentence to identify an animal and what it likes to read.
LT 4 CELP 10	I can find a word on the Word Wall by looking for its matching picture.	I can use domain-specific art vocabulary, such as color, shape, or line, to describe how a painting tells a story.	I can use the word “knowledge” in a sentence to tell my partner one thing I learned from the text.

Lesson Sequence	**Learning Target**	**Success Criteria/ Assessment**	**Resources**
1	I can make observations about a text.	I used sentence frames to make observations about a text.	*Rainbow Fish* Module 0 Teacher Edition (Digital)
2	I can make observations about a text.	I can show how my character changes to demonstrate a key event in a text.	*Rainbow Fish*
3	I can identify how words and pictures work together to communicate key details and meaning.	I used evidence from the pictures and words to explain what is happening in the text.	*Rainbow Fish*
4	I can determine the essential meaning of a text. I can explain how a character’s actions impact others in a text.	I explained the essential meaning of *Rainbow Fish* and used details to support my thinking.	*Rainbow Fish*

5	I can discuss how a text builds our knowledge. I can improve my writing by responding to peer feedback.	I participated in a Socratic Seminar to share my ideas and listen to my classmates. .	*Rainbow Fish*
6	I can describe how an artist uses color and shape to tell a story in a painting.	I explained how an artist uses colors and shapes to tell a story in a painting.	*The Goldfish* PDF WW_Nat_GK2_...

Fundations

As part of Module 0, students will continue to be instructed using Fundations. Students will start an introductory Orientation unit to review common procedures. It also acts as a bridge for students new to Fundations.

Fundations Lessons	**Learning Targets**	**Success Criteria**
Level 1 Orientation	I can use my tools to help me recognize letters and sounds in order to say, read, and write them.	With and without prompting, I can recognize taught letters and sounds. I can use proper pencil grip and scaffolds (Fundations lines) to form letters. With adult support, I can track text with one-to-one correspondence.

Heggerty

Week 1	**Phoneme Isolation & Syllable Blending ~30 sessions** **Learning Targets:** • I can isolate the initial sound in a spoken word, including words beginning with vowel sounds. • I can isolate the final sound in a spoken word, including consonant digraphs. • I can blend syllables to say a whole word. • I can blend 2-3 phonemes into a spoken word. • I can segment a spoken word into syllables. • I can delete a syllable from a spoken word. • I can connect spoken sounds to their letters.	**Phoneme Isolation & Syllable Blending ~30 sessions** **Success Criteria:** *Isolating the initial sound* • I listened to the whole word. • I noticed if the first sound was a consonant or a vowel. • I held that first sound and said it on its own. *Isolating the final sound* • I listened to the whole word. • I held the ending sound, including if it was a digraph. • I said only the last sound I heard. *Blending syllables* • I listened to each syllable chunk. • I put the chunks together in my head.

		● I said the whole word. *Blending 2-3 phonemes* ● I listened to each individual sound. ● I held all the sounds in order. ● I put the sounds together and said the word. *Segmenting syllables & deleting a syllable* ● I listened to the whole word. ● I clapped out the syllable chunks. ● I removed the syllable I was told. ● I said what was left. *Connecting phonemes to graphemes* ● I heard or said the sound. ● I thought about which letter or letters make that sound. ● I matched the sound to the correct letter.

Module 1: A World of Books

Module 1: A World of Books

Relevant Standards: Bold indicates priority

See above.

Essential Question(s):	**Enduring Understanding(s):**
How do books change lives around the world?	Students in Grade 1 will understand the following concepts as a result of this module: • Reading helps people everywhere build knowledge. • Stories have messages that can change the way people think and feel. • People all over the world enjoy books, though people living in different places get books in different ways. • Some people, including all kinds of librarians around the world, dedicate their lives to making sure others have access to books. • Reading changes lives by helping people imagine things they have not experienced.
Demonstration of Learning:	**Pacing for Unit**
Students may demonstrate their learning within this unit in a variety of ways. At the end of this module, students will craft a narrative about a character whose life has changed because of books. In addition, students will participate in a Socratic seminar and several assessments throughout the unit, such as vocabulary and "New Read" assessments, demonstrating their comprehension skills with new texts.	39 school days
Family Overview (link below)	**Integration of Technology:**
WW_G1_M1_FamilyTipSheet_English.pdf WW_G1_M1_FamilyTipSheet_Spanish.pdf	Videos and digital visual art displays are listed below.
Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology (beyond core resources):**
WW_G1_MLL_Glossaries_English.pdf WW_G1_MLL_Glossaries_Spanish.pdf	WW_Nat_G1_M1_TE_Lesson01-06_v2.pdf WW_Nat_G1_M1_TE_Lesson07-12_v2.pdf WW_Nat_G1_M1_TE_Lesson13-16_v2.pdf WW_Nat_G1_M1_TE_Lesson17-22_v2.pdf WW_Nat_G1_M1_TE_Lesson23-27_v2.pdf WW_Nat_G1_M1_TE_Lesson28-32_v2.pdf

Content Vocabulary

borrow	britches	burrows
chicken scratch	creatures	*duck*
dump	granted	market
migrant	*mobile*	*poke*
reveal	reckon	*remote*
spell	village	yearn

Academic Vocabulary

adjective	arduous	base word
caption	capitalize	central message
character	collect	common noun
contact	declarative sentence	eager
edit	encourage	fancy
imagination	imperative sentence	*inspire*
passionate	problem	proper noun
resolution	revise	*scholar*
sentence frames	setting	shades of meaning
signs	storyteller	temporal words
value	valued	verb

Visual Art Vocabulary

landscape	*portrait*	*still life*

Core Texts

Tomas and the Library Lady, Pat Mora
Waiting for the Biblioburro, Monica Brown
That Book Woman, Heather Henson
Green Eggs and Ham, Dr. Seuss
Museum ABC, The Metropolitan Museum of Art
My Librarian is a Camel, Margriet Ruurs

Supplementary Texts

The Old Farmer's Almanac

Multimedia

CNN Heroes: Luis Soriano
Pack Horse Librarians
ASL Signs for Yes
ASL Signs for No
ASL Signs for Same

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
Science: The *Wit & Wisdom* Grade 1 Module 1 curriculum, *A World of Books*, is strategically designed to foster focused instruction on systematic observation and evidence-based inquiry. Through the "Notice and Wonder" routine, students develop the habit of gathering sensory data and formulating investigative questions, a process that directly mirrors the initial stages of the Scientific Method. For example, in the study of the informational text *Museum ABC*, students are not merely identifying letters but are tasked with analyzing fine art to find specific details—such as the texture of an apple or the lines of a boat—practicing scientific observations. This integration ensures that students view literacy as a tool for acquiring domain-specific knowledge, preparing them to categorize information and communicate findings in later STEM coursework. **Social Studies:** The *Wit & Wisdom* Grade 1 Module 1 curriculum, *A World of Books*, provides a focus of instruction on human-environment interaction and global citizenship. Through the study of texts like *My Librarian is a Camel* and *Waiting for the Biblioburro*, students analyze how diverse cultures adapt to their physical geography to solve the universal challenge of resource distribution. This exploration of "community helpers" across the globe—from Kenya to Colombia—allows students to compare their local library systems with international models. By evaluating how the environment and transportation shape the lives of others, students meet foundational standards for geography and civics while developing an understanding of their role within a global society. **Social Emotional Learning:** The *Wit & Wisdom* Grade 1 Module 1 curriculum, *A World of Books*, provides a framework for Social-Emotional Learning by focusing instruction on the core competencies of perseverance and perspective-taking. Through the "Notice and Wonder" routine, students develop self-awareness and executive functioning as they focus on detailed analysis. By examining the challenges characters face in texts like *Waiting for the Biblioburro* and *Tomas and the Library Lady*, students build social awareness and empathy, recognizing the persistence required to overcome barriers to education. This module explicitly fosters a growth mindset, teaching students that literacy is not just an academic skill, but a tool for personal empowerment and emotional connection within their own communities and the wider world.	● A “library” only looks like a building, making it harder to understand that book access is different around the world. ● All children around the world get books the same way we do. ● Illustrations are decoration rather than a meaningful source of information. ● Retelling a story means repeating every detail rather than identifying the most important ones.

Art: An interdisciplinary art unit would be a study of the portrait, guiding first graders to look at how artists capture personality and emotion through facial expression, posture, and the objects around a sitter. Teachers could pair this with a study of picture-book illustration as its own art form, since the module's texts feature dramatically different illustration styles (Raul Colón's lush, dreamlike imagery in *Tomás and the Library Lady*, John Parra's folk-art palette in *Waiting for the Biblioburro*, and David Small's expressive ink work in *That Book Woman*). Students can compare how each illustrator visually shows a character changed by books, then create their own illustrated self-portrait that shows who they are as a reader — connecting their writing in the EOM Task to a visual self-representation in the spirit of *Museum ABC*	
Connections to Prior Units:	**Connections to Future Units:**
This is the second unit of the course. Students will leverage the newly taught routines in Module 0 through a more in-depth study of a particular topic through a variety of texts and works of visual art.	This unit is focused on narrative types of writing–part of a cycle structure throughout the Wit & Wisdom curricular resource. Students will leverage skills taught in this unit in later units with different genres of text.

Differentiation through Universal Design for Learning

UDL Indicator & Teacher Actions:

Engagement
- Connect the "Essential Question" to students' personal interests by allowing them to bring a favorite book or object from home to share during the "Welcome" routine.
- During the Socratic Seminar, provide "talking chips" or "equity sticks" to ensure equitable participation and reduce the social anxiety of speaking in a large group.
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Supporting Multilingual/English Learners

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Lesson Sequence	Learning Target	Success Criteria/ Assessment	Resources
Focusing Question 1: Lessons 1-6 **How do library books change life for Tomas?**			
1	**Content Learning Target:** I can use details from words and pictures to describe how a character changes throughout a story. **Literacy Skills Learning Target:** I can use what I notice about text features and illustrations to make observations and ask questions about a text.	• I can share something I noticed about Museum ABC. • I can ask a question about Tomás and the Library Lady. • I can record an observation in my Response Journal. • I can use a question word (who, what, where,	*Tomás and the Library Lady,* Pat Mora *Museum ABC,* The Metropolitan Museum of Art MET Artwork Resources Lesson Materials

		when, why, how) to ask a question.	
2	**Content Learning Target:** I can use details from words and pictures to describe how a character changes throughout a story. **Literacy Skills Learning Target:** I can use sentence frames to speak and write in complete sentences.	• I can identify a portrait in Museum ABC. • I can name a character, setting, and event in Tomás and the Library Lady. • I can use a sentence frame to share an idea. • I can explain why sentence frames help us write clearly.	*Tomás and the Library Lady,* Pat Mora *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
3	**Content Learning Target:** I can use details from words and pictures to describe how a character changes throughout a story. **Literacy Skills Learning Target:** I can use a sentence frame to speak and write about a text.	• I can identify the subject of a group of paintings as landscape. • I can retell a key event from the text. • I can complete a sentence frame about Tomás. • I can use my sentence in a Think-Pair-Share.	*Tomás and the Library Lady,* Pat Mora *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
4 ✔FQT	**Content Learning Target:** I can use details from words and pictures to describe how a character changes throughout a story. **Literacy Skills Learning Target:** I can use sentence frames to write complete sentences about a text.	• I can name the problem and resolution in Tomás's story. • I can complete a sentence frame in writing. • I can use a complete sentence to share my idea.	*Tomás and the Library Lady,* Pat Mora *Museum ABC,* The Metropolitan Museum of Art ASL: Sign for 'yes' ASL: Sign for 'no' Lesson Materials

5 ✔FQT	**Content Learning Target:** I can use details from words and pictures to describe how a character changes throughout a story. **Literacy Skills Learning Target:** I can tell the difference between a character's imagination and reality in a story.	• I can find an example of Tomás imagining something. • I can act out a key scene from the story. • I can describe Tomás using a sentence frame. • I can collect evidence about Tomás for the Focusing Question Task.	*Tomás and the Library Lady,* Pat Mora *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
6	**Content Learning Target:** I can use details from words and pictures to describe how a character changes throughout a story. **Literacy Skills Learning Target:** I can improve my writing by using sentence frames carefully.	• I can draw a portrait of Tomás. • I can connect a fact from the author's note to the story. • I can revise a sentence using a sentence frame. • I can add what I learned to our class Knowledge Journal.	*Tomás and the Library Lady,* Pat Mora *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
Focusing Question 2: Lessons 7-12 **How does the Biblioburro change life for Ana?**			
7 ✔NR	**Content Learning Target:** I can describe how events in a story can change a character's life. **Literacy Skills Learning Target:** I can read with fluency by paying attention to accuracy and pace.	• I can share an observation about the book. • I can ask a question about Ana's life. • I can read a passage with accuracy. • I can name the parts of fluent reading.	*Waiting for the Bibioburro,* Monica Brown Lesson Materials

8	**Content Learning Target:** I can describe how events in a story can change a character's life. **Literacy Skills Learning Target:** I can identify what is happening across groups of paintings or pictures.	• I can name the characters and setting. • I can group paintings in Museum ABC by what they show. • I can retell a key event from the book. • I can read aloud with fluency.	*Waiting for the Bibioburro,* Monica Brown *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
9	**Content Learning Target:** I can describe how events in a story can change a character's life. **Literacy Skills Learning Target:** I can read with phrasing and proper pausing.	• I can name the problem and resolution in the story. • I can pause at the right places when I read aloud. • I can explain why writing complete sentences matters. • I can identify a complete sentence.	*Waiting for the Bibioburro,* Monica Brown Lesson Materials
10	**Content Learning Target:** I can describe how events in a story can change a character's life. **Literacy Skills Learning Target:** I can read with expression and write complete sentences.	• I can read a passage with expression. • I can describe Ana using details from the book. • I can write a complete sentence about a character.	*Waiting for the Bibioburro,* Monica Brown Lesson Materials

		• I can edit a sentence to make it complete.	
11 ✔FQT	**Content Learning Target:** I can describe how events in a story can change a character's life. **Literacy Skills Learning Target:** I can write complete sentences when writing about a text.	• I can read a passage at a good rate. • I can complete the Essential Questions Chart with details from the book. • I can write a complete sentence about Ana. • I can use a capital letter and end punctuation.	*Waiting for the Bibioburro,* Monica Brown Lesson Materials
12	**Content Learning Target:** I can describe how events in a story can change a character's life. **Literacy Skills Learning Target:** I can improve my writing by checking for complete sentences.	• I can draw a portrait of Ana. • I can connect a fact from the author's note to the story. • I can revise a sentence to make it complete with a capital letter and end punctuation. • I can add to our class Knowledge Journal.	*Waiting for the Bibioburro,* Monica Brown *CNN Heroes: Luis Soriano* ASL: Sign for 'same' Lesson Materials
Focusing Question 3: Lessons 13-16 **How do people around the world get books?**			
13 ✔NR	**Content Learning Target:** I can describe how people around the world get books by discussing and writing.	• I can share an observation about Museum ABC. • I can complete New-Read Assessment 1.	*My Librarian is A Camel,* Margriet Ruurs *Museum ABC,* The Metropolitan Museum of Art

	Literacy Skills Learning Target: I can ask questions about a new informational text.	• I can ask a question about how children get books. • I can record an observation in my Response Journal.	Lesson Materials
14	**Content Learning Target:** I can describe how people around the world get books by discussing and writing. **Literacy Skills Learning Target:** I can identify and capitalize proper nouns in my writing.	• I can name the main topic of the introduction. • I can find a key detail. • I can identify a proper noun in a sentence. • I can tell why proper nouns are capitalized.	*My Librarian is A Camel,* Margriet Ruurs Lesson Materials
15	**Content Learning Target:** I can describe how people around the world get books by discussing and writing. **Literacy Skills Learning Target:** I can use pictures and captions to gather evidence about a text.	• I can read a caption to learn about a country. • I can record evidence on a sentence chart. • I can identify a proper noun in the text. • I can write a sentence with a proper noun.	*My Librarian is A Camel,* Margriet Ruurs Lesson Materials
16 ✔FQT ✔VOC	**Content Learning Target:** I can describe how people around the world get books by discussing and writing.	• I can find a quotation in the text. • I can record evidence from a quotation on a sentence chart.	*My Librarian is A Camel,* Margriet Ruurs Lesson Materials

	Literacy Skills Learning Target: I can use proper nouns correctly in my writing.	• I can capitalize proper nouns in my writing. • I can write a sentence using a proper noun about a country.	
Focusing Question 4: Lessons 17-22 **How does the packhorse librarian change life for Cal?**			
17	**Content Learning Target:** I can describe how events in a story can change a character’s feelings. **Literacy Skills Learning Target:** I can ask and answer questions about key events in a story.	• I can share an observation about That Book Woman. • I can ask a question about Cal's life. • I can record an observation in my Response Journal.	*That Book Woman,* Heather Henson *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
18	**Content Learning Target:** I can describe how events in a story can change a character’s feelings. **Literacy Skills Learning Target:** I can participate in a discussion about a character by listening and responding to what my classmates are saying.	• I can name characters, setting, and key events. • I can respond to a partner's idea using a sentence frame. • I can tell why it is important to respond to others.	*That Book Woman,* Heather Henson Lesson Materials

		• I can take a turn in a small-group discussion.	
19	**Content Learning Target:** I can describe how events in a story can change a character’s feelings. **Literacy Skills Learning Target:** I can respond to a classmate's comments using complete sentences.	• I can match a facial expression to a scene in the story. • I can describe Cal's feelings at the beginning and end. • I can respond to a partner by adding on to their idea. • I can collect evidence about Cal's feelings.	*That Book Woman,* Heather Henson Lesson Materials
20	**Content Learning Target:** I can describe how events in a story can change a character’s feelings. **Literacy Skills Learning Target:** I can use context clues to figure out the meaning of an unknown word.	• I can find an unknown word in the text and figure out its meaning. • I can describe how Cal's feelings change. • I can use a sentence frame to share my idea.	*That Book Woman,* Heather Henson Lesson Materials
21 ✔FQT ✔SS	**Content Learning Target:** I can describe how events in a story can change a character’s feelings. **Literacy Skills Learning Target:** I can use adjectives (describing words) to add details in my writing.	• I can connect a fact from the author's note to the story. • I can compare a video about packhorse librarians to the book. • I can use an adjective to describe Cal. • I can write a sentence using an adjective.	*That Book Woman,* Heather Henson ASL: Sign for ‘same’ *The Old Farmer’s Almanac* Lesson Materials

22	**Content Learning Target:** I can describe how events in a story can change a character's feelings. **Literacy Skills Learning Target:** I can improve my writing by adding strong adjectives.	• I can complete the Essential Questions Chart with information from That Book Woman. • I can revise a sentence by adding an adjective. • I can record knowledge in our class Knowledge Journal. • I can use a complete sentence with an adjective.	*That Book Woman*, Heather Henson Lesson Materials
Focusing Question 5: Lessons 23-27 **How can books change my life?**			
23 ✔NR	**Content Learning Target:** I can describe how books can change my life. **Literacy Skills Learning Target:** I can ask questions about a new story.	• I can share an observation about the artwork in Museum ABC. • I can ask a question about Green Eggs and Ham. • I can use a question word to ask a question. • I can record an observation in my Response Journal.	*Green Eggs and Ham*, Dr. Seuss *Museum ABC*, The Metropolitan Museum of Art Lesson Materials
24	**Content Learning Target:** I can describe how books can change my life. **Literacy Skills Learning Target:**	• I can describe the subject matter in select Museum ABC paintings. • I can identify the characters in Green Eggs and Ham.	*Green Eggs and Ham*, Dr. Seuss *Museum ABC*, The Metropolitan Museum of Art Lesson Materials

	I can identify story elements and retell events in sequence.	• I can retell a beginning, middle, and end event. • I can tell why sequencing events matters.	
25	**Content Learning Target:** I can describe how books can change my life. **Literacy Skills Learning Target:** I can sequence the events of a story in writing.	• I can show which character is speaking using a Nonverbal Signal. • I can perform a Readers' Theater section. • I can put three events from the story in order. • I can use sequencing words (first, next, then, last).	*Green Eggs and Ham,* Dr. Seuss *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
26 ✔FQT	**Content Learning Target:** I can describe how books can change my life. **Literacy Skills Learning Target:** I can write events in sequence to retell a story.	• I can share the central message of the book. • I can find evidence that supports the central message. • I can write a sequence of events in order. • I can use sequencing words in my writing.	*Green Eggs and Ham,* Dr. Seuss *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
27 ✔SS	**Content Learning Target:** I can describe how books can change my life. **Literacy Skills Learning Target:** I can improve my writing by sequencing events more clearly.	• I can draw my self-portrait for the EOM Task. • I can take a turn in a Socratic Seminar. • I can revise my writing to improve event order. • I can use sequencing words to connect events.	*Green Eggs and Ham,* Dr. Seuss *Museum ABC,* The Metropolitan Museum of Art Lesson Materials

Focus Question 6: Lessons 28-32 **How do books change lives around the world?**			
28 ✔VOC ✔EOM	**Content Learning Target:** I can describe how books change the lives of people around the world. **Literacy Skills Learning Target:** I can use story elements to plan a narrative.	• I can illustrate the cover for my EOM book. • I can name the story elements (characters, setting, problem, resolution). • I can plan a narrative using story elements. • I can explain why story elements help an author write a story.	*Green Eggs and Ham,* Dr. Seuss *Museum ABC,* The Metropolitan Museum of Art Lesson Materials
29 ✔EOM	**Content Learning Target:** I can describe how books change the lives of people around the world. **Literacy Skills Learning Target:** I can use story elements to write a narrative.	• I can record knowledge in the Knowledge Journal. • I can write a character description for my narrative. • I can describe a setting in my narrative. • I can use a complete sentence in my writing.	All Module Texts Lesson Materials
30 ✔EOM	**Content Learning Target:** I can describe how books change the lives of people around the world. **Literacy Skills Learning Target:** I can use story elements to continue writing a narrative.	• I can name a way each Module 1 text shows books changing lives. • I can continue working on my EOM Task. • I can write a problem and a resolution in my narrative. • I can illustrate a scene from my narrative.	All Module Texts Lesson Materials

31 ✔EOM	**Content Learning Target:** I can describe how books change the lives of people around the world. **Literacy Skills Learning Target:** I can use story elements to complete a narrative.	• I can create a tableaux of 'before and after books'. • I can complete my EOM Task narrative. • I can use complete sentences in my writing. • I can use proper nouns and adjectives correctly.	All Module Texts Lesson Materials
32 ✔SS	**Content Learning Target:** I can describe how books change the lives of people around the world. **Literacy Skills Learning Target:** I can respond to others' ideas in a Socratic Seminar.	• I can take a turn in a Socratic Seminar. • I can respond to a classmate's idea by adding on. • I can present my EOM Task to the class. • I can reflect on what I learned across the module.	All Module Texts Lesson Materials

Fundations
Unit 1 will review many of the taught concepts in K around letter identification and letter-sound correspondence. Fundations recommends a pacing of 3 weeks, but provides teachers with options to condense this unit for students familiar with the program and/or students whose BOY data demonstrates a strong command of these skills. As a reminder, **80% of students should master the unit assessment with a score of 80% or more when determining to advance instruction.**

Fundations Lessons	**Learning Targets & Success Criteria**
Unit 1- ~ 3 weeks, 15 days.	*I can name and say the sound for every letter of the alphabet.* ● I can name and say the sound for every letter of the alphabet. ● I can say the sound each letter makes. ● I can match each letter to its keyword picture (e.g., /a/ - apple). *I can write every lowercase letter correctly using Fundations lines.* ● I can use the right pencil grip and start each letter in the right place. ● I can say the letter name as I write it. *I can say and use the alphabet in order.* ● I can put letters in alphabetical order. ● I can identify which letters come before and after a given letter. *I can identify the words in a spoken sentence and recognize how sentences are built.* ● I can identify and count the words in a spoken sentence. ● I can recognize that sentences start with a capital letter and end with a punctuation mark. ● I can retell or act out part of a story that was read to me.
Unit 2~ 2 weeks, 10 days.	*I can blend sounds together to read 3-sound short-vowel words.* ● I can tap out (segment) every sound in a 3-sound word. ● I can blend sounds together to read a word (e.g., c-a-t -> cat). ● I can read simple 3-sound words with short vowels (CVC words). *I can listen to a word and spell it by writing each sound in order.* ● I can listen to a word and write each sound in order. ● I can spell 3-sound short-vowel words (e.g., sip, log, fox). ● I can check my spelling by tapping out the sounds.

	I can change sounds in a word to make new words. • I can change the first sound in a word to make a new word. • I can change the last sound in a word to make a new word. • I can identify and change the middle (vowel) sound in a word. *I can write a complete sentence with a capital letter, spaces, and a period.* • I can write a sentence that starts with a capital letter. • I can put a period at the end of a sentence.
Unit 3 ~ 2 weeks, 10 days.	*I can explain what a digraph is and say the sound for sh, ch, th, wh, and ck.* • I can explain that a digraph is two letters that make one sound. • I can say the sound for sh, ch, th, wh, and ck. • I can identify the digraph in a word. *I can read and spell words with digraphs and use the -ck rule.* • I can read words with digraphs (chop, wish, sock). • I can spell words with digraphs. • I know that -ck only comes right after a short vowel at the end of a word when writing or spelling. *I can use correct end punctuation in a sentence.* • I can read a sentence and decide if it is a statement or a question. • I can put a question mark or period at the end of a sentence. *I can write a complete sentence with a capital letter, spaces, and a period.* • I can write a sentence that starts with a capital letter. • I can put a period at the end of a sentence. • I can leave spaces between words in a sentence.
Heggerty	
Phoneme Isolation & Syllable Blending ~30 sessions **Learning Targets:** • I can isolate the initial sound in a spoken word, including words beginning with vowel sounds. • I can isolate the final sound in a spoken word, including consonant digraphs.	**Phoneme Isolation & Syllable Blending ~30 sessions** **Success Criteria:** *Isolating the initial sound* • I listened to the whole word. • I noticed if the first sound was a consonant or a vowel.

● I can blend syllables to say a whole word. ● I can blend 2-3 phonemes into a spoken word. ● I can segment a spoken word into syllables. ● I can delete a syllable from a spoken word. ● I can connect spoken sounds to their letters.	● I held that first sound and said it on its own. *Isolating the final sound* ● I listened to the whole word. ● I held the ending sound, including if it was a digraph. ● I said only the last sound I heard. *Blending syllables* ● I listened to each syllable chunk. ● I put the chunks together in my head. ● I said the whole word. *Blending 2-3 phonemes* ● I listened to each individual sound. ● I held all the sounds in order. ● I put the sounds together and said the word. *Segmenting syllables & deleting a syllable* ● I listened to the whole word. ● I clapped out the syllable chunks. ● I removed the syllable I was told. ● I said what was left. *Connecting phonemes to graphemes* ● I heard or said the sound. ● I thought about which letter or letters make that sound. ● I matched the sound to the correct letter.

Module 2: Creature Features

Unit Title: Creature Features

Module 2: Creature Features

Relevant Standards: Bold indicates priority

See above.

Essential Question(s):

What can we discover about animals/ unique features?

Enduring Understanding(s):

Students in Grade 1 will understand the following concepts as a result of this module:

- People can learn about what makes animals similar and different from one another by observing and describing animal features.
- Animal experts describe animals in books, pictures, and videos to help us learn about the natural world and how animals survive.
- When authors and illustrators write or draw about animals, they research them carefully and use a lot of detail so others can learn more about them.

Demonstration of Learning:

Students may demonstrate their learning within this unit in a variety of ways. At the end of this module, students will craft an informative paragraph about an animal's unique features. In addition, students will participate in a Socratic seminar and participate in several assessments throughout the unit, such as vocabulary and "New Read" assessments, demonstrating their comprehension skills on new texts.

Pacing for Unit

44 school days

Family Overview (link below)

WW_G1_M2_FamilyTipSheet_English.pdf
WW_G1_M2_FamilyTipSheet_Spanish.pdf

Integration of Technology:

Videos and digital visual art displays are listed below.

Unit-specific Vocabulary:

WW_G1_MLL_Glossaries_English.pdf
WW_G1_MLL_Glossaries_Spanish.pdf

Content Vocabulary

chimpanzee	mammals	opposable (thumbs)

Aligned Unit Materials, Resources, and Technology (beyond core resources):

WW_Nat_G1_M2_TE_Lesson01-09_v2.pdf
WW_Nat_G1_M2_TE_Lesson10-14_v2.pdf
WW_Nat_G1_M2_TE_Lesson15-20_v2.pdf
WW_Nat_G1_M2_TE_Lesson21-26_v2.pdf
WW_Nat_G1_M2_TE_Lesson27-32_v2.pdf

webbed (toes)	camouflage	defend
poisonous	predator	survive
venom	aggressive	coop
current	reproduce	sap
straw	cruises	peer (to look)
pesky	protect	relatives
riled	snapper	starving
sunburned	swiftest	utensils

Academic Vocabulary

index	Text feature	point
reason	observe	convince
wisdom	unique	majestic
ridiculous	invisible	unexpected
avoid	capture	feature
manipulate	sift	cherish
clever	curious	determine
disgust	discover	impossible
inflict	miracle	moral
move	sensitive	shyest
steadily	tale	threat
touch	unpredictable	unsuspecting
shades of meaning	interrogative	exclamatory
demonstrative	attribute	conclusion
buttons and boxes	simile	preposition
prepositional phrases	Informative paragraph	articles

Core Texts

Seven Blind Mice, Ed Young
Me..Jane, Patrick McDonnell
Never Smile at a Monkey, Steve Jenkins
Sea Horse: The Shyest Fish in the Sea, Chris Butterworth, John Lawrence
What Do You Do With a Tail Like This? Steve Jenkins, Robin Page

Supplementary Texts

"The Hare and the Tortoise," *Aesop's Fables*
"The Ants and the Grasshopper," *Aesop's Fables*
"Fish", Mary Ann Hoberman

Multimedia

"Pygmy Sea Horses: Masters of Camouflage"
Young Hare, Albrecht Dürer
The Snail, Henri Matisse

determiner		

Visual Art Vocabulary

abstract art	collage	color wheel
complimentary colors	portrait	portray
texture		

Opportunities for Interdisciplinary Connections:

Science: Students explore the natural world by focusing on the form and function of animal body parts and how people use observation to learn about species. Through content-rich informational texts and visual art, they discover how animals use unique features to survive and defend themselves, while also learning safe ways to act around them. By acting as "animal experts," students participate in shared research to collect evidence, identifying similarities and differences across diverse species. This scientific curiosity culminates in an informative writing project where students apply their research to explain how an animal's specific physical features serve a particular purpose.

Social Studies: Students explore social studies by examining the historical and cultural significance of animal observation. Through the biography of Jane Goodall, they learn about the life and impact of a key historical figure dedicated to environmental stewardship. They also study art history via works by Henri Matisse and Albrecht Dürer to understand how different cultures have depicted nature. Additionally, students build citizenship skills by engaging in collaborative research and Socratic Seminars to share knowledge and promote community safety.

Social Emotional Learning: Students connect to Social Emotional Learning by exploring the power of curiosity and empathy. Through the story of Jane Goodall, they reflect on how passion and persistence can lead to a life of caring for the world. Students also build self-awareness and relationship skills by learning to act responsibly around animals and practicing respectful collaboration during Socratic Seminars and shared research.

Anticipated misconceptions:

Students may have misconceptions of:

- Struggling to distinguish between the fantasy elements (animals reading) and the realistic elements of a story.
- Decoding a word vs. comprehending a word. True knowledge of a word involves understanding its meaning in different contexts. (E.g., *wild,* acting crazy, undomesticated animals, deeply enthusiastic, excited.)
- Visual art is more than pretty or weird shapes. Artists use specific elements like line, shape, and color to communicate an idea or feeling.

Art: This module pairs two opposing visual traditions: Matisse's cut-paper *The Snail* and Dürer's *Young Hare*. That contrast opens the door for a scientific-illustration unit anchored in the work of naturalists like Jane Goodall, John James Audubon, and Maria Sibylla Merian. Students can practice careful observation of a real animal (a class pet, a backyard creature, or a photograph), then create labeled scientific drawings the way Goodall recorded chimpanzees in her notebooks. As a counterpoint, teachers can introduce Matisse-style cut-paper collage and Steve Jenkins's iconic torn-paper illustrations — Jenkins illustrates several Module 2 texts, including *What Do You Do with a Tail Like This?* — so students see how artists make deliberate choices about medium to highlight an animal's unique features. A culminating project might ask each child to render the same animal twice, once in a realistic Dürer style and once in a Jenkins/Matisse cut-paper style, reflecting on how each version reveals something different.	
Connections to Prior Units:	**Connections to Future Units:**
This is the third unit of the course. Students will leverage the newly taught routines in the previous module through a more in-depth study of a particular topic with a variety of texts and works of visual art. This module has a greater emphasis on informational texts compared to prior units.	This unit is focused on informational texts and crafting writing using said structures–part of a cycle structure throughout the Wit & Wisdom curricular resource. Students will leverage skills taught in this unit in later units with different genres of text.

Differentiation through *Universal Design for Learning*

UDL Indicator & Teacher Actions:

Engagement
- Before reading, show book covers and have students make observations and predictions about what they might discover.
- Use ASL signs for “yes” or “no,” or other physical movements to allow all students to participate in checks for understanding.
- During the Socratic Seminar, provide “talking chips” or “equity sticks” to ensure equitable participation and reduce the social anxiety of speaking in a large group.
- Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class.

Representation
- Pair written observations with matching drawings or icons to increase accessibility for non-readers.
- Maintain and display multiple anchor charts throughout the unit, including the “Informative Writing Anchor Chart,” “Topic Sandwich Chart,” and “Text Features Anchor Chart.”
- Use a word wall with visual anchors (pictures) next to key terms so students can refer to them independently during the unit.
- Use abstract art to teach concepts of shape, color, and interpretation that mirror the themes found in literature.

Action & Expression

- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.
- Encourage students to add detailed illustrations to their informative paragraphs to help clarify their written ideas.
- Use the Topic Sandwich Organizer (9A) to help students structure informative paragraphs with a topic statement, details, and a conclusion.
- For students with fine motor or high linguistic needs, use scribing to support a student in generating a response.

Supporting Multilingual/English Learners

Related *CELP standards* and differentiated Learning Targets:

Standards	**Emerging**	**Expanding**	**Bridging**
LT 1 CELP 1	I can identify a few key details about an animal's features using pictures and gestures during a read-aloud.	I can identify the main topic and multiple key details from an informational text with moderate guidance.	I can independently explain how an author uses text features (like headings or indices) to help me find information.
LT 2 CELP 2	I can answer simple "yes/no" or one-word questions about Jane Goodall using visual supports.	I can use sentence frames to describe an animal's unique feature to a partner during "Think-Pair-Share."	I can ask clarifying questions and add my own observations to a discussion using academic vocabulary.
LT 3 CELP 3	I can label parts of an animal (e.g., tail, fins) on a diagram and copy a simple "is/has" sentence.	I can write an informative paragraph using a "Topic Sandwich" organizer with at least two facts.	I can write a complete informative paragraph with a clear topic statement, supporting facts, and a conclusion.
LT 4 CELP 8	I can recognize the meaning of high-frequency words like "see" or "move" when paired with a physical action.	I can use the "Outside-In" strategy to find the meaning of a word by looking at nearby pictures and context.	I can explain "shades of meaning" between similar verbs (e.g., touch vs. clutch) and choose the most precise word.

Lesson Sequence	Learning Target	Success Criteria/ Assessment	Resources
Focusing Question 1: Lessons 1-9 **What lessons can we learn through stories about animals?**			
1	**Content Learning Target:** I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can ask questions about a fable.	• I can share an observation about a fable. • I can ask a question using a question word. • I can record observations in my Response Journal. • I can identify the animal characters in each fable.	*The Ants and the Grasshopper* by Aesop Fables *The Hare and the Tortoise* by Aesop Fables Lesson Materials
2	**Content Learning Target:** I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can identify the structure of an informative paragraph (topic, details, conclusion).	• I can name the characters in each fable. • I can retell a fable to a partner. • I can name the parts of an informative paragraph. • I can explain why structure helps writers and readers.	*The Ants and the Grasshopper* by Aesop Fables *The Hare and the Tortoise* by Aesop Fables Lesson Materials
3	**Content Learning Target:** I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can identify how the structure of an informative paragraph helps a reader.	• I can describe an action by the grasshopper or the tortoise. • I can explain how an action led to the resolution. • I can identify a topic statement in a paragraph. • I can identify a detail sentence in a paragraph.	*The Ants and the Grasshopper* by Aesop Fables *The Hare and the Tortoise* by Aesop Fables Lesson Materials

4	**Content Learning Target:** I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can use text evidence to support my thinking.	• I can state the lesson of one fable in my own words. • I can find evidence in the text that supports the lesson. • I can identify a conclusion sentence in a paragraph. • I can connect a lesson to a real-life example.	*The Ants and the Grasshopper* by Aesop Fables *The Hare and the Tortoise* by Aesop Fables Lesson Materials
5	**Content Learning Target:** I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can use the structure of an informative paragraph as a model for writing.	• I can share an observation about Henri Matisse's artwork. • I can ask a question about Seven Blind Mice. • I can identify the parts of an informative paragraph in a model. • I can record observations in my Response Journal.	*Seven Blind Mice* by Ed Young *The Snail* by Henri Matisse *The Hare and the Tortoise* by Aesop Fables Lesson Materials
6	**Content Learning Target:** I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can use the structure of an informative paragraph (topic, details, conclusion) in my writing.	• I can identify the subject of The Snail. • I can retell the events of Seven Blind Mice in order. • I can write a topic statement for an informative paragraph. • I can write a detail sentence that matches my topic.	*Seven Blind Mice* by Ed Young *The Snail* by Henri Matisse Lesson Materials
7	**Content Learning Target:**	• I can describe what each mouse does.	*Seven Blind Mice* by Ed Young *The Snail* by Henri Matisse

	I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can speak in complete sentences when discussing a text.	• I can compare two mice's actions. • I can speak in a complete sentence using a sentence frame. • I can explain why complete sentences help listeners.	Lesson Materials
8	**Content Learning Target:** I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can use the text and illustrations to find a central message.	• I can state the lesson of Seven Blind Mice. • I can find text evidence for the lesson. • I can interpret the essential meaning of The Snail. • I can link The Snail to the story's lesson.	*Seven Blind Mice* by Ed Young *The Snail* by Henri Matisse Lesson Materials
9 ✔FQT	**Content Learning Target:** I can discuss and write about the lessons we learn through stories about animals. **Literacy Skills Learning Target:** I can engage in a Socratic Seminar to share what I learned.	• I can take a turn in a Socratic Seminar. • I can connect a lesson to my own life. • I can respond to a classmate's idea. • I can use a complete sentence to share my thinking.	*Seven Blind Mice* by Ed Young *The Hare and the Tortoise* by Aesop Fables *The Ants and the Grasshopper* by Aesop Fables *The Snail* by Henri Matisse Lesson Materials
Focusing Question 2: Lessons 10-14			

How did Jane Goodall make discoveries about animals?			
10	**Content Learning Target:** I can describe how Jane Goodall made discoveries about animals. **Literacy Skills Learning Target:** I can explain why a topic statement is important in informative writing.	• I can share an observation about Me...Jane. • I can ask a question about Jane Goodall. • I can identify a topic statement in a paragraph. • I can explain why a topic statement helps a reader.	*Me...Jane* by Patrick Mc'Donnell Lesson Materials
11	**Content Learning Target:** I can describe how Jane Goodall made discoveries about animals. **Literacy Skills Learning Target:** I can write a topic statement for an informative paragraph.	• I can name the main topic using Buttons and Boxes. • I can find a key detail that matches the main topic. • I can write a topic statement using a frame. • I can share my topic statement with a partner.	*Me...Jane* by Patrick Mc'Donnell Lesson Materials
12	**Content Learning Target:** I can describe how Jane Goodall made discoveries about animals. **Literacy Skills Learning Target:** I can write a topic statement for my own informative paragraph.	• I can describe Jane using an illustration. • I can describe Jane using a photograph. • I can write a topic statement for the Focusing Question Task. • I can use a complete sentence with a strong topic word.	*Me...Jane* by Patrick Mc'Donnell Lesson Materials

13	**Content Learning Target:** I can describe how Jane Goodall made discoveries about animals. **Literacy Skills Learning Target:** I can use phonetic spelling to write words I do not yet know.	• I can review main topics and key details from the text. • I can state the essential meaning of Me...Jane. • I can use letter sounds to spell a new word. • I can use phonetic spelling in my writing.	*Me...Jane* by Patrick Mc'Donnell Lesson Materials
14 ✔FQT	**Content Learning Target:** I can describe how Jane Goodall made discoveries about animals. **Literacy Skills Learning Target:** I can revise a topic statement to make it stronger.	• I can record knowledge in the Knowledge Journal. • I can revise my topic statement to be clearer. • I can speak in complete sentences during a discussion. • I can use phonetic spelling for an unknown word.	Me...Jane by Patrick Mc'Donnell Lesson Materials
Focusing Question 3: Lessons 15-20 **How do sea horses use their unique features?**			
15	**Content Learning Target:** I can explain how seahorses use their unique features to survive. **Literacy Skills Learning Target:** I can use the Outside-In strategy to figure out the meaning of a new word.	• I can share an observation about the book. • I can ask a question about sea horses. • I can use Outside-In to define the word shyest.	*Sea Horse: The Shyest Fish in the Sea* by Chris Butterworth Lesson Materials

		• I can record an observation in my Response Journal.	
16	**Content Learning Target:** I can explain how seahorses use their unique features to survive. **Literacy Skills Learning Target:** I can explain why we select information that matches our topic.	• I can name the main topic of a section. • I can find a key detail that matches the main topic. • I can explain why we choose only details that match. • I can sort details that fit a topic from those that don't.	*Sea Horse: The Shyest Fish in the Sea* by Chris Butterworth Lesson Materials
17	**Content Learning Target:** I can explain how seahorses use their unique features to survive. **Literacy Skills Learning Target:** I can select the most important information for my informative paragraph.	• I can select a key detail to include in my paragraph. • I can tell why adding illustrations strengthens writing. • I can leave out details that don't match my topic.	*Sea Horse: The Shyest Fish in the Sea* by Chris Butterworth Lesson Materials
18	**Content Learning Target:** I can explain how seahorses use their unique features to survive. **Literacy Skills Learning Target:** I can select information from text features for my informative paragraph.	• I can find an index, text box, label, or large text in the book. • I can tell what each text feature is used for. • I can select a key detail from a text feature. • I can add a selected detail to my paragraph.	*Sea Horse: The Shyest Fish in the Sea* by Chris Butterworth Lesson Materials

19	**Content Learning Target:** I can explain how seahorses use their unique features to survive. **Literacy Skills Learning Target:** I can use phonetic spelling to write unknown words.	• I can find a simile in the text. • I can draw what a simile helps me picture. • I can use letter sounds to spell a word. • I can write a sentence using phonetic spelling.	*Sea Horse: The Shyest Fish in the Sea* by Chris Butterworth Lesson Materials
20 ✔FQT ✔VOC	**Content Learning Target:** I can explain how seahorses use their unique features to survive. **Literacy Skills Learning Target:** I can use complete sentences in a Socratic Seminar.	• I can make a connection between a video and the book. • I can take a turn in a Socratic Seminar. • I can speak in a complete sentence to share an idea.	*Sea Horse: The Shyest Fish in the Sea* by Chris Butterworth *Pygmy Seahorses: Masters of Camouflage* Lesson Materials
Focusing Question 4: Lessons 21-26 **How do animals use the same feature in unique ways?**			
21 ✔NR	**Content Learning Target:** I can explain how different animals use the same feature in unique ways to survive. **Literacy Skills Learning Target:** I can identify the main topic and key details in a new text.	• I can share an observation about the book. • I can ask a question about the animals. • I can identify the main topic of a section. • I can complete the New-Read Assessment.	*What Do You Do with a Tail Like This* by Steve Jenkins and Robin Page Lesson Materials
22	**Content Learning Target:** I can explain how different animals use the same feature in unique ways to survive. **Literacy Skills Learning Target:**	• I can name a feature animals share (like tail or nose). • I can describe two animals that use the same feature differently.	*What Do You Do with a Tail Like This* by Steve Jenkins and Robin Page *Young Hare*, Albrecht Dürer Lesson Materials

	I can add an illustration that adds detail to my informative paragraph.	• I can plan an illustration to add to my paragraph. • I can describe Young Hare using sensory details.	
23	**Content Learning Target:** I can explain how different animals use the same feature in unique ways to survive. **Literacy Skills Learning Target:** I can use illustrations and labels to add detail to my writing.	• I can find a label or caption in the book. • I can describe how an illustration helps me understand. • I can add a label to my own illustration. • I can use a complete sentence to describe an animal.	*What Do You Do with a Tail Like This* by Steve Jenkins and Robin Page *Young Hare*, Albrecht Dürer Lesson Materials
24	**Content Learning Target:** I can explain how different animals use the same feature in unique ways to survive. **Literacy Skills Learning Target:** I can use a digital tool to type my informative writing.	• I can describe the essential meaning of Young Hare. • I can add an illustration to clarify an idea in my writing. • I can use a digital tool to type a sentence. • I can identify keys on a keyboard.	*What Do You Do with a Tail Like This* by Steve Jenkins and Robin Page *Young Hare*, Albrecht Dürer Lesson Materials
25	**Content Learning Target:** I can explain how different animals use the same feature in unique ways to survive. **Literacy Skills Learning Target:** I can use a digital tool to type and publish my informative writing.	• I can complete a class Knowledge Journal entry. • I can type my informative paragraph. • I can publish my writing using a digital tool. • I can add an illustration to my published piece.	*What Do You Do with a Tail Like This* by Steve Jenkins and Robin Page *Young Hare*, Albrecht Dürer Lesson Materials

26 ✔FQT	**Content Learning Target:** I can explain how different animals use the same feature in unique ways to survive. **Literacy Skills Learning Target:** I can do research using more than one source.	• I can choose an animal to research • I can use two sources to learn about my animal. • I can record what I learned from each source. • I can share a fact I found through research.	*Me… Jane* by Patrick Mc'Donnell *What Do You Do with a Tail Like This* by Steve Jenkins and Robin Page *5 Reasons Why Bald Eagles are the Best* by April Capochino Myers Lesson Materials
Focusing Question 5: Lessons 27-32 **How do animals use their unique features in unexpected ways?**			
27	**Content Learning Target:** I can explain how different animals use their unique features in unexpected ways. **Literacy Skills Learning Target:** I can ask questions about a new informational text.	• I can share an observation about the book. • I can ask a question about an animal in the book. • I can record observations in my Response Journal. • I can use a question word to ask a question.	*Never Smile at a Monkey* by Steve Jenkins Lesson Materials
28	**Content Learning Target:** I can explain how different animals use their unique features in unexpected ways. **Literacy Skills Learning Target:** I can explain why an informative paragraph needs a conclusion.	• I can use Buttons and Boxes to find the author's point. • I can find a reason that supports the author's point. • I can identify a conclusion sentence in a paragraph. • I can explain why a conclusion is important.	*Never Smile at a Monkey* by Steve Jenkins Lesson Materials
29	**Content Learning Target:**	• I can find a text feature in the book.	*Never Smile at a Monkey* by Steve Jenkins Lesson Materials

	I can explain how different animals use their unique features in unexpected ways. **Literacy Skills Learning Target:** I can write a conclusion sentence for my informative paragraph.	• I can show how a text feature supports the author's point. • I can write a conclusion sentence using a frame. • I can share my conclusion with a partner.	
30	**Content Learning Target:** I can explain how different animals use their unique features in unexpected ways. **Literacy Skills Learning Target:** I can use illustrations as evidence in informative writing.	• I can describe an illustration in the book. • I can explain how an illustration supports the author's point. • I can write a sentence using illustration evidence. • I can revise my conclusion sentence.	*Never Smile at a Monkey* by Steve Jenkins Lesson Materials
31 ✔NR	**Content Learning Target:** I can explain how different animals use their unique features in unexpected ways. **Literacy Skills Learning Target:** I can use evidence from a text to find its essential meaning.	• I can state the essential meaning of the book. • I can find evidence to support the essential meaning. • I can connect the essential meaning to my life. • I can use a complete sentence to share my thinking.	*Never Smile at a Monkey* by Steve Jenkins Lesson Materials
32 ✔FQT	**Content Learning Target:** I can explain how different animals use their unique features in unexpected ways. **Literacy Skills Learning Target:** I can revise my conclusion sentence to	• I can identify the author's points and reasons. • I can categorize vocabulary words from the text. • I can revise my conclusion to be clearer.	*Never Smile at a Monkey* by Steve Jenkins Lesson Materials

	make it stronger.	• I can complete New-Read Assessment 2.	
Focusing Question 6: Lessons 33-36 **What can we discover about animals' unique features?**			
33 ✔VOC ✔EOM	**Content Learning Target:** I can explain how animals have unique features that help them survive. **Literacy Skills Learning Target:** I can orally rehearse an informative paragraph before writing it.	• I can choose an animal for my EOM Task. • I can plan a topic statement, details, and a conclusion. • I can orally rehearse my paragraph with a partner. • I can complete the Vocabulary Assessment using module words.	All Module Texts Lesson Materials
34 ✔EOM	**Content Learning Target:** I can explain how animals have unique features that help them survive. **Literacy Skills Learning Target:** I can edit and revise my writing to make it stronger.	• I can write a topic statement for my EOM Task. • I can write detail sentences with evidence. • I can write a conclusion sentence. • I can edit my sentences to fix capitalization and punctuation.	All Module Texts Lesson Materials
35 ✔EOM	**Content Learning Target:** I can explain how animals have unique features that help them survive. **Literacy Skills Learning Target:** I can add a drawing with details that clarify ideas in my informative paragraph.	• I can complete my EOM Task illustration. • I can add details to my drawing that match my writing. • I can edit my EOM Task one more time. • I can reflect on the module artwork.	All Module Texts Lesson Materials

36 ✔EOM ✔SOC	**Content Learning Target:** I can explain how animals have unique features that help them survive. **Literacy Skills Learning Target:** I can speak in complete sentences during a Socratic Seminar.	• I can take a turn in a Socratic Seminar. • I can speak in a complete sentence to share my idea. • I can use the Socratic Seminar Checklist as a guide.	All Module Texts Lesson Materials

Fundations	
Important Reminder: **80% of students should master the unit assessment with a score of 80% or more when determining to advance instruction.**	
Fundations Lessons	**Learning Targets & Success Criteria**
Unit 4- ~ 2 weeks, 10 days.	***I can use the bonus letter rule and read and spell words with ff, ll, ss, and zz.*** • I can explain the bonus letter rule; after a short vowel at the end of a 1-syllable word, we double the f, l, s, or z, like in puff, miss, or hill. • I can read and spell bonus letter words. • I can identify if a word needs a bonus letter. ***I can read and spell words with the glued sound -all.*** • I can say the glued sound -all in one chunk. • I can read and spell words that end in --all, like in call, ball, tall.

	● I can explain why -all is a glued sound. ***I can use correct end punctuation in a sentence.*** ● I can read a sentence and decide if it is a statement, a question, or conveys a strong feeling. ● I can put a question mark, period, or exclamation point at the end of a sentence.
Unit 5~ 1 week, 5 days.	***I can read and spell words with the glued sound -am and -an*** ● I can say the glued sounds -am and -an in one chunk. ● I can read and spell words that end in -am or –and, like ham, clam, jam, fan, and plan. ● I can explain why -am and –an are glued sounds. ***I can proofread a sentence and fix capitalization, punctuation, and spelling errors.*** ● I can read a sentence and decide if it is a statement, a question, or conveys a strong feeling. ● I can put a question mark, period, or exclamation point at the end of a sentence. ● I can find and fix capitalization errors in a sentence.
Unit 6 ~ 3 weeks, 15 days.	***I can identify a base word and explain how adding -s changes its meaning.*** ● I can identify the base word in a word with a suffix. ● I can explain that adding -s can make a noun plural. ● I can read and spell words with the -s suffix, like hills, bugs, and shops. ***I can read and spell plural nouns by adding -s to a base word.*** ● I can explain what plural means. ● I can sort words into singular and plural. ● I can add -s to a base word to make it mean more than one.
Unit 7- 3 weeks, 15 days.	***I can read and spell words with -ng and -nk glued sounds, tapping each chunk as one unit.*** ● I can read and spell words with -ng glued sounds; -ang, -ing, -ong, -ung, like, bang, and rang. ● I can read and spell words with -nk glued sounds; -ank, -ink, -onk, -unk, like bank and pink. ● I can tap the glued sound as one chunk when reading and spelling. ***I can blend and segment words with -ng and -nk endings.*** ● I can blend sounds to read the -ng and -nk words, remembering that the glued sound is one sound.

<table>
<tr><td></td><td>- I can segment words that end in -ng and -nk, remembering that the glued sound is one sound represented by multiple letters.
- I can sort words based on their glued sound ending, -nk, or -ng.</td></tr>
<tr><td colspan="2">Heggerty</td></tr>
<tr><td>Phoneme Segmenting & Manipulation with Blends ~30 sessions
Learning Targets:
- I can blend 4+ phonemes into a spoken word, including consonant blends.
- I can segment a spoken word into 2–3 individual phonemes.
- I can isolate the medial (vowel) sound in a spoken word.
- I can add an initial phoneme to make a new word.
- I can add the initial phoneme of a consonant blend.
- I can delete an initial phoneme to say what remains.
- I can substitute an initial phoneme to make a new word.</td><td>Phoneme Segmenting & Manipulation with Blends ~30 sessions
Success Criteria:
<i>Blending 4+ phonemes (including blends)</i>
- I listened to all the sounds, including any blended consonants.
- I held each sound in order in my head.
- I slid all the sounds together smoothly.
- I said the whole word.
<i>Segmenting into 2–3 phonemes</i>
- I listened to the whole word.
- I chopped it into each separate sound.
- I said each sound one at a time in order.</td></tr>
</table>

	Isolating the medial vowel ● I listened to the word and heard all three sounds. ● I let the first and last sounds go. ● I said only the middle vowel sound I heard. *Adding an initial phoneme* ● I listened to the word part I was given. ● I added the new first sound to the front. ● I blended the new sound with the rest and said the new word. *Deleting an initial phoneme* ● I listened to the whole word. ● I removed the first sound in my head. ● I blended what was left and said the new word. *Substituting an initial phoneme* ● I listened to the word and held the first sound. ● I swapped the first sound for the new one I was given. ● I blended the new first sound with the rest and said the new word.

Module 3: Powerful Forces

<table>
<tr><td colspan="2">Unit Title:</td></tr>
<tr><td colspan="2">Module 3: Powerful Forces</td></tr>
<tr><td colspan="2">Relevant Standards: Bold indicates priority</td></tr>
<tr><td colspan="2">See above.</td></tr>
<tr><td>Essential Question(s):</td><td>Enduring Understanding(s):</td></tr>
<tr><td>How do people respond to the powerful force of the wind?</td><td>Students in Grade 1 will understand the following concepts as a result of this module:
● Forces like wind can be strong or gentle.
● People can respond differently to the force of the wind.
● People can experience different emotions in reaction to the same event.
● People can use the wind to help them.
● Authors use descriptive words to communicate feelings and sensory perceptions.</td></tr>
<tr><td>Demonstration of Learning:</td><td>Pacing for Unit</td></tr>
<tr><td>Students may demonstrate their learning within this unit in a variety of ways. At the end of this module, students will craft a narrative focusing on story elements. In addition, they will participate in a Socratic seminar and in several assessments throughout the unit, such as vocabulary and “New Read” assessments, demonstrating their comprehension skills with new texts.</td><td>41 school days</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>WW_G1_M3_FamilyTipSheet_English.pdf
WW_G1_M3_FamilyTipSheet_Spanish.pdf</td><td>Videos and digital visual art displays are listed below.</td></tr>
<tr><td>Unit-specific Vocabulary:</td><td>Aligned Unit Materials, Resources, and Technology (beyond core resources):</td></tr>
<tr><td>WW_G1_MLL_Glossaries_English.pdf
WW_G1_MLL_Glossaries_Spanish.pdf

Content Vocabulary
<table>
<tr><td>bearing</td><td>chinook</td><td>electricity</td></tr>
<tr><td>equator</td><td>forecaster</td><td>gale</td></tr>
<tr><td>gusting</td><td>pump</td><td>sirocco</td></tr>
</table></td><td>WW_Nat_G1_M3_TE_Lesson01-07_v2.pdf
WW_Nat_G1_M3_TE_Lesson08-12_v2.pdf
WW_Nat_G1_M3_TE_Lesson13-20_v2.pdf
WW_Nat_G1_M3_TE_Lesson21-25_v2.pdf
WW_Nat_G1_M3_TE_Lesson26-31_v2.pdf
WW_Nat_G1_M3_TE_Lesson32-35_v2.pdf

Core Texts

<i>Seven Blind Mice</i>, Ed Young</td></tr>
</table>

sundial	threading	windmills
whooshed	harnessed	banana slug
burrows	crocus	maize (corn)
meadow	apron	aristocrat
bedchamber	mansion	palace
doubters	float	flounce
force	furrow	whirled
heed	howl	jerk
lantern	paralyzed	pasture
powerful	ripe	rumbled
sailors	scatter	scorched
shiver	soar	starve
squinting	wrenched	thumping
tinkered	unlatched	waltz
wind	powerful	

Academic Vocabulary

infer	sequence	source
similar	science	determination
persistent	brave	frustrated
resentful	personification	events
evidence	respond	disappointed
generous	impatient	selfish
strong	carries	produce
reappear	rearrange	confused
embarrassed	essential	squinting
excited	feeling	furious

Me..Jane, Patrick McDonnell
Never Smile at a Monkey, Steve Jenkins
Sea Horse: The Shyest Fish in the Sea, Chris Butterworth, John Lawrence
What Do You Do With a Tail Like This? Steve Jenkins, Robin Page

Supplementary Texts

"The Hare and the Tortoise," *Aesop's Fables*
"The Ants and the Grasshopper," *Aesop's Fables*
"Fish", Mary Ann Hoberman

Multimedia

"Pygmy Sea Horses: Masters of Camouflage"
Young Hare, Albrecht Dürer
The Snail, Henri Matisse

gentle	guilty	humiliated
insulted	jealous	magic
meddling	miserable	petrified
scared	sad	scanned
wicked	spiteful	verbs
singular and plural nouns	adjective	sensory words

Visual Art Vocabulary

horizontal	vertical	primary colors
radiant	abstract	knobby
arrayed	root words	inflectional endings

Opportunities for Interdisciplinary Connections:

Science: Students explore the invisible but powerful force of wind, connecting deeply to scientific concepts of weather and energy. By examining how wind is created and its varying intensities—from gentle breezes to hurricane-strength storms—students learn to identify and describe the physical effects of this force on the world around them. They investigate the impact of extreme weather and discover how wind can be harnessed as a form of energy to generate power. Through observation and the use of sensory vocabulary, students build a foundational understanding of how natural forces move objects and influence the environment.

Social Studies: Students explore how natural forces shape human life and how individuals can impact their communities through innovation. By studying the real-life story of William Kamkwamba, they learn how one person's determination and use of technology can solve a community-wide problem. Additionally, students build citizenship skills by practicing collaborative research and effective communication while exploring how different cultures historically interact with and harness their environment.

Anticipated misconceptions:

Students may have misconceptions of:

- Students often think of "force" only as a human push or pull, rather than a mechanical or physical property.
- In historical or narrative texts, students may struggle to distinguish between someone's job or class and their personality.
- Students might have a limited view of why certain items are used, seeing them only in a domestic context rather than a functional one.
- Students may struggle with the specific terminology of animal habitats.

Social Emotional Learning: Students explore the "invisible power" of emotions alongside the force of the wind. Using the text *Feelings*, they develop a vocabulary to identify and describe complex internal states like fear, joy, and frustration. By analyzing how characters respond to the challenges of the wind, students build self-awareness and empathy, ultimately learning how to process and express their own emotional responses to powerful life events. **Art:** Students could trace Mondrian's journey by creating their own three-part sequence: a realistic drawing of a windy scene, a partial abstraction emphasizing line and direction, and a fully abstract composition expressing the *feel* of wind without showing the wind itself. Hands-on, teachers can extend this with kinetic art inspired by Alexander Calder's wind-powered mobiles, blown-ink or straw-paint techniques, kite-making, or simple pinwheel and sail engineering — bridging into STEM and pointing back to William Kamkwamba's invention in *The Boy Who Harnessed the Wind*. William Steig's swirling watercolor illustrations in *Brave Irene* also reward close looking: students can analyze how the artist makes a viewer *feel* wind through brushwork alone, then try their own expressive painting of a powerful force.	
Connections to Prior Units:	**Connections to Future Units:**
This is the fourth unit of the course. Students will leverage the newly taught routines in the previous module through a more in-depth study of a particular topic through a variety of texts and works of visual art. This module has a greater emphasis on informational texts compared to prior units.	This unit is focused on narrative texts and crafting writing using said structures–part of a cycle structure throughout the Wit & Wisdom curricular resource. Students will leverage skills taught in this unit in later units with different genres of text.

Differentiation through *Universal Design for Learning*

UDL Indicator & Teacher Actions:

Engagement
- Connect the “Essential Question” to students’ personal interests by allowing them to bring a favorite book or object from home to share during the “Welcome” routine.
- During the Socratic Seminar, provide “talking chips” or “equity sticks” to ensure equitable participation and reduce the social anxiety of speaking in a large group.
- Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class.

Representation
- Pair written observations with matching drawings or icons to increase accessibility for non-readers.
- Use a word wall with visual anchors (pictures) next to key terms so students can refer to them independently during the unit.

- Use echo reading for the Essential and Focusing Questions, providing a clear vocal model and physical tracking of the text to help students connect spoken words to print.

Action & Expression

- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.

Supporting Multilingual/English Learners

Related *CELP standards* and differentiated Learning Targets:

Standards	Emerging	Expanding	Bridging
LT 1 CELP 1	I can identify key details or characters in a text about the wind using non-verbal signals or single words.	I can answer “who,” “what,” and “where” questions about a character’s response to the wind using simple sentences.	I can answer “how” and “why" questions, providing specific textual evidence to support an answer.
LT 2 CELP 2	I can use echo reading and repetition to participate in group discussions about the wind.	I can ask for more information from a speaker to clear up confusion during a Think-Pair-Share.	I can actively contribute to a Socratic seminar by posing questions and responding to peers’ comments about module texts.
LT 3 CELP 8	I can match pictures to sensory or feeling words from the module’s anchor charts.	I can use context clues about illustrations to define unknown words.	I can distinguish between the shades of meaning of related verbs and adjectives.
LT 4 CELP 9	I can dictate or write a single sentence using a provided frame to describe a character’s feeling.	I can write a short narrative sequence using time-order words and descriptive adjectives to show a character’s response.	I can independently write a multi-sentence story with a clear beginning, middle, and end, including a resolution to a problem.

Lesson Sequence	Learning Target	Success Criteria/ Assessment	Resources
Focusing Question 1: Lessons 1-7 **How is wind a powerful force?**			
1	**Content Learning Target:** I can explain how the wind is a powerful force. **Literacy Skills Learning Target:** I can use clues from a poem to predict the topic of a new text.	• I can share an observation about the poem. • I can predict what Feel the Wind will be about. • I can ask a question about wind. • I can record observations in my Response Journal.	*The Wind* by James Reeves All Module Texts American Sign Language Dictionary Website Lesson Materials
2	**Content Learning Target:** I can explain how the wind is a powerful force. **Literacy Skills Learning Target:** I can ask questions to clear up confusion about a text.	• I can ask a question to clear up something confusing. • I can use a question word to start my question. • I can listen carefully to a friend's answer. • I can record a question in my Response Journal.	*Feel the Wind* by Arthur Dorros *Oostzijdse Mill with Extended Blue, Yellow, and Purple Sky* by Piet Mondrian *Windmill in the Gien* by Piet Mondrian *The Red Mill* by Piet Mondrian American Sign Language Dictionary Website Lesson Materials
3	**Content Learning Target:** I can explain how the wind is a powerful force. **Literacy Skills Learning Target:** I can explain why researchers use more than one source.	• I can define the word powerful. • I can name the main topic of Feel the Wind. • I can find a key detail that matches the main topic.	*Feel the Wind* by Arthur Dorros *Oostzijdse Mill with Extended Blue, Yellow, and Purple Sky* by Piet Mondrian *Windmill in the Gien* by Piet Mondrian

		• I can explain why using multiple sources is important.	The Red Mill by Piet Mondrian American Sign Language Dictionary Website *Soaring Bird MVI 0902* by SanfordAr *Hummingbird Wing Sounds* by My Backyard Birding Lesson Materials
4	**Content Learning Target:** I can explain how the wind is a powerful force. **Literacy Skills Learning Target:** I can use multiple sources to learn about a topic.	• I can read a passage with fluency. • I can name two effects of wind from the book. • I can compare a fact from the book to another source. • I can record a detail from a second source.	*Feel the Wind* by Arthur Dorros *Hurricanes* by DK Find Out Lesson Materials
5	**Content Learning Target:** I can explain how the wind is a powerful force. **Literacy Skills Learning Target:** I can use multiple sources to gather information about a topic.	• I can analyze an illustration in the book. • I can find evidence in the words of the text. • I can use two sources to learn about wind. • I can record a fact from each source.	*Feel the Wind* by Arthur Dorros *Oostzijdse Mill with Extended Blue, Yellow, and Purple Sky* by Piet Mondrian *Windmill in the Gien* by Piet Mondrian *The Red Mill* by Piet Mondrian Lesson Materials

<table>
<tr><td>6
✔FQT</td><td>Content Learning Target:
I can explain how the wind is a powerful force.
Literacy Skills Learning Target:
I can use evidence from a text to find its essential meaning.</td><td>• I can state the essential meaning of Feel the Wind.
• I can find evidence that supports the essential meaning.
• I can connect the essential meaning to a real-life example.
• I can use a complete sentence to share my thinking.</td><td><i>Feel the Wind</i> by Arthur Dorros
Lesson Materials</td></tr>
<tr><td>7
✔FQT</td><td>Content Learning Target:
I can explain how the wind is a powerful force.
Literacy Skills Learning Target:
I can use research from multiple sources in an informative paragraph.</td><td>• I can write a topic statement about wind.
• I can use facts from two sources in my paragraph.
• I can include a conclusion sentence.</td><td><i>Feel the Wind</i> by Arthur Dorros
American Sign Language Dictionary Website
Lesson Materials</td></tr>
<tr><td colspan="4">Focusing Question 2: Lessons 8-12
What are feelings?</td></tr>
<tr><td>8</td><td>Content Learning Target:
I can identify and explain how feelings and emotions matter in a story.
Literacy Skills Learning Target:
I can ask questions to clear up confusion when reading a story.</td><td>• I can share an observation about Feelings.
• I can ask a question to clear up something confusing.
• I can use a question word to ask a question.
• I can record observations in my Response Journal.</td><td><i>Feelings by Aliki</i>
Lesson Materials</td></tr>
</table>

9	**Content Learning Target:** I can identify and explain how feelings and emotions matter in a story. **Literacy Skills Learning Target:** I can identify the author's points and reasons in a text.	• I can define the word feelings. • I can find an author's point in the book. • I can find a reason that supports the point. • I can explain why every story needs a problem.	*Feel the Wind* by Arthur Dorros *Feelings* by Aliki Lesson Materials
10	**Content Learning Target:** I can identify and explain how feelings and emotions matter in a story. **Literacy Skills Learning Target:** I can write a problem for a narrative story.	• I can analyze text features in the book. • I can describe a feeling shown in an illustration. • I can write a problem for a class narrative. • I can use a complete sentence to share my problem.	*Feelings* by Aliki Lesson Materials
11 ✔FQT	**Content Learning Target:** I can identify and explain how feelings and emotions matter in a story. **Literacy Skills Learning Target:** I can write a problem in a narrative story.	• I can read my fluency passage with expression. • I can state the essential meaning of Feelings. • I can write a problem for my own story. • I can use a sentence frame to introduce the problem.	*Feelings* by Aliki Lesson Materials
12 ✔FQT	**Content Learning Target:** I can identify and explain how feelings and emotions matter in a story.	• I can read a fluency passage with expression.	*Feelings* by Aliki American Sign Language Dictionary Website Lesson Materials

	Literacy Skills Learning Target: I can read with expression to show feelings in a text.	• I can describe a feeling using evidence from the book. • I can add to the Knowledge Journal. • I can use a complete sentence to share an idea.	
Focusing Question 3: Lessons 13-20 **How do characters respond to the powerful force of the wind?**			
13	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can ask for more information from a speaker.	• I can share an observation about the book. • I can ask a question about the wind in the story. • I can ask a speaker for more information. • I can record observations in my Response Journal.	*Gilberto and the Wind* by Marie Hall Ets American Sign Language Dictionary Website Lesson Materials
14	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can explain why a story needs responses to a problem and a resolution.	• I can define the word respond. • I can describe one way Gilberto responds to the wind. • I can identify a response to a problem in a story. • I can identify a resolution in a story.	*Gilberto and the Wind* by Marie Hall Ets Lesson Materials

15	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can write a response to a problem in a story.	• I can find a sensory word in the text. • I can find a feeling word in the text. • I can read with appropriate volume. • I can write a response to a problem in our class story.	*Gilberto and the Wind* by Marie Hall Ets Lesson Materials
16	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can write a resolution to a problem in a narrative story.	• I can read my fluency passage with varying volume. • I can find a detail that personifies the wind. • I can state the central message of the story. • I can write a resolution for our class story.	*Gilberto and the Wind* by Marie Hall Ets Lesson Materials
17 ✔NR	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can answer questions to determine what is happening in a story.	• I can share an observation about "The Guest." • I can ask a question about the story. • I can record observations in my Response Journal.	*Owl at Home, "The Guest"* by Arnold Lobel *Wind at Work* by Amy Tao Lesson Materials
18 ✔FQT	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can write a response to a problem and a resolution in a narrative story.	• I can practice my fluency passage with volume. • I can identify the characters and setting in "The Guest."	*Owl at Home, "The Guest"* by Arnold Lobel Lesson Materials

		• I can write a response to the problem in my story. • I can write a resolution for my story.	
19 ✔FQT	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can use sensory and feeling words to describe a scene.	• I can find a sensory word in the text. • I can find a feeling word in the text. • I can state the central message of "The Guest." • I can connect the message to my life.	*Owl at Home, "The Guest"* by Arnold Lobel Lesson Materials
20	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can ask for more information from a speaker during a discussion.	• I can perform a Reader's Theater for a partner. • I can compare a character from each story. • I can ask a speaker for more information. • I can respond to a partner using complete sentences.	*Gilberto and the Wind* by Marie Hall Ets *Owl at Home, "The Guest"* by Arnold Lobel American Sign Language Dictionary Website Lesson Materials
Focusing Question 4: Lessons 21-25 **How does Irene respond to the powerful force of wind?**			
21 ✔VOC	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can ask questions about a new story.	• I can share an observation about Brave Irene. • I can ask a question about Irene's journey. • I can use a question word to ask a question.	*It Fell in the City* by Eve Merriam *Brave Irene* by William Steig Lesson Materials

		• I can record observations in my Response Journal.	
22	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can explain why sensory words make a scene more vivid.	• I can name the characters and setting of Brave Irene. • I can find a sensory word in the text. • I can explain why sensory words help readers.	*It Fell in the City* by Eve Merriam *Brave Irene* by William Steig Lesson Materials
23	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can use sensory and feeling words to write a scene.	• I can define the word brave. • I can act out a scene from Brave Irene. • I can use a sensory word in my writing. • I can use a feelings word in my writing.	*Feelings* by Aliki *Brave Irene* by William Steig Lesson Materials
24 ✔FQT	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can use sensory and feeling words to write a scene with detail.	• I can identify how punctuation helps phrasing. • I can state the central message of Brave Irene. • I can write a scene with at least one sensory word. • I can write a scene with at least one feeling word.	*It Fell in the City* by Eve Merriam *Brave Irene* by William Steig American Sign Language Dictionary Website Lesson Materials
25 ✔FQT	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind.	• I can connect "It Fell in the City" to Brave Irene. • I can describe Irene's bravery using evidence.	*It Fell in the City* by Eve Merriam *Brave Irene* by William Steig Lesson Materials

	Literacy Skills Learning Target: I can connect ideas across two texts.	• I can record knowledge in the Knowledge Journal. • I can use a complete sentence to share an idea.	
Focusing Question 5: Lessons 26-31 **How does William use the powerful force of the wind?**			
26	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can connect prior knowledge to a new text.	• I can share an observation about the book. • I can ask a question about William. • I can record observations in my Response Journal.	*Oostzijdse Mill with Extended Blue, Yellow, and Purple Sky* by Piet Mondrian *Windmill in the Gein* by Piet Mondrian *The Red Mill* by Piet Mondrian *The Boy Who Harnessed the Wind* by William Kamkwamba and Bryan Mealer Lesson Materials
27	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can use sensory and feeling words to write a story.	• I can define the word harnessed. • I can name the main events of the story. • I can use a sensory word in my writing. • I can use a feelings word in my writing.	*The Boy Who Harnessed the Wind* by William Kamkwamba and Bryan Mealer American Sign Language Dictionary Website Lesson Materials

28 ✔FQT	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can use sensory and feeling words in a scene I write.	• I can define the word produce. • I can describe how a windmill produces electricity. • I can write a scene about William using sensory words. • I can use a feeling word in my scene.	*The Boy Who Harnessed the Wind* by William Kamkwamba and Bryan Mealer American Sign Language Dictionary Website Lesson Materials
29 ✔SS ✔FQT	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can ask for more information from a speaker in a Socratic Seminar.	•I used the Socratic Seminar Checklist to ask and answer questions. •I orally rehearsed my sentences about what the wind was like and how William felt. •I used words and illustrations to understand the words *scanned* and *rumbled.*	*The Boy Who Harnessed the Wind* by William Kamkwamba and Bryan Mealer Lesson Materials
30 ✔FQT	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can use evidence to support an essential meaning.	• I can read a poem about windmills. • I can state the essential meaning of the book. • I can find evidence to support the essential meaning.	*The Boy Who Harnessed the Wind* by William Kamkwamba and Bryan Mealer *This Windmill* by Amy Ludwig Vandewater Lesson Materials

		• I can connect the essential meaning to my life.	
31 ✔NR ✔VOC	**Content Learning Target:** I can use what I know about feelings to describe how characters respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can identify the main topic and key details in two new texts.	• I can complete New-Read Assessment 2. • I can find the main topic of a new text. • I can find a key detail in a new text. • I can record knowledge in the Knowledge Journal.	*The Boy Who Harnessed the Wind* by William Kamkwamba and Bryan Mealer *William and the Windmill* by Toronto Star *What Makes the Wind* by Amy Tao *Owl and the Moon* by Arnold Lobel American Sign Language Dictionary Website Lesson Materials
Essential Question: Lessons 32-35 **How do people respond to the powerful force of the wind?**			
32 ✔EOM	**Content Learning Target:** I can describe how people can respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can use a story map to plan narrative story elements.	• I can name the characters and setting for my story. • I can name a problem and a resolution involving the wind. • I can complete a Story Map for the EOM Task.	All Module Texts *The Red Mill* by Piet Mondrian *Oostzijdse Mill in the Evening* by Piet Mondrian *Windmill in the Gein* by Piet Mondrian Lesson Materials

33 ✔EOM	**Content Learning Target:** I can describe how people can respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can use sensory and feelings words to describe the wind and a character.	• I can write the beginning of my original story. • I can use a sensory word to describe the wind. • I can use a feelings word to describe my character.	All Module Texts *The Red Mill* by Piet Mondrian *Oostzijdse Mill in the Evening* by Piet Mondrian *Windmill in the Gein* by Piet Mondrian Lesson Materials
34 ✔EOM	**Content Learning Target:** I can describe how people can respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can revise my story by adding stronger sensory and feelings words.	• I can revise my story based on peer feedback. • I can add a new sensory or feelings word to my draft. • I can add what I learned to our class Knowledge Journal.	All Module Texts Lesson Materials
35 ✔SS	**Content Learning Target:** I can describe how people can respond to the powerful force of the wind. **Literacy Skills Learning Target:** I can ask questions to clear up confusion or gather more information from a speaker.	• I can take a turn in a Socratic Seminar. • I can ask a speaker for more information. • I can answer a classmate's question using evidence. • I can perform a fluency passage for the class.	All Module Texts American Sign Language Dictionary Lesson Materials

Fundations	
Important Reminder: **80% of students should master the unit assessment with a score of 80% or more when determining to advance instruction.**	
Fundations Lessons	**Learning Targets & Success Criteria**
Unit 8- ~ 2 weeks, 10 days.	***I can blend and spell 4-sound words, including words with the suffix -s.*** ● I can tap and blend 4 sounds to read words, like bump, bled, past, and cats. ● I can segment and spell 4- sound words. ● I can read and spell 4-sound words with and without the suffix -s, like steps or pinch. ***I can identify, read, and spell words with consonant blends at the beginning and end.*** ● I can identify a consonant blend at the beginning or end of a word. ● I can read and spell words with beginning blends (bl, st, shr...) and ending blends (mp, st, nch...). ● I can say each sound in a blend separately while tapping. ***I can identify and read words with the r-controlled vowels: ar, or, er, ir, and ur.*** ● I can use visual anchors to help me recognize r-controlled vowels. ● I can say the r-controlled vowel as one sound. ● I can recognize r-controlled vowels in a written word.
Unit 9~ 2 weeks, 10 days.	***I can explain what a closed syllable is and identify one in a word.*** ● I can explain what a closed syllable is: one vowel, closed in by at least one consonant, making a short vowel sound. ● I can identify whether a syllable is closed or open. ● I can mark a closed syllable with a curved mark under the short vowel. ***I can read and spell closed-syllable words by identifying the pattern.*** ● I can read multisyllabic words by identifying the closed syllable pattern. ● I can spell closed-syllable words (e.g., click, chunk, sniffs). ● I can tap out each sound in a closed syllable.

	I can tell the difference between a closed syllable and an open syllable and use that knowledge to read new words. • I can tell the difference between an open syllable (ends with a vowel = long sound) and a closed syllable. • I can sort syllables as open or closed. • I can use syllable type knowledge to help me read unfamiliar words.
Unit 10 ~ 3 weeks, 15 days.	***I can blend and spell 5-sound words, including words with the suffix -s.*** • I can blend and read words with 5 sounds (e.g., stump, clasp, strap). • I can segment and spell 5-sound words. • I can add -s to 5-sound words (e.g., slashing). **I can add -ed and -ing to a base word and explain what each ending means.** • I can add -ed to a base word to show something already happened. • I can add -ing to a base word to show something is happening now. • I can identify that the base word does not change when adding -ed or -ing to a closed-syllable word. **I can explain whether -s makes a word plural or adds to an action word.** • I can explain that -s can mean more than one (plural) OR can go with an action word (e.g., she runs). • can identify whether -s makes a noun plural or adds to a verb. • I can use -s correctly in sentences. **I can read and spell words with vowel teams: oa, oe, ow, ou, oo, ue, ew, au, aw.** • I can name the vowel teams introduced: oa, oe, ow, ou, oo, ue, ew, au, aw. • I can say the sound each vowel team makes. • I can read and spell words with vowel teams.

Unit 11- 3 weeks, 15 days.	***I can explain the VCe rule and identify the pattern in a word.*** ● I can explain the VCe rule: the silent e at the end makes the vowel say its long name. ● I can identify the VCe pattern in a word (e.g., stove, hope, caves). ● I can mark the long vowel and the silent e in a word. ***I can read and spell VCe words and tell them apart from CVC words.*** ● I can read 1-syllable VCe words accurately. ● I can spell VCe words by remembering the silent e. ● I can tell the difference between a CVC word (short vowel) and a CVCe word (long vowel). ***I can say all 5 long vowel sounds and identify whether a vowel is long or short.*** ● I can say all 5 long vowel sounds: long a, long e, long i, long o, long u. ● I can match each long vowel to its letter name. ● I can identify whether a vowel in a word is long or short. ***I can write sentences with VCe words and retell information from what I read.*** ● I can write sentences that include VCe words. ● I can retell facts from an informational text. ● I can retell the plot of a story and identify narrative vs. informational text.

Heggerty	
Advanced Segmenting, Final & Medial Sound Manipulation ~30 sessions **Learning Targets:** ● I can segment a spoken word into 4+ individual phonemes. ● I can isolate the final phoneme or medial vowel with automaticity. ● I can add a final phoneme to make a new word. ● I can delete a final phoneme to say what remains. ● I can substitute a final phoneme to make a new word. ● I can add the initial phoneme of a consonant blend. ● I can connect multi-phoneme manipulation to reading and spelling.	**Advanced Segmenting, Final & Medial Sound Manipulation ~30 sessions** **Success Criteria:** *Segmenting into 4+ phonemes* ● I listened to the whole word. ● chopped it into every individual sound, including blends. ● I said each sound in order and tracked them on my fingers. ● I counted to confirm how many sounds I said. *Adding a final phoneme* ● I listened to the word part I was given. ● I added the new ending sound. ● I blended the whole word together and said it. *Deleting a final phoneme* ● I listened to the whole word. ● I removed the last sound in my head. ● I blended what was left and said the new word. *Substituting a final phoneme* ● I listened to the word and held the last sound. ● I swapped the final sound for the new one I was given. ● I blended the word with its new ending and said it. *Adding a blend's initial phoneme* ● I listened to the word and knew the blend had two consonant sounds. ● I added the first consonant of the blend to the front. ● I blended all the sounds and said the new word.

Module 4: Cinderella Stories

Unit Title:

Module 4: Cinderella Stories

Relevant Standards: Bold indicates priority

See above.

Essential Question(s):

Why do people around the world admire Cinderella?

Enduring Understanding(s):

Students in Grade 1 will understand the following concepts as a result of this module:

- Reading helps people everywhere build knowledge.
- Stories have messages that can change the way people think and feel.
- People all over the world enjoy books, though those in different places get them in different ways.
- Some people, including all kinds of librarians around the world, dedicate their lives to making sure others have access to books.
- Reading changes lives by helping people imagine things they have not experienced.

Demonstration of Learning:

Students may demonstrate their learning within this unit in a variety of ways. At the end of this module, students will craft an opinion piece of writing discussing which Cinderella character they admire the most. In addition, they will participate in a Socratic seminar and in several assessments throughout the unit, such as vocabulary and “New Read” assessments, demonstrating their comprehension skills with new texts.

Pacing for Unit

42 school days

Family Overview (link below)

WW_G1_M4_FamilyTipSheet_English.pdf
WW_G1_M4_FamilyTipSheet_Spanish.pdf

Integration of Technology:

Videos and digital visual art displays are listed below.

Unit-specific Vocabulary:

WW_G1_MLL_Glossaries_English.pdf
WW_G1_MLL_Glossaries_Spanish.pdf

Aligned Unit Materials, Resources, and Technology (beyond core resources):

WW_Nat_G1_M4_TE_Lesson01-09_v2.pdf
WW_Nat_G1_M4_TE_Lesson10-16_v2.pdf
WW_Nat_G1_M4_TE_Lesson17-27_v2.pdf
WW_Nat_G1_M4_TE_Lesson28-35_v2.pdf

Content Vocabulary

alighted	chaperone	coach
fiesta	footmen	herald
magistrate	merchant	orphan
Palanquin	peasant	widow
Banana Slug	cedar	coniferous
Douglas Fir	island	pinecones
wildflowers	anklets	bow
buckskin	cloak	kimono
moccasins	sarong	slippers
bedchamber	chimney	garret
hearth	hull	pallet
wigwams	bellowed	blistered
charred	curdle	feeble
hoarse	odoriferous	putrid
stench	vilest	*gasped*
invisible		

Academic Vocabulary

abide	admire	adoring
ashamed	astonished	considerate
creative	deserve	despair
desperate	despised	disposition
elements	embarrassed	faith
fathom	favored	glossary
honored	plot	point of view
relevant	trait	central message

Core Texts

Adelita, Tomie dePaola
Bigfoot Cinderrrrella, Tony Johnston
Cendrillon: A Caribbean Cinderella, Robert D. San Souci
Cinderella, Marcia Brown
Glass Slipper, Gold Sandal: A Worldwide Cinderella, Paul Fleischman
The Korean Cinderella, Shirley Climo
The Rough-Face Girl, Rafe Martin

Supplementary Texts

“900 Cinderellas” Marcia Amidon Lusted and Judith C. Greenfield

Multimedia

First Steps, Jean-Francois Millet
First Steps, Pablo Picasso
First Steps, after Millet, Vincent Van Gogh
“Kudhinda Screen Printing”
“The Process of Making Batik-Artisans at Work”
“Wycinanka/Paper Cutout”

opinion	text evidence	compare & contrast
capitalize	punctuation	comma
compound sentences	pronouns	possessive pronouns
proper noun	conjunctions	shades of meaning
indefinite pronoun		

Visual Art Vocabulary

abstract	arrayed	embroidered
gilded	textile	

Opportunities for Interdisciplinary Connections:

Science: Module 4 integrates ELA with NGSS Life Science standards by examining how geographic settings in global "Cinderella" tales influence character adaptations. As students analyze diverse environments, they apply the NGSS Crosscutting Concept of Patterns (1-LS1-2) to identify recurring narrative and cultural structures. Furthermore, by exploring how characters utilize local natural resources for survival and status, students connect to 1-LS1-1, observing the relationship between living things and their specific habitats. This synthesis allows students to practice Obtaining, Evaluating, and Communicating Information across both literary and scientific domains.

Social Studies: In Module 4, students explore the geographic and cultural diversity of the world by comparing "Cinderella" archetypes from varied global regions. This study aligns with Social Studies standards regarding Geography and Global Awareness, as students use maps to locate story origins and identify how physical environments shape cultural traditions, clothing, and architecture. By analyzing the "wisdom" embedded in these tales, students examine Civics and Cultural Identity, identifying universal human values and the unique ways different societies express them. This cross-curricular approach strengthens students' ability to recognize patterns of continuity and change across diverse civilizations.

Anticipated misconceptions:

- Animals can live anywhere, and all animals within a group share the same characteristics (e.g., all birds fly), rather than understanding that habitats meet specific needs and animals vary within groups.
- Animals think, feel, and behave like humans (anthropomorphism), especially when influenced by narrative texts.
- Needs and wants are interchangeable, rather than distinguishing survival needs (food, water, shelter) from preferences.
- Informational texts function like stories, leading students to focus on retelling or characters instead of identifying main ideas and key details.

Social Emotional Learning: Module 4 fosters Social Awareness and Relationship Skills as students navigate the complex interpersonal dynamics within global "Cinderella" stories. By analyzing characters' responses to adversity and injustice, students develop Perspective-Taking and Empathy, recognizing universal human emotions across diverse cultural contexts. The module's focus on resilience and the "triumph of the underdog" supports Self-Management and Responsible Decision-Making, encouraging students to evaluate how character choices impact outcomes. This literary exploration provides a safe framework for students to discuss conflict resolution and the importance of perseverance, directly aligning with CASEL competencies for early childhood development. **Art:** Students can compare Susan Jeffers's romantic naturalism in *The Rough-Face Girl*, Tomie dePaola's folk-art geometry in *Adelita*, and Ruth Heller's vivid color in *The Korean Cinderella*, examining how an illustrator's choices of color, line, and pattern reflect the story's cultural origins. The module's paintings by Millet and Van Gogh add a second strand: Millet's quiet, dignified images of laborers echo Cinderella's hidden worth, while Van Gogh's emotionally charged brushwork models how feelings can be communicated through color and stroke. Teachers can build a culminating gallery-walk project where students research the traditional dress, color symbolism, or craft tradition of a country with its own Cinderella tale, then design an illustration or paper-doll costume for that Cinderella. This connects directly to the Module 4 craft work on "point of view" — students discover that *how* a story looks, not just how it's told, shapes what readers admire about it.	
Connections to Prior Units:	**Connections to Future Units:**
This is the fifth and final unit of the course. Students will leverage the newly taught routines in the previous module through a more in-depth study of a particular topic through a variety of texts and works of visual art. This module has a greater emphasis on narrative texts compared to prior units.	As part of the spiral approach, this unit will provide students with the foundational skills they need to expand their reading comprehension, vocabulary, and writing skills in later grades.

Differentiation through Universal Design for Learning

UDL Indicator & Teacher Actions:

Engagement

- Connect the "Essential Question" to students' personal interests by allowing them to bring a favorite book or object from home to share during the "Welcome" routine.
- During the Socratic Seminar, provide "talking chips" or "equity sticks" to ensure equitable participation and reduce the social anxiety of speaking in a large group.
- Use the Think-Pair-Share routine to allow students to verbally rehearse their ideas with a partner before sharing with the whole class.

Representation

- Pair written observations with matching drawings or icons to increase accessibility for non-readers.
- Use a word wall with visual anchors (pictures) next to key terms so students can refer to them independently during the unit.
- Use echo reading for the Essential and Focusing Questions, providing a clear vocal model and physical tracking of the text to help students connect spoken words to print.

Action & Expression

- Offer a variety of options for students to respond: writing, drawing, acting it out through a tableaux, or a physical pointer to identify details.
- Provide sentence frames to lower the cognitive load for students as they practice articulating their observations.

Supporting Multilingual/English Learners

Related CELP standards: and differentiated Learning Targets:

Standards	Emerging	Expanding	Bridging
LT 1 CELP 4	I can use picture cards and character names to identify one thing that is the same and one thing that is different between the different Cinderella characters.	I can use a Venn diagram and sentence frames to orally describe how the experiences of characters are similar and different.	I can use specific text evidence to compare and contrast the experiences of different characters.
LT 2 CELP 6	I can state an admirable trait for Cinderella and point to a picture in the text that shows why I chose it.	I can write an opinion sentence about an admirable trait of Cinderella using a sentence frame and draw and/or write one piece of supporting evidence.	I can write a complete opinion paragraph about Cinderella's admirable traits, including an opinion statement, supporting reasons from the text, and a conclusion statement.
LT 4 CELP 10	I can identify the conjunction "and" or "or" when listening to a sentence in a given text.	I can use a conjunction to combine two short sentences about a text into one compound sentence.	I can write a compound sentence using correct conjunctions and commas.

Lesson Sequence	Learning Target	Success Criteria/ Assessment	Resources
Focusing Question 1: Lessons 1-9 Why do people admire Perrault's Cinderella?			
1	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can ask questions about a new text using a world map for context.	• I can share an observation about Glass Slipper, Gold Sandal. • I can locate a place on the world map. • I can ask a question about the book. • I can record observations in my Response Journal.	*Glass Slipper: A Worldwide Cinderella, Gold Sandal* Lesson Materials
2	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can compare different versions of a text.	• I can share an observation about Perrault's Cinderella. • I can ask a question about Cinderella. • I can name two versions of Cinderella. • I can record observations in my Response Journal.	*Cinderella,* Marcia Brown Lesson Materials
3	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can use context clues to define an unknown word.	• I can use context clues to define a word. • I can name the characters and setting. • I can retell the events of Cinderella.	*Cinderella,* Marcia Brown Lesson Materials

		• I can use a complete sentence to share my idea.	
4	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can explain why evidence is important when forming an opinion.	• I can name an element of Cinderella stories (like magic or a wish). • I can find a story element in Perrault's Cinderella. • I can explain why opinions need evidence. • I can use a complete sentence to share an idea.	*Cinderella,* Marcia Brown Lesson Materials
5	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can use evidence to form an opinion about a character.	• I can find a detail about Cinderella in the text. • I can find a detail about another character in the text. • I can form an opinion using evidence. • I can share my opinion with a sentence frame.	*Cinderella,* Marcia Brown Lesson Materials
6	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can name the parts of an opinion paragraph (introduction, reasons, conclusion).	• I can define a pair of idioms from the text. • I can state the central message of Cinderella. • I can identify the parts of an opinion paragraph. • I can explain why structure helps a reader.	*Cinderella,* Marcia Brown Lesson Materials

7	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can structure an opinion paragraph with an opinion, reasons, and a conclusion.	• I can name the characters and setting in Cendrillon. • I can retell key events of Cendrillon. • I can write an opinion statement. • I can list reasons that support my opinion.	*Cendrillion: A Caribbean Cinderella* Lesson Materials
8 ✔FQT	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can connect a painting to themes in a text.	• I can describe a character in Cendrillon using evidence. • I can name the titles of the Millet and Van Gogh paintings. • I can connect a painting to Cendrillon. • I can use a complete sentence to share my idea.	*Cendrillion: A Caribbean Cinderella* Lesson Materials
9 ✔FQT	**Content Learning Target:** I can explain why people admire Perrault's Cinderella. **Literacy Skills Learning Target:** I can write an opinion paragraph using the right structure.	• I can complete the Knowledge Journal. • I can compare a character from each story. • I can write an opinion paragraph with introduction, reasons, and conclusion. • I can use evidence from the texts in my writing.	*Cendrillion: A Caribbean Cinderella,* Robert D. San Souci *Cinderella,* Marcia Brown Lesson Materials

Focusing Question 2: Lessons 10-16
Why do people admire Rough-Face Girl and Ella?

10	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can explain why an opinion statement is important.	• I can name the characters and setting in The Rough-Face Girl. • I can retell a key event from the story. • I can identify an opinion statement. • I can explain why an opinion statement starts a paragraph.	*The Rough-Face Girl,* Rafe Martin Lesson Materials
11	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can write an opinion statement using a sentence frame.	• I can use context clues to define a new word. • I can describe Rough-Face Girl using text evidence. • I can write an opinion statement. • I can share my opinion with a partner.	*The Rough-Face Girl,* Rafe Martin Lesson Materials
12	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can explain why reasons are needed to support an opinion.	• I can share an observation about the book. • I can ask a question about Ella and the Bigfoot prince. • I can identify a reason in an opinion paragraph.	*Bigfoot Cinderrrrrella*, Tony Johnston Lesson Materials

		• I can explain why reasons make an opinion stronger.	
13	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can supply reasons to support an opinion.	• I can use context clues to define a new word. • I can retell a key event from the story. • I can write a reason that supports an opinion. • I can use a complete sentence to share a reason.	*Bigfoot Cinderrrrrella*, Tony Johnston Lesson Materials
14	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can identify who is telling a story and supply reasons for an opinion.	• I can practice my Readers' Theater fluency passage. • I can identify who is telling the story. • I can supply two reasons that support an opinion. • I can use evidence in my reasons.	*Bigfoot Cinderrrrrella*, Tony Johnston Lesson Materials
15 ✔FQT	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can identify who is telling a story and supply reasons for an opinion.	• I can read my fluency passage with accuracy. • I can state the central message of the book. • I can write an opinion paragraph with an opinion and reasons. • I can use evidence from the text in my paragraph.	*Bigfoot Cinderrrrrella*, Tony Johnston Lesson Materials

16 ✔FQT	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can synthesize knowledge across two texts.	• I can name an element shared by both stories. • I can compare two characters across the books. • I can add to the Knowledge Journal. • I can use a complete sentence to share an idea.	*The Rough-Face Girl, Rafe Martin* *Bigfoot Cinderrrrrella*, Tony Johnston Lesson Materials
Focusing Question 3: Lessons 17-27 **Why do people admire Adelita and Pear Blossom?**			
17 ✔NR	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can write compound declarative, interrogative, and imperative sentences.	• I can share an observation about Adelita. • I can identify who is telling the story. • I can add a relevant detail when I speak. • I can explain why relevant details help listeners.	*Adelita,* Tomie dePaola Lesson Materials
18	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can explain why conclusions are important in opinion paragraphs.	• I can use the Outside-In strategy to define a new word. • I can retell a key event from Adelita. • I can identify a conclusion sentence. • I can explain why a conclusion ties a paragraph together.	*Adelita, Tomie dePaola* Lesson Materials

19	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can write a conclusion sentence for an opinion paragraph.	• I can describe Adelita using evidence. • I can write a conclusion sentence using a frame. • I can share my conclusion with a partner.	*Adelita,* Tomie dePaola Lesson Materials
20	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can explain why an introduction is important in an opinion paragraph.	• I can find descriptive language in the text. • I can state the central message of Adelita. • I can identify an introduction sentence. • I can explain why an introduction helps a reader.	*Adelita, Tomie dePaola* Lesson Materials
21	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can write an introduction for an opinion paragraph.	• I can add to the Elements of Cinderella Stories Chart. • I can write an introduction for an opinion paragraph. • I can use a strong opening sentence. • I can share my introduction with a partner.	*Adelita,* Tomie dePaola *Bigfoot Cinderrrrella,* Tony Johnston Lesson Materials

22 ✔VOC	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can add relevant details when I speak.	• I can locate Korea on the world map. • I can share an observation about the book. • I can ask a question about Pear Blossom. • I can add a relevant detail when sharing an idea.	*The Korean Cinderella,* Shirley Climo Lesson Materials
23	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can write an introduction for an opinion paragraph independently.	• I can read my fluency passage at the proper rate. • I can retell a key event from the story. • I can write an introduction using a frame. • I can use a strong opening sentence.	*The Korean Cinderella,* Shirley Climo Lesson Materials
24 ✔FQT	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can use verbs in a story to infer characters' feelings.	• I can find a verb in the story. • I can use a verb to infer a character's feeling. • I can describe Pear Blossom using evidence. • I can use a complete sentence to share my idea.	*The Korean Cinderella, Shirley Climo* Lesson Materials
25 ✔FQT	**Content Learning Target:** I can describe the qualities of characters that are admirable.	• I can find sensory words that describe the pear tree. • I can describe an illustration in the book.	*The Korean Cinderella,* Shirley Climo Lesson Materials

	Literacy Skills Learning Target: I can write an introduction and a conclusion for an opinion paragraph.	• I can write an introduction for my opinion paragraph. • I can write a conclusion for my opinion paragraph.	
26 ✔FQT	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can read with expression to show characters' feelings.	• I can read a fluency passage with expression. • I can state the central message of the book. • I can find evidence to support the central message. • I can connect the central message to my life.	*The Korean Cinderella, Shirley Climo* Lesson Materials
27	**Content Learning Target:** I can describe the qualities of characters that are admirable. **Literacy Skills Learning Target:** I can revise my introduction sentence to make it stronger.	• I can add to the Elements of Cinderella Stories Chart. • I can revise my introduction sentence. • I can use a vivid word in my introduction. • I can share my improved writing with a partner.	*The Korean Cinderella,* Shirley Climo *“900 Cinderellas” Adelita* *Cinderella,* Marcia Brown Lesson Materials
Focusing Question 4: Lessons 28-35 **Why do people admire Cinderella stories around the world?**			

28 ✔SS	**Content Learning Target:** I can explain why people admire Cinderella stories around the world. **Literacy Skills Learning Target:** I can add relevant details when speaking in a Socratic Seminar.	• I can define the word admire. • I can describe actions I admire and don't admire. • I can take a turn in a Socratic Seminar. • I can add a relevant detail when I speak.	*Glass Slipper, Gold Sandal: A Worldwide Cinderella,* Paul Fleischman Lesson Materials
29 ✔EOM	**Content Learning Target:** I can explain why people admire Cinderella stories around the world. **Literacy Skills Learning Target:** I can compare illustrations across artworks.	• I can describe a baby's first steps painting. • I can compare illustrations in the book. • I can describe a detail in an illustration. • I can use a complete sentence to share my idea.	*Glass Slipper, Gold Sandal: A Worldwide Cinderella,* Paul Fleischman Lesson Materials
30 ✔EOM	**Content Learning Target:** I can explain why people admire Cinderella stories around the world. **Literacy Skills Learning Target:** I can use illustrations to compare different versions of a tale.	• I can describe an illustration from a version of Cinderella. • I can compare illustrations from two versions. • I can find a clue in an illustration. • I can use a complete sentence to share my idea.	*Glass Slipper, Gold Sandal: A Worldwide Cinderella,* Paul Fleischman Lesson Materials

31 ✔EOM	**Content Learning Target:** I can explain why people admire Cinderella stories around the world. **Literacy Skills Learning Target:** I can analyze the point of view in artwork and texts.	• I can define the term point of view. • I can analyze the point of view in an artwork. • I can identify the point of view in a story. • I can use a complete sentence to share my idea.	All Module Texts Lesson Materials
32 ✔EOM	**Content Learning Target:** I can explain why people admire Cinderella stories around the world. **Literacy Skills Learning Target:** I can read a fluency passage with accuracy, rate, and expression.	• I can practice my fluency passage. • I can connect a fluency passage to a Cinderella story. • I can share what I learned across the module. • I can use a complete sentence to share an idea.	*"900 Cinderellas"* *Cinderella,* Marcia Brown Lesson Materials
33 ✔EOM ✔NR	**Content Learning Target:** I can explain why people admire Cinderella stories around the world. **Literacy Skills Learning Target:** I can revise my writing to improve capitalization.	• I can read the "900 Cinderellas" article. • I can revise my writing to capitalize the first word and proper nouns. • I can use evidence to write an opinion.	*"900 Cinderellas"* *Cinderella,* Marcia Brown Lesson Materials

34 ✔SS ✔VOC	**Content Learning Target:** I can explain why people admire Cinderella stories around the world. **Literacy Skills Learning Target:** I can speak with more relevant details.	• I can revisit the world map from Lesson 1. • I can describe a place a Cinderella story comes from. • I can add a relevant detail when speaking. • I can present my EOM Task with detail.	All Module Texts Lesson Materials
35	**Content Learning Target:** I can explain why people admire Cinderella stories around the world. **Literacy Skills Learning Target:** I can reflect on key skills I have learned.	• I can complete the Knowledge Journal. • I can name a key skill I gained this year. • I can name my favorite text from the year. • I can use a complete sentence to share my reflection.	All Module Texts Lesson Materials
End of Year Question: What is the story of the year?			
36	**Content Learning Target:** I can reflect upon my learning this year and share key details from books I enjoyed.	I drew and wrote details about a character that brought me joy.	All Module Texts Lesson Materials

Fundations	
Important Reminder: **80% of students should master the unit assessment with a score of 80% or more when determining to advance instruction.**	
Fundations Lessons	**Learning Targets & Success Criteria**
Unit 12- ~ 3 weeks, 15 days.	***I can explain what a syllable is and count syllables in a word.*** ● I can explain that a syllable is a word part with one vowel sound. ● I can clap or tap the syllables in a word. ● I can count the syllables in 1- and 2-syllable words. ***I can break apart and read compound words.*** ● I can explain that a compound word is made from two smaller words joined together. ● I can break a compound word into its two parts (e.g., sun + set = sunset). ● I can read and spell compound words. ***I can divide a 2-syllable word into parts to help me read and spell it.*** ● I can divide a 2-syllable word between two consonants (e.g., fin-ish). ● I can divide a 2-syllable word with a VCe pattern. ● I can use syllable division to help me read and spell longer words (e.g., reptile). ***I can read multisyllabic words by breaking them into parts and retell a story.*** ● I can read a multi-syllable word by breaking it into parts. ● I can retell a story using key story elements. ● I can read with expression and accuracy.
Unit 13~ 3 weeks, 15 days.	***I can add -s, ---es, -ed, and -ing to 2-syllable base words.*** . ● I can add -s, -ed, and -ing to 2-syllable base words. ● I can add -es to words that end in certain sounds (e.g., boxes, finishes). ● I can identify the base word after removing a suffix. ***I can explain when to add -es instead of -s and use it correctly.*** ● I can explain that we add -es instead of -s when a word ends in certain sounds (x, s, sh, ch, z). ● I can read and spell words with -es (e.g., trombones, picnics, boxes).

	- I can use the -es ending in sentences. ***I can read multisyllabic words accurately and retell what I read.*** - I can read multisyllabic words accurately. - I can retell what I read from a story or informational text. - I can read with fluency and good expression.
Unit 14 ~ 2 weeks, 10 days.	***I can read and spell words using all the word structures I have learned this year.*** - I can read and spell words with all word structures learned this year: CVC, CCVC, CVCC, CVCe, digraphs, glued sounds, suffixes, and multisyllabic words. - I can identify the syllable type in a word (closed or VCe). - I can use what I know about word structure to read and spell new words (e.g., disrupted, insisting, disputes). **I can write a complete, correct sentence and find and fix errors in my writing.** - I can write a complete sentence with correct capitalization and punctuation. - I can find and fix errors in capitalization, punctuation, and spelling. - I can write a paragraph with a topic sentence and supporting details. **I can read all word types and trick words I have learned this year with fluency and accuracy.** - I can read CVC, CCVC, CVCC, CCVCC, and CVCe words fluently. - I can read all 100+ trick words I have learned this year. - I can read a decodable story with fluency, accuracy, and expression.

Heggerty	
Within Word Manipulation & Full Phoneme Mastery ~30 sessions **Learning Targets:** • I can delete a phoneme from within a word (including the 2nd phoneme of a blend). • I can substitute the medial vowel sound to make a new word. • I can substitute initial and final phonemes of blend words. • I can add, delete, and substitute phonemes within longer words. • I can segment and blend words with consonant blends and digraphs. • I can apply phoneme manipulation to support reading and spelling.	**Within Word Manipulation & Full Phoneme Mastery ~30 sessions** **Success Criteria:** *Deleting a within-word phoneme (incl. 2nd phoneme of a blend)* • I listened to the word and segmented it into all its sounds. • I found the sound I needed to remove inside the word. • I took that sound out and held the remaining sounds. • I blended what was left and said the new word. *Substituting the medial vowel* • I listened to the word and heard the middle vowel sound. • I removed the vowel from the middle in my head. • I put the new vowel sound in its place. • I blended all the sounds and said the new word. *Substituting phonemes in blend words* • I listened to the word and identified which sound I was changing. • I swapped that sound for the new one, keeping the blend structure in mind. • I blended all the sounds and said the new word. *Applying manipulation to reading and spelling* • I heard or said all the sounds in a word. • I matched each sound to the letter or letters that spell it. • I used what I know about sounds to read or spell the word correctly. *Segmenting & blending blend and digraph words* • I listened to the word and noticed it had a blend or digraph. • I treated each sound separately, even inside a blend. • I segmented or blended every sound in the correct order. • I said the full segmented sounds or the blended whole word.

Course Title:	**Content Area:**	**Grade Level:**	**Credit (if applicable)**
Academic Support: Transition	Special Education, Transition Planning	11	.5

Course Description:

This course is designed with a results-oriented process, focusing on improving the academic and functional achievement of all students, as they prepare to embark on post-school activities, including postsecondary education, vocational education, integrated employment, continuing and adult education, adult services, independent living, and community participation. The standards for this course are rooted in the CT Core Transition Skills Standards.

Aligned Core Resources:	**Connection to the *BPS Vision of the Graduate***
The standards for this course are rooted in the CT Core Transition Skills Standards. CT CORE Transition Skills.pdf	The Academic Support: Transition course for high school-aged students is directly aligned with the Bristol Public Schools Vision of the Graduate by preparing students with the academic knowledge, life skills, and dispositions necessary to become self-sufficient and contributing members of society. Through individualized transition planning, students develop communication, collaboration, self-advocacy, problem-solving, and workplace readiness skills that support meaningful participation in post-secondary education, employment, and community life. Transition services foster independence, social and cross-cultural competence, and responsible decision-making while empowering students to identify their strengths, set goals, and navigate real-world experiences with confidence. By connecting classroom learning to career exploration, community engagement, and independent living opportunities, Special Education Transition Services ensure that all students are equipped to meaningfully contribute to a rapidly changing global society in alignment with the Bristol Public Schools Vision of the Graduate.

Additional Course Information: ***Knowledge/Skill Dependent courses/prerequisites***	**Link to *Completed Equity Audit***
There are no prerequisites required. All students enrolled must receive special education services.	**Academic Support Transition Copy of Equity Curri...**

Standard Matrix

The document included below identifies the CT Core Transition Skills by grade level per unit within this curriculum
CT Core Transition Skills (breakdown per grade level).docx

Unit Links

Unit 1: Understanding My Learner Profile
Unit 2: Exploring Post Secondary Pathways and Possibilities
Unit 3: Life skills for Success
Unit 4: Building My Career Profile

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<table>
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Course Title:	**Content Area:**	**Grade Level:**	**Credit (if applicable)**
Academic Support: Transition	Special Education, Transition Planning	10	.5

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Unit Links
Unit 1: Understanding My Learner Profile **Unit 2**: Exploring Post Secondary Pathways and Possibilities **Unit 3:** Life skills for Success **Unit 4:** Building My Career Profile

Course Title:	**Content Area:**	**Grade Level:**	**Credit (if applicable)**
Academic Support: Transition	Special Education, Transition Planning	9	.5

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CT Core Transition Skills (breakdown per grade level).docx

Unit Links

Unit 1: Understanding My Learner Profile

Course Title	Content Area	Grade Level	Credit (if applicable)
Grade 8 Math: Pathways to Algebra	**Mathematics**	**Grade 8**	**N/A**

Course Description

IM Grade 8 begins with transformational geometry. Students study rigid transformations and congruence, and then dilations and similarity. This provides background for understanding the slope of a line in the coordinate plane.

Next, students build on their understanding of proportional relationships, from IM Grade 7, to study linear relationships. They use equations, tables, and graphs to represent linear relationships, and make connections across these representations. Students expand their ability to work with linear equations in one and two variables, extending their understanding of a solution to an equation in one or two variables to comprehend a solution to a system of equations in two variables. They learn that linear relationships are an example of a special kind of relationship called a function. Students apply their understanding of linear relationships and functions to contexts involving data with variability.

The course ends the year with students extending their understanding of exponents to include all integers, and in the process codifying the properties of exponents. They learn about orders of magnitude and scientific notation in order to represent and compute with very large and very small quantities. They encounter irrational numbers for the first time and informally extend the rational-number system to the real-number system, motivated by their work with the Pythagorean Theorem.

Aligned Core Resources

CT Core Standards
(aligned to National Common Core Standards)
https://accessim.org

Imagine Learning iM Resources (Imagine 6-8)
BPS teacher login through ClassLink required

https://accessim.org/6-8/grade-8/course-guide/further-reading?a=teacher

- Empowering All Storytellers: Tips for Engaging Special Populations Using IM® v.360 for Grade 6–12
- Tackling Wordy Problems: How the Three Reads Math Language Routine Supports Access for All Learners
- Think Pair Share
- Making Sense of Story Problems
- Math Language Routines: Discourse with a Purpose
- Unlocking Learners' Thinking Using the Mathematical Language Routines

Connection to the *BPS Vision of the Graduate*

Common Core State Standards: Math Practice (MP) Standards
MP 1: Make sense of problems and persevere in solving them.
MP 2: Reason abstractly and quantitatively.
MP 3: Construct viable arguments and critique the reasoning of others.
MP 4: Model with mathematics.
MP 5: Use appropriate tools strategically.
MP 6: Attend to precision.
MP 7: Look for and make use of structure.
MP 8: Look for and express regularity in repeated reasoning.

	Lessons that Showcase Math Practice Standards							
	Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	**Unit 7**	**Unit 8**
MP 1	1, 6, 13	5,10,13	3, 5, 9, 10	8,	1,4,10,15,19-21	1,9	1,14	1,8,12,18
MP 2	6	11,	1, 4, 5, 12, 14	1,4,7,9	3-8,10,11,17,18	1,3,4,6-9,11	2,10-11-12,14,15,16	3,4,11, 14
MP 3	2, 6-9, 11-14	2,3,6,8,12	4, 14	13,	6,14-17	5,10	4,13,15	5,6
MP 4	2		2, 3, 11	15	5,6,9-13	2,4-6,8,10,11	12-16	18
MP 5	1, 3, 7, 11	4,	5	10,13,	7	2,11		2
MP 6	1, 3, 4, 8, 10-14	1,4,5,6,	1, 3, 6	6,11,12,	2,5,6,11,12,21	3,5-7,9	1,7-9,11,14-16	1,7,8,9,12,13,15,16
MP 7	1,, 3, 4, 5, 9, 10, 15-17	1,2,3,4,8,9,12,	2, 5	3,4,5,10,	2,13,14,16,19,20	1,2,4,7,9	4,5,7,8,10,11,13	1,2,5,6,8,10,13,14, 17
MP 8	8, 15	6,9,10,	6, 7, 8, 10, 13, 15	5,6,7,8,13, 14,15,16	3,22		1-6,8	7, 16,17

Bristol Public Schools Vision of the Graduate

Problem Solving
- iM's focus on real-world modeling and problem-solving strategies
- Multiple solution pathways are encouraged and explored
- Students develop perseverance through challenging tasks

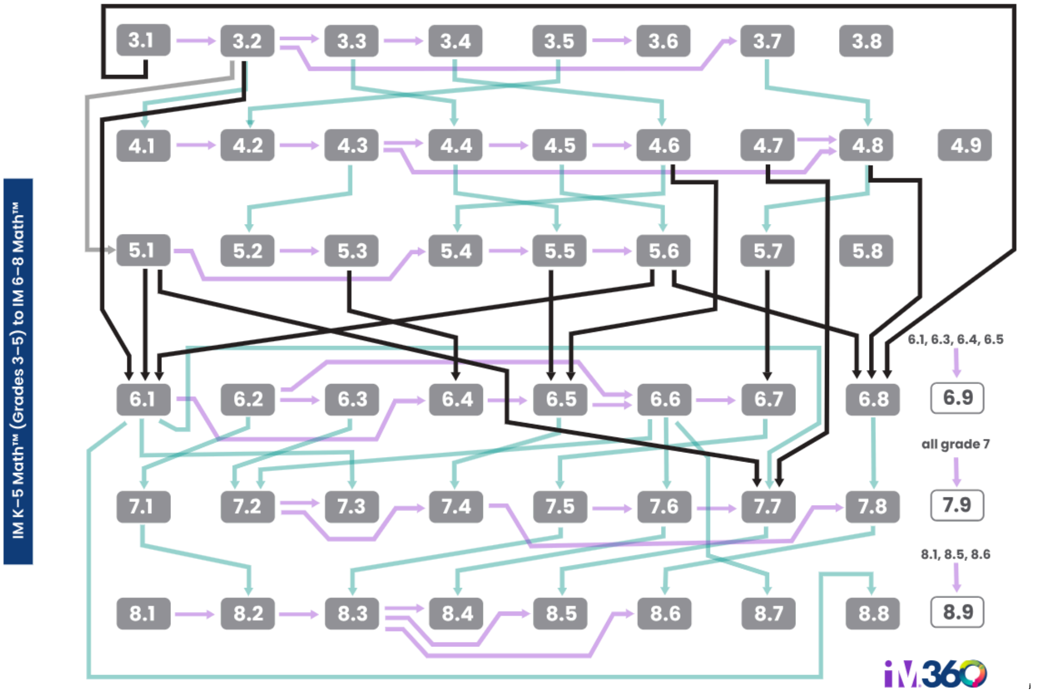
Critical Thinking
- Students analyze mathematical relationships and justify their reasoning
- Regular opportunities to critique others' reasoning
- Emphasis on understanding "why" not just "how"

Communication and Collaboration
- Structured mathematical discourse is built into lessons
- Students explain their thinking both verbally and in writing
- Many activities involve partner and group work

Link to *Equity Audit* | Equity Curriculum Review Audit (Gr. 8 Path)

Additional Course Information:

Knowledge/Skill Dependent courses/prerequisites



Standard Matrix

Standard	**Lessons**			
8.EE.A	Unit 8, Lesson 16			
8.EE.A.1	Unit 7, Lesson 2 Unit 7, Lesson 3 Unit 7, Lesson 4	Unit 7, Lesson 5 Unit 7, Lesson 6 Unit 7, Lesson 7	Unit 7, Lesson 8 Unit 7, Lesson 11 Unit 7, Lesson 14	
8.EE.A.2	Unit 8, Lesson 3 Unit 8, Lesson 4 Unit 8, Lesson 5	Unit 8, Lesson 6 Unit 8, Lesson 14 Unit 8, Lesson 15	Unit 8, Lesson 11	
8.EE.A.3	Unit 7, Lesson 9 Unit 7, Lesson 10 Unit 7, Lesson 11	Unit 7, Lesson 12 Unit 7, Lesson 14 Unit 7, Lesson 16		
8.EE.A.4	Unit 7, Lesson 10 Unit 7, Lesson 11 Unit 7, Lesson 12	Unit 7, Lesson 13 Unit 7, Lesson 14 Unit 7, Lesson 15	Unit 7, Lesson 16	
8.EE.B	Unit 3, Lesson 1 Unit 3, Lesson 2 Unit 3, Lesson 3 Unit 3, Lesson 4	Unit 3, Lesson 5 Unit 3, Lesson 6 Unit 3, Lesson 7	Unit 3, Lesson 8 Unit 3, Lesson 9 Unit 3, Lesson 10	Unit 3, Lesson 11 Unit 3, Lesson 12 Unit 3, Lesson 13
8.EE.B.5	Unit 3, Lesson 2	Unit 3, Lesson 3	Unit 3, Lesson 4	Unit 3, Lesson 6
8.EE.B.6	Unit 2, Lesson 10 Unit 2, Lesson 11 Unit 2, Lesson 12	Unit 3, Lesson 7 Unit 3, Lesson 10	Unit 3, Lesson 11 Unit 3, Lesson 12	Unit 3, Lesson 15
8.EE.C	Unit 3, Lesson 13 Unit 3, Lesson 14	Unit 4, Lesson 2 Unit 4, Lesson 3	Unit 4, Lesson 4 Unit 4, Lesson 5	Unit 4, Lesson 9 Unit 4, Lesson 10
8.EE.C.7	Unit 4, Lesson 3 Unit 4, Lesson 4	Unit 4, Lesson 5 Unit 4, Lesson 6	Unit 4, Lesson 9	
8.EE.C.7.a	Unit 4, Lesson 7	Unit 4, Lesson 8		
8.EE.C.7.b	Unit 4, Lesson 6			
8.EE.C.8	Unit 4, Lesson 9 Unit 4, Lesson 10	Unit 4, Lesson 11 Unit 4, Lesson 12	Unit 4, Lesson 13 Unit 4, Lesson 14	Unit 4, Lesson 15
8.EE.C.8.a	Unit 3, Lesson 14	Unit 3, Lesson 15	Unit 4, Lesson 12	Unit 4, Lesson 13
8.EE.C.8.b	Unit 4, Lesson 12	Unit 4, Lesson 15		
8.EE.C.8.c	Unit 4, Lesson 15	Unit 4, Lesson 16		

8.F.A	Unit 5, Lesson 3	Unit 5, Lesson 22		
8.F.A.1	Unit 5, Lesson 1 Unit 5, Lesson 2	Unit 5, Lesson 3 Unit 5, Lesson 4	Unit 5, Lesson 5 Unit 5, Lesson 17	Unit 9, Lesson 4
8.F.A.2	Unit 5, Lesson 7	Unit 5, Lesson 8		
8.F.A.3	Unit 5, Lesson 4 Unit 5, Lesson 7	Unit 5, Lesson 8	Unit 5, Lesson 17	Unit 5, Lesson 18
8.F.B	Unit 5, Lesson 10 Unit 5, Lesson 11	Unit 5, Lesson 17 Unit 5, Lesson 18	Unit 8, Lesson 3	Unit 9, Lesson 4 Unit 9, Lesson 6
8.F.B.4	Unit 5, Lesson 8	Unit 5, Lesson 9	Unit 5, Lesson 10	Unit 5, Lesson 11
8.F.B.5	Unit 5, Lesson 5	Unit 5, Lesson 6	Unit 5, Lesson 10	
8.G.A	Unit 1, Lesson 17 Unit 2, Lesson 2	Unit 2, Lesson 3 Unit 2, Lesson 4 Unit 2, Lesson 5	Unit 2, Lesson 8 Unit 2, Lesson 9 Unit 2, Lesson 12	Unit 9, Lesson 1 Unit 9, Lesson 2 Unit 9, Lesson 3
8.G.A.1	Unit 1, Lesson 2 Unit 1, Lesson 3	Unit 1, Lesson 4 Unit 1, Lesson 6	Unit 1, Lesson 11 Unit 1, Lesson 14	
8.G.A.1.a	Unit 1, Lesson 7 Unit 1, Lesson 8	Unit 1, Lesson 9	Unit 1, Lesson 10	Unit 1, Lesson 13
8.G.A.1.b	Unit 1, Lesson 7	Unit 1, Lesson 8	Unit 1, Lesson 9	Unit 1, Lesson 10
8.G.A.1.c	Unit 1, Lesson 9			
8.G.A.2	Unit 1, Lesson 11 Unit 1, Lesson 12	Unit 1, Lesson 13	Unit 1, Lesson 15	Unit 2, Lesson 6 Unit 2, Lesson 7
8.G.A.3	Unit 1, Lesson 5 Unit 1, Lesson 6	Unit 2, Lesson 4	Unit 2, Lesson 5	Unit 2, Lesson 12
8.G.A.4	Unit 2, Lesson 6	Unit 2, Lesson 7	Unit 2, Lesson 9	
8.G.A.5	Unit 1, Lesson 14 Unit 1, Lesson 15	Unit 1, Lesson 16	Unit 2, Lesson 8 Unit 2, Lesson 13	Unit 9, Lesson 2
8.G.B	Unit 8, Lesson 7	Unit 8, Lesson 8	Unit 8, Lesson 10	Unit 8, Lesson 12
8.G.B.6	Unit 8, Lesson 8	Unit 8, Lesson 10		
8.G.B.7	Unit 8, Lesson 7 Unit 8, Lesson 8	Unit 8, Lesson 9 Unit 8, Lesson 11	Unit 8, Lesson 12	Unit 8, Lesson 18
8.G.B.8	Unit 8, Lesson 13			
8.G.C	Unit 5, Lesson 12	Unit 5, Lesson 17	Unit 5, Lesson 19	Unit 5, Lesson 20
8.G.C.9	Unit 5, Lesson 13 Unit 5, Lesson 14 Unit 5, Lesson 15	Unit 5, Lesson 16 Unit 5, Lesson 17 Unit 5, Lesson 18	Unit 5, Lesson 19 Unit 5, Lesson 20	Unit 5, Lesson 21 Unit 5, Lesson 22
8.NS.A	Unit 8, Lesson 2	Unit 8, Lesson 4	Unit 8, Lesson 11	Unit 8, Lesson 16
8.NS.A.1	Unit 8, Lesson 16	Unit 8, Lesson 17		
8.NS.A.2	Unit 8, Lesson 2 Unit 8, Lesson 5	Unit 8, Lesson 6	Unit 8, Lesson 14	Unit 8, Lesson 15
8.SP.A	Unit 6, Lesson 11	Unit 9, Lesson 4	Unit 9, Lesson 5	Unit 9, Lesson 6
8.SP.A.1	Unit 6, Lesson 1 Unit 6, Lesson 2	Unit 6, Lesson 3 Unit 6, Lesson 4	Unit 6, Lesson 5 Unit 6, Lesson 6	Unit 6, Lesson 7 Unit 6, Lesson 8
8.SP.A.2	Unit 6, Lesson 4	Unit 6, Lesson 5	Unit 6, Lesson 6	Unit 6, Lesson 8
8.SP.A.3	Unit 6, Lesson 3	Unit 6, Lesson 6	Unit 6, Lesson 8	
8.SP.A.4	Unit 6, Lesson 9	Unit 6, Lesson 10		

Unit Links

Grade 8 Mathematics: Pathways to Algebra
Unit 1: Rigid Transformations and Congruence
Unit 2: Dilation, Similarity, and Introducing Slope
Unit 3: Linear Relationships
Unit 4: Linear Equations and Linear Systems
Unit 5: Functions and Volume
Unit 6: Associations in Data
Unit 7: Exponents and Scientific Notation
Unit 8: Pythagorean Theorem and Irrational Numbers
Course Assessment Map

Use of Instructional Time (181 School Days)

- ➔ 162 iM Content and Assessment Days
- ➔ 6 Climate and Culture Days: 2 days at start of year, 2 shortened days before breaks, and 2 days at end of year
- ➔ 9 IAB Days: 1 day Strategic Review and 2 day IAB in fall, winter, and spring
- ➔ 4 SBA Days: 1 day Strategic Review and 3 day SBA

Unit Title:

Unit 1: Rigid Transformations and Congruence

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1		Lesson 10	8.G.A.1.a 8.G.A.1.b
Lesson 2	8.G.A.1	Lesson 11	8.G.A.1 8.G.A.2
Lesson 3	8.G.A.1	Lesson 12	8.G.A.2
Lesson 4	8.G.A.1	Lesson 13	8.G.A.1.a 8.G.A.2
Lesson 5	8.G.A.3	Lesson 14	8.G.A.1 8.G.A.5
Lesson 6	8.G.A.1, 8.G.A.3	Lesson 15	8.G.A.2 8.G.A.5
Lesson 7	8.G.A.1.a 8.G.A.1.b	Lesson 16	8.G.A.5
Lesson 8	8.G.A.1.a 8.G.A.1.b	Lesson 17	8.G.A
Lesson 9	8.G.A.1.a 8.G.A.1.b 8.G.A.1.c		

Essential Question(s):

- How do different transformations (translation, rotation, reflection) affect the position and properties of a figure?
- What does it mean for two geometric figures to be "congruent"?
- What universal relationship exists among the interior angles of any triangle?

Enduring Understanding(s):

- Rigid transformations change a figure's position in the plane but preserve all side lengths and angle measures
- Two figures are congruent if there is a sequence of rigid transformations that takes one figure exactly onto the other
- The sum of the interior angle measures of any triangle is always 180 degrees, a fact that can be justified using rigid motions and parallel line relationships

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 6)
CFA 2: Checkpoint B (after lesson 10)
CFA 3: Checkpoint C (after lesson 13)
CFA 4: Lesson 14 and Lesson 15 Cool Downs

Checkpoint D (after lesson 16) is an opportunity for feedback and/or review before the EOU assessment

***NOTE:** Could combine MOU and EOU Assessments - potentially???*
MoU: Assessment A (after lesson 10)
EoU: Assessment A (after lesson 16)

Pacing for Unit

14 Days (12 instructional days, 1 review, 1 assess)

- Keep as is: Lessons 1, 2, 7, 8, 11, 14, 15, 16
- Combine Lessons 3+4 (L4 Warmup, 3.1, 4,2)
- Combine Lessons 5+6 (L5 Warmup, 5.1, L6 Warmup)
- Combine Lessons 9+10 (L9 Warmup, 9.2, 10.2)2
- Suggestion: Combine mid and end of unit assessments into one.
- Combine Lessons 12+13 (12 Warmup, 12.1, 13.1, 13.2)

Lesson to Remove or Modify:

- Remove 8.1.14. In this lesson, students are introduced to transversal and types of angles. This is an additional standard for Geometry and can be revisited in high school Geometry
- Remove 8.1.15. In this lesson, students focus on interior angles of a triangle, this is also an additional standard for grade 8 that can be revisited in Geometry
- Remove 8.1.16. This lesson focused on triangles on and off a grid can be removed and revisited in Geometry
- Move 8.1.17 to outside of class as a culminating activity for the unit

Family Overview

https://accessim.org/6-8/grade-8/unit-1?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

New Terminology

Lesson	receptive	productive
8.1.1	vertex plane measure	slide turn

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.1.1 Lesson Synthesis Applet: Triangle Square Dance
- 8.1.2 Digital Applet: Move Card Sort
- 8.1.3 Digital Applet: Transformation Information
- 8.1.4 Digital Applets: Make That Move, A to B to C
- 8.1.5 Digital Applets: Reflecting Points on the

	direction	
8.1.2	clockwise counterclockwise reflection rotation translation	opposite
8.1.3	image angle of rotation center (of rotation) line of reflection	vertex
8.1.4	transformation sequence of transformations distance	clockwise counterclockwise reflect rotate translate
8.1.5	coordinate plane point segment coordinates x-axis y-axis	
8.1.6	polygon	angle of rotation center (of rotation) line of reflection
8.1.7	rigid transformation corresponding measurements preserve	reflection rotation translation measure point
8.1.8	midpoint	segment
8.1.9	vertical angles parallel intersect	distance
8.1.10		Image rigid transformation midpoint parallel
8.1.11	congruent perimeter area	
8.1.12		right angle x-axis y-axis area
8.1.13		corresponding
8.1.14	alternate interior angles transversal	vertical angles congruent supplementary angles
8.1.15	straight angle	
8.1.16		alternate interior angles transversal straight angle
8.1.17	tessellation symmetry	

Coordinate Plane, Transformations of a Segment
- 8.1.7 Activity 2 Applet: Which One?
- 8.1.8 Digital Applet: A Pattern of Four Triangles
- 8.1.16 Digital Applet: Angle Plus Two

For whole course:
https://accessim.org/6-8/grade-7/course-guide/required-materials?a=teacher

Provide access as needed throughout the unit:
- Chart paper
- Geometry toolkits (Tracing paper, graph paper, colored pencils, scissors, and an index card to use as a straightedge or to mark right angles. ruler and a protractor. Clear protractors with no holes and with radial lines printed on them are recommended.)
  Notes: (1) “Tracing paper” is easiest to use when it’s a smaller size. Commercially available “patty paper” is 5 inches by 5 inches and ideal for this. If using larger sheets of tracing paper, consider cutting them down for student use. (2) When compasses are required in grades 6–8, they are listed as separate Required Material.
- Math Community Chart
- Rulers
- Scissors
- Sticky notes
- Toothpicks, pencils, straws, or other objects
- Tracing paper or “patty paper"

Lesson	Materials to Gather	Materials to Copy
Lesson 1	• Geometry toolkits: Lesson, Activity 1 • Chart paper: Activity 1 • Sticky notes: Activity 1	• Math Community Chart (1 copy for every 30 students): Activity 1 • Triangle Square Dance Handout (1 copy for every 2 students): Activity 2
Lesson 2	Geometry toolkits: Activity 1, Activity 2	Move Cards (1 copy for every 3 students): Activity 3
Lesson 3	• Math Community Chart: Activity 1 • Sticky notes: Activity 1 • Geometry toolkits: Activity 2	
Lesson 4	Geometry toolkits: Activity 3	Make that Move Cards (1 copy for every 4 students): Activity 2
Lesson 5	Geometry toolkits: Activity 3	
Lesson 6	• Geometry toolkits: Activity 1 • Math Community Chart: Activity 1	Transformation Information Cards (1 copy for every 2 students): Activity 2
Lesson 7	Geometry toolkits: Activity 3	
Lesson 8	• Math Community Chart: Lesson, Activity 1	

	• Sticky notes: Activity 1 • Geometry toolkits: Activity 2, Activity 3	
Lesson 9	• Tracing paper: Activity 1, Activity 2 • Geometry toolkits: Activity 3	
Lesson 10	Geometry toolkits: Activity 1, Activity 2, Activity 3, Activity 4	
Lesson 11	• Geometry toolkits: Activity 1, Activity 2, Activity 3 • Math Community Chart: Activity 1, Activity 2	
Lesson 12	• Geometry toolkits: Activity 1, Activity 2, Activity 3 • Toothpicks, pencils, straws, or other objects: Activity 4	
Lesson 13	• Chart paper: Activity 1 • Math Community Chart: Activity 1 • Geometry toolkits: Activity 2, Activity 3, Activity 4 • Rulers: Activity 3	
Lesson 14	Geometry toolkits: Activity 1, Activity 2, Activity 3	
Lesson 15	• Sticky notes: Activity 1 • Geometry toolkits: Activity 2, Activity 3 • Scissors: Activity 3	Find All Three Cards (1 copy for every 15 students): Activity 2
Lesson 16	Geometry toolkits: Activity 2	
Lesson 17	Geometry toolkits: Activity 1, Activity 2, Activity 3	Deducing Angle Measures Handout (1 copy for every 2 students): Activity 1

Opportunities for Interdisciplinary Connections:

- **Entertainment/Media:** Animation frames are used to describe how shapes move through space
- **Art:** Students create complex patterns and tessellations using sequences of rigid transformation

Anticipated misconceptions:

Congruence vs. Position: Students may think two figures are not congruent simply because they are in different positions or orientations

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- Plotting points on a coordinate plane
- Naming angles with the same vertex

Relevant Unit(s)/Lesson(s) to Review:
- Grade 7 Unit 7: Angles, Triangles, and Prisms
- While there are connections to Grade 7 Unit 7, students should be able to engage with this unit without any additional review. If the initial Check Your Readiness assessment indicates students

Connections to Future Units:

Unit 2: Continues working with polygons on a plane, rigid transformations are built upon using dilations are not familiar with important concepts, consider proceeding through the unit without any modification continuing to monitor their readiness.

Differentiation through *Universal Design for Learning*

Engagement:
- Develop effort and persistence by connecting new concepts for curved shapes to success with polygons (Lesson 13, Activity 1)

Representation:
- Internalize comprehension through a physical demonstration using tracing paper to perform each type of transformation (Lesson 3, Activity 1 Launch)

Action & Expression:
- Internalize executive functions by inviting students to rephrase Info Gap directions in their own words (Lesson 6, Activity 1 Launch)

Related *CELP standards* aligned to Learning Targets:

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:
- MLR2: Collect and Display (Lessons 1, 2, 3, 7, 8, 12, 14, 16)
- MLR8: Discussion Supports (Lessons 3, 7, 8, 10, 12, 13, 14, 15, 16, 17)
- MLR1: Stronger and Clearer Each Time (Lessons 8, 9, 10, 12, 13)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as describing, generalizing, and justifying. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Justify
- Whether or not rigid transformations could produce an image (Lesson 7).
- Whether or not shapes are congruent (Lesson 11).
- Whether or not polygons are congruent (Lesson 12).
- Whether or not ovals are congruent (Lesson 13).
- Whether or not triangles can be created from given angle measurements (Lesson 15).

Generalize
- About categories for movement (Lesson 2).
- About rotating line segments 180°
- (Lesson 8).
- About the relationship between vertical angles (Lesson 9).
- About transformations and congruence (Lesson 12).
- About corresponding segments and length (Lesson 13).
- About alternate interior angles (Lesson 14).
- About the sum of angles in a triangle (Lesson 16).

Describe
- Movements of figures (Lessons 1 and 2).
- Observations about transforming parallel lines (Lesson 9).
- Transformations using corresponding points, line segments, and angles (Lesson 10).
- Observations about angle measurements (Lesson 16).
- Transformations found in tessellations and in designs with rotational symmetry (Lesson 17).

Sentence Frames and Stems

Section A
- The coordinates of the image are ... after a _____ (transformation).

- When a figure is transformed using a _____ (transformation), the coordinates change by ...
- A _____ (transformation) of a figure on a grid looks like ...
- To draw an image of figure _____ using a _____ (transformation), first I _____, then I ...

Section B

- Between the original figure _____ and its image, side _____ corresponds to side _____ ...
- The image of line _____ is _____ to the original because ...
- I know the image was created using a _____ (transformation) because ...

Section C

- Figure _____ is/is not congruent to figure _____ because ...
- I can prove figure _____ is congruent to figure _____ by using the following transformations ...

Section D

- Given the parallel lines _____ and transversal _____, angles _____ and _____ are congruent because ...
- If I know the measure of angle _____ is _____ degrees, then angle _____ must be _____ degrees because ...
- The sum of the measures of angles _____ and _____ is _____ degrees because ...
- To find the angle measures in the triangle, first I _____, then I ...

Section E

- To create a tessellation, first I _____, then I ...
- _____ are shapes that work well in tessellations because ...
- To create a figure with rotational symmetry, I have to think about ...

Unit Outline

In this unit, students explore translations, rotations, and reflections of plane figures in order to understand the structure of rigid transformations. They use the properties of rigid transformations to formally define what it means for shapes to be congruent.

In earlier grades, students studied geometric measurement to find angle measures and side lengths of two-dimensional figures as well as applied area and perimeter formulas for polygons including rectangles, parallelograms, and triangles. In this unit, students build on this work as they identify corresponding congruent angles and side lengths of figures and their images under rigid transformations. In an upcoming unit, students will explore dilations and similar figures in the plane.

In the first section, students begin with an informal exploration of transformations in the plane, then increase their precision of language to describe translations, rotations, and reflections with formal descriptions, including coordinates (MP6).

Then students identify corresponding parts of figures and conclude that angles and distances are preserved under rigid transformations. Students use this property to reason about plane figures, including parallel lines cut by a transversal.

Students then learn the formal definition of "congruent" and use this definition to show that corresponding parts of congruent figures are also congruent. Finally, students apply their understanding of congruence and rigid motions to justify that the sum of the interior angles in a triangle must be .

The lessons in this unit ask students to work on geometric figures that are not set in a real-world context. Students have opportunities to engage in real-world applications in the culminating lesson of the unit where they examine tessellations and other symmetric designs.

In this unit, students reason about congruence and justify properties of figures using rigid transformations, but they are not required to create a formal proof. They will prove these and other geometric properties more formally in later courses.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Rigid Transformations (Lessons 1-6)	**Learning Target #1** Determine coordinates that represent the image of a polygon or line segment in the coordinate plane after a transformation. **Learning Target #2** Draw and label the image of figures that result from translations, rotations, and reflections on a square or isometric grid. **Learning Target #3** Explain the sequence of transformations that takes one figure to its image.	**Lesson 1 Moving in the Plane** • I can describe how a figure moves and turns to get from one position to another. **Lesson 2 Naming the Moves** • I can identify corresponding points before and after a transformation. • I know the difference between translations, rotations, and reflections. **Lesson 3 Grid Moves** • I can decide which type of transformations will work to move one figure to another. • I can use grids to carry out transformations of figures. **Lesson 4 Making the Moves** • I can use the terms “translation,” “rotation,” and “reflection” to precisely describe transformations. **Lesson 5 Coordinate Moves**

		- I can apply transformations to points on a grid if I know their coordinates. **Lesson 6 Describing Transformations** - I can apply transformations to a polygon on a grid if I know the coordinates of its vertices.
Checkpoint A	***Responding to Student Thinking*** - **Problem 1:** Points to Emphasize: If students struggle with identifying coordinates of a point or line segment after a translation or reflection, spend time addressing this in a future lesson. For example, in the Activity Synthesis of the activity referred to here, draw a set of axes on a grid and ask students to identify the coordinates of a few points on the figure and its image. ○ Grade 8, Unit 1, Lesson 7, Activity 2 Sides and Angles - **Problem 2:** Points to Emphasize: If students struggle with describing a translation, rotation, or reflection, spend time in a future lesson addressing the description of a sequence of transformations. For example, in the activity referred to here, ask students to describe the sequence of transformations needed to get from the first figure to the second. ○ Grade 8, Unit 1, Lesson 8, Activity 1 Notice and Wonder: Building a Quadrilateral ○ ***NOTE:*** *Add a sentence to clarify for students that they do not need to be specific about the number of units the object needs to move.*	
Section B Properties of Rigid Transformations (Lessons 7-10)	**Learning Target #4** Draw and label rigid transformations of lines and parallel lines and explain the relationship between the original and its image under the transformation. **Learning Target #5** Identify a rigid transformation using a drawing of a figure and its image. **Learning Target #6** Identify side lengths and angles that have equivalent measurements in composite shapes and explain why they are equivalent.	**Lesson 7 No Bending or Stretching** - I can describe the effects of a rigid transformation on the lengths and angles in a polygon. **Lesson 8 Rotation Patterns** - I can describe how to move one part of a figure to another using a rigid transformation. **Lesson 9 Moves in Parallel** - I can describe the effects of a rigid transformation on a pair of parallel lines. - If I have a pair of vertical angles and know the angle measure of one of them, I can find the angle measure of the other. **Lesson 10 Composing Figures** - I can find missing side lengths or angle measures using properties of rigid transformations.
Checkpoint B	***Responding to Student Thinking*** - **Problem 1:** Points to Emphasize: If students struggle with constructing the image of a segment after a rotation, spend time in a future lesson addressing strategies for constructing transformations. For example, in the activity referred to here, select students to demonstrate or describe their strategy for rotating the congruent figures. ○ Grade 8, Unit 1, Lesson 12, Activity 2 Congruent Pairs (Part 1) - **Problem 2:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section C Congruence (Lessons 11-13)	**Learning Target #7** Compare and contrast side lengths, angle measures, and other features of shapes using rigid transformations to explain why a shape is or is not congruent to another. **Learning Target #8** Justify that two polygons on a grid are congruent using the definition of congruence in terms of rigid transformations.	**Lesson 11 What Is the Same?** - I can decide whether or not two figures are congruent using rigid transformations. **Lesson 12 Congruent Polygons** - I can decide using rigid transformations whether or not two figures are congruent. **Lesson 13 Congruence** - I can use distances between points to decide if two figures are congruent.
Checkpoint C	***Responding to Student Thinking***	

	● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of describing rigid transformations between congruent figures and justifying why two figures are not congruent. If most students struggle with these concepts, make time to examine related work in the section referred to here. The Course Guide provides additional ideas for revisiting earlier work. ○ Grade 8, Unit 1, Section C Congruence	
Mid-Unit Assessment		
Section D Angles in a Triangle (Lessons 14-16)	**Learning Target #9** Calculate angle measures using alternate interior, vertical, and supplementary angles to solve problems. **Learning Target #10** Generalize that the sum of angles in a triangle is 180 degrees using rigid transformations or the congruence of alternate interior angles of parallel lines cut by a transversal.	**Lesson 14 Alternate Interior Angles** ● If I have two parallel lines cut by a transversal, I can identify alternate interior angles and use that to find missing angle measurements. **Lesson 15 Adding the Angles in a Triangle** ● I can determine whether three angles could make a triangle using their sum. **Lesson 16 Parallel Lines and the Angles in a Triangle** ● I can explain using pictures why the sum of the angles in any triangle is 180 degrees.
Checkpoint D	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of solving problems using corresponding angles and properties of parallel lines. If students struggle with these concepts, make time to examine related work in the section referred to here. The Course Guide provides additional ideas for revisiting earlier work. ○ Grade 8, Unit 1, Section D Angles in a Triangle ● **Problem 2**: More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section E Let's Put it to Work (Lessons 17)	**Learning Target #13** Create tessellations and designs with rotational symmetry using rigid transformations. **Learning Target #14** Explain (orally and in writing) the rigid transformations needed to move a tessellation or design with rotational symmetry onto itself.	**Lesson 17 Rotate and Tesselate** ● I can repeatedly use rigid transformations to make interesting repeating patterns of figures. ● I can use properties of angle sums to reason about how figures will fit together.
End of Unit Assessment		

Unit Title:

Unit 2: Dilation, Similarity, and Introducing Slope

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1		Lesson 8	8.G.A 8.G.A.5
Lesson 2	8.G.A	Lesson 9	8.G.A 8.G.A.4
Lesson 3	8.G.A	Lesson 10	8.EE.B.6
Lesson 4	8.G.A 8.G.A.3	Lesson 11	8.EE.B.6
Lesson 5	8.G.A 8.G.A.3	Lesson 12	8.EE.B.6 8.G.A 8.G.A.3
Lesson 6	8.G.A.2 8.G.A.4	Lesson 13	8.G.A.5
Lesson 7	8.G.A.2 8.G.A.4		

Essential Question(s):

- How is a dilation different from a rigid transformation?
- What defines similarity between two geometric figures?
- How does triangle similarity explain the concept of slope?

Enduring Understanding(s):

- Unlike rigid transformations, a dilation changes the size of a figure based on a scale factor and a center of dilation while keeping the shape (angles) the same
- What defines similarity between two geometric figures
- The slope of a line is constant because any two "slope triangles" drawn on the same line are similar, meaning the ratio of vertical change to horizontal change is always the same

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 4)
CFA 2: Checkpoint B (after lesson 9)
CFA 3 Checkpoint C (after lesson 12)
EoU: Assessment A (after lesson 12)

Pacing for Unit

11 Days (9 instructional Days 2 assessment Days)

Lessons to Add/Review

- Combine 7.1.4 and 7.1.5; Activity 1 Three Quadrilaterals; Activity 3 Missing Figure, Factor or Copy

Lessons to Remove/Modify

- Combine 8.2.3 and 8.2.4. Focus on dilations with no grid and square grids.
- Remove 8.2.8 Activity 2. Can be done outside of class as an extension.
- Move to outside of class 8.2.13—culminating lesson incorporating work from the unit.

BPS Lesson Modifications:

- Lesson 1 SKIP
- Keep Lessons: 2,3,4,7,9,10,11,12
- Combine Lessons 5+6 (L5 Warmup, 6.1, 6.3)
- Lesson 8 SKIP

Family Overview

https://accessim.org/6-8/grade-8/unit-2?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
8.2.1	scale factor scaled copy scaling	
8.2.2	dilation center of dilation dilate	
8.2.4		center of dilation

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.2.2 Digital Applets: A Droplet on the Surface, Quadrilateral on a Circular Grid, A Quadrilateral and Concentric Circles
- 8.2.3 Digital Applets: Dilation Obstacle Course, Getting Perspective, Perspective Drawing
- 8.2.5 Digital Applet: Many Dilations of a Triangle
- 8.2.6 Digital Applet: Similarity Transformations

Provide access as needed throughout the unit:

		scale factor
8.2.6	similar	dilate
8.2.7		dilation
8.2.9	quotient	
8.2.10		slope slope triangle
8.2.11	similarity x-coordinate y-coordinate equation of a line	quotient
8.2.13	estimate approximate/approximately	

- Blank paper
- Dried linguine pasta (We specified linguine since it is flatter and less likely to roll around than spaghetti.)
- Geometry toolkits (ongoing)
- Long straightedge
- Math Community Chart
- Measuring tapes
- Protractors
- Clear protractors with no holes and with radial lines printed on them are recommended.
- Rulers
- Scissors
- Straightedges
- Tape
- Tracing paper
- Yardsticks

Lesson	Materials to Gather	Materials to Copy
Lesson 1	• Math Community Chart: Warm-up • Blank paper: Activity 1 • Long straightedge: Activity 1 • Scissors: Activity 1 • Rulers: Activity 2	
Lesson 2	Straightedges: Activity 1, Activity 2, Activity 3	
Lesson 3	Geometry toolkits: Warm-up, Activity 1, Activity 2	
Lesson 4	Geometry toolkits: Warm-up, Activity 1	Matching Dilations on a Coordinate Plane Cards (1 copy for every 2 students): Activity 2
Lesson 5	• Math Community Chart: Warm-up • Geometry toolkits: Activity 1	Dilations Cards (1 copy for every 2 students): Activity 1
Lesson 6	Geometry toolkits: Activity 1, Activity 2	Methods for Translations and Dilations Cards (1 copy for every 2 students): Activity 3
Lesson 7		Find Someone Similar Cards (1 copy for every 10 students): Activity 2
Lesson 8	• Blank paper: Activity 1 • Dried linguine pasta: Activity 1 • Geometry toolkits: Activity 1, Activity 2 • Protractors: Activity 1 • Rulers: Activity 1 • Tape: Activity 1	Making Pasta Angles and Triangles Cards (1 copy for every 4 students): Activity 1
Lesson 9	Geometry toolkits: Warm-up	
Lesson 10	Geometry toolkits: Warm-up	

	• Tracing paper: Warm-up • Straightedges: Activity 2	
Lesson 11	• Rulers: Warm-up • Straightedges: Warm-up	
Lesson 12	• Geometry toolkits: Warm-up, Activity 1, Activity 2 • Straightedges: Activity 2	
Lesson 13	• Measuring tapes: Activity 2, Activity 3 • Rulers: Activity 2, Activity 3 • Yardsticks: Activity 2, Activity 3	

Opportunities for Interdisciplinary Connections:

- **Optics:** Dilation is introduced through the lens of projecting images.
- **Physics:** Students use triangle similarity and shadows to calculate the height of tall objects that are difficult to measure directly

Anticipated misconceptions:

Similarity Criteria: Students might believe triangles are similar if they share only one congruent angle

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Identify scale factors.
- Identify scaled copies.
- Identify angle lengths and side measurements in a triangle.

Relevant Unit(s)/Lesson(s) to Review:

- Grade 7 Unit 1 Scale Drawings
- Grade 7 Unit 7 Angles, Triangles and Prisms

Connections to Future Units:

Triangle similarity explains the concept of slope, which is a primary focus of Unit 3: Linear Relationships

Differentiation through *Universal Design for Learning*

Engagement:

- Recruit interest by providing choices in which pair of triangles students will show are similar (Lesson 10, Activity 1)

Representation:

- Use color coding and annotations to highlight connections between representations of similar triangles and ratios (Lesson 9, Activity 2)

Action & Expression:

- Support expression and communication by providing blank or partially completed graphs with slope triangles (Lesson 12, Activity 2)

Related *CELP standards* aligned to Learning Targets:

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR8: Discussion Supports (Lessons 2, 4, 5, 9, 10)
- MLR7: Compare and Connect (Lessons 1, 3, 5, 8, 9, 10)
- MLR1: Stronger and Clearer Each Time (Lessons 6, 7, 10)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as describing, explaining, representing, and justifying. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Describe

- Observations about scaled rectangles (Lesson 1).
- Observations about dilated points, circles, and polygons (Lesson 2).
- Sequences of transformations (Lesson 6).
- Observations about side lengths in similar triangles (Lesson 9).

Explain

- How to apply dilations to find specific images (Lesson 5).
- How to determine whether triangles are congruent, similar, or neither (Lesson 8).
- Strategies for finding missing side lengths (Lesson 9).
- How to apply dilations to find specific images of points (Lesson 12).
- Reasoning for a conjecture (Lesson 13).

Represent

- Dilations using given scale factors and coordinates (Lesson 4).
- Figures using specific transformations (Lesson 6).
- Graphs of lines using equations (Lesson 12).

Sentence Frames and Stems

Section A

- To create a dilation of figure _____ with center _____, first I _____, then I ...
- I know the scale factor is _____ because ...
- I know the center of dilation is _____ because ...
- The image of figure _____ was dilated with a scale factor of _____ and a center _____. The coordinates of the image are ...
- I used _____ to dilate figure _____ because ...

Section B

- The ratio of side lengths _____ and _____ is equivalent to the ratio of the corresponding side lengths _____ and _____. This means ...
- The transformations ... move figure _____ to figure _____. The figures are similar because ...
- Figure _____ is similar to figure _____ because ...
- Triangle _____ is similar to triangle _____ because ...

Section C

- The slope of a line is a value that describes ...
- I know that line _____ has a slope of _____ because ...
- To draw a line with a slope of _____, first I _____, then I ...
- The point _____ is on the line because the equation for the line is _____ and ...

Section D

- If I know the shadow length of the _____ is _____, then the height of the lamppost is _____ because ...
- The triangles created by the objects and their shadows are similar because ...

Unit Outline

In this unit students learn what makes figures similar and justify claims of similarity. They are introduced to the slope of a line and use properties of similar triangles to write equations that can describe all points (x,y) on a given line.

In prior grades, students learned about the relationship between scale factors and scaled copies. Students expand on this in the first section where they learn about dilations as a new transformation that creates scaled copies.

In the next section, students connect dilations to earlier work with rigid transformations as they explain why two figures are similar by describing a sequence of translations, reflections, rotations, and dilations that take one figure to the other. They discover that angle measures in similar figures are preserved, which can be used to justify that two triangles are similar if they share two (or three) angle measures. Students also find that the quotients of corresponding side lengths in similar figures are equal. This along with the fact that side lengths in similar figures are all multiplied by the same scale factor allows students to calculate unknown lengths in similar figures.

In the following section, students use the similarity of slope triangles to understand why any two distinct points on a line determine the same slope. Using these same properties of similar triangles, students practice writing equations for a given line, though students are not expected at this time to write equations in the form y=mx+b.

The lessons in this unit ask students to work on geometric figures that are not set in a real-world context, as those tasks are sometimes contrived and hinder rather than help understanding. Students do have opportunities to tackle real-world applications in the culminating activity of the unit where students examine shadows cast by objects.

In this unit, several lesson plans suggest that each student have access to a geometry toolkit. Each toolkit contains tracing paper, graph paper, colored pencils, scissors, ruler, protractor, and an index card to use as a straightedge or to mark right angles, giving students opportunities to develop their abilities to select appropriate tools and use them strategically to solve problems. Note that even students in a digitally enhanced classroom should have access to such tools; apps and simulations should be considered additions to their toolkits, not replacements for physical tools.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Dilations (Lessons 1-5)	**Learning Target #1** Create a dilation of a figure given a scale factor and center of dilation. **Learning Target #2** Describe a figure on a coordinate grid and its image under a dilation, using coordinates to refer to points. **Learning Target #3** Identify the center, scale factor, and image of a dilation.	**Lesson 1 Projecting and Scaling** • I can decide if one rectangle is a scaled copy of another rectangle. **Lesson 2 Circular Grid** • I can apply dilations to figures on a circular grid when the center of dilation is the center of the grid. **Lesson 3 Dilations with No Grid** • I can apply a dilation to a polygon using a ruler. **Lesson 4 Dilations on a Square Grid** • I can apply dilations to figures on a square grid. **Lesson 5 More Dilations** • I can apply dilations to polygons on a rectangular grid if I know the coordinates of the vertices and of the center of dilation.
Checkpoint A	***Responding to Student Thinking*** • **Problem 1:** Points to Emphasize: If most students struggle with finding the center of dilation, revisit how to describe dilations when showing that two figures are similar. For example, in the activity refer to here, emphasize the location of the center of the dilation. ○ Grade 8, Unit 2, Lesson 6, Activity 2 Similarity Transformations (Part 1) • **Problem 2:** Points to Emphasize: If most students struggle with drawing a dilation on the coordinate plane, revisit how to do this before starting the activity referred to here. ○ Grade 8, Unit 2, Lesson 12, Activity 2 Dilations and Slope Triangles	
Section B Similarity (Lessons 6-9)	**Learning Target #4** Calculate unknown side lengths in similar triangles using the ratios of side lengths within the triangles and the scale factor between similar triangles. **Learning Target #5** Justify that two triangles are similar by finding a sequence of transformations that takes one triangle to the other or by checking that two pairs of corresponding angles are congruent.	**Lesson 6 Similarity** • I can apply a sequence of transformations to one figure to a similar figure. • I can use a sequence of transformations to explain why tw figures are similar. **Lesson 7 Similar Polygons** • I can use angle measures and side lengths to conclude tha two polygons are not similar. • I know the relationship between angle measures and side lengths in similar polygons. **Lesson 8 Similar Triangles** • I know how to decide if two triangles are similar just by looking at their angle measures. **Lesson 9 Side Length Quotients in Similar Triangles** • I can decide if two triangles are similar by looking at quotients of lengths of corresponding sides. • I can find missing side lengths in a pair of similar triangles using quotients of side lengths.
Checkpoint B	***Responding to Student Thinking*** • **Problem 1:** Points to Emphasize: If most students struggle with explaining why two figures are similar, before starting the activity referred to here, emphasize the different ways to show similarity. ○ Grade 8, Unit 2, Lesson 10, Activity 2 Similar Triangles on the Same Line • **Problem 2:** More chances: Students will have more opportunities to understand the mathematical idea addressed here. There is no need to slow down or add additional work to the next lessons.	
Section C Slope (Lessons 10-12)	**Learning Target #6** Comprehend the term “slope” to mean a number that tells how steep a line is.	**Lesson 10 Meet Slope** • I can draw a line on a grid with a given slope. • I can find the slope of a line on a grid. **Lesson 11 Writing Equations for Lines**

	Learning Target #7 Create an equation relating the quotient of the vertical and horizontal side lengths of a slope triangle to the slope of a line and use it to justify whether a point (x,y) is on the line by verifying that the values of x and y satisfy the equation.	• I can decide whether a point is on a line by finding quotients of horizontal and vertical distances. **Lesson 12 Using Equations for Lines** • I can find an equation for a line and use it to decide which points a on that line.
Checkpoint C	***Responding to Student Thinking*** • **Problem 1, 2, & 3:** More Chances: Students will have more opportunities to understand the mathematic ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section D Let's Put it to Work (Lessons 13)	**Learning Target #8** Calculate the unknown heights of objects by using proportional reasoning and explain (orally) the solution method. **Learning Target #9** Justify (orally) why the relationship between the height of objects and the length of their shadows cast by the sun is approximately proportional.	**Lesson 13 The Shadow Knows** • I can model a real-world context with similar triangles to find the height of an unknown object.
End of Unit Assessment		

Unit Title:

Unit 3: Linear Relationships

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	8.EE.B	Lesson 9	8.EE.B
Lesson 2	8.EE.B 8.EE.B.5	Lesson 10	8.EE.B 8.EE.B.6
Lesson 3	8.EE.B 8.EE.B.5	Lesson 11	8.EE.B 8.EE.B.6
Lesson 4	8.EE.B 8.EE.B.5	Lesson 12	8.EE.B 8.EE.B.6
Lesson 5	8.44.B	Lesson 13	8.EE.B 8.EE.C
Lesson 6	8.EE.B 8.EE.D.5	Lesson 14	8.EE.C 8.EE.C.8.a
Lesson 7	8.EE.B 8.EE.B.6	Lesson 15	8.EE.B.6 8.EE.C.8.a
Lesson 8	8.EE.B		

Essential Question(s):

- What defines a linear relationship and how does it differ from a proportional one?
- How do the slope and y-intercept of a line communicate the "story" of a real-world situation?
- How are decreasing relationships represented mathematically?

Enduring Understanding(s):

- A linear relationship is characterized by a constant rate of change between two quantities; it is only proportional if its graph passes through the origin (0, 0)
- In a linear context, the slope represents the rate of change (how much the dependent variable changes for every unit increase in the independent variable), and the y-intercept represents the initial or starting value
- A negative slope indicates a linear relationship where one quantity decreases at a constant rate in relation to a second quantity

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 4)
CFA 2: Checkpoint B (after lesson 8)
CFA 3: Checkpoint C (after lesson 12)
CFA 4: Checkpoint D After lesson 14)
EoU: Assessment A (after lesson 15)

Pacing for Unit

18 Days (16 instructional days, 1 review, 1 assess)

Lessons to Add/Review

- Grade 7 Unit 2 Lesson 10: Activities 1 and 2 can be completed digitally. This lesson launches the introduction to graphing proportional relationships.
- Grade 7 Unit 2 Lesson 11 Activity 2: This activity can be completed digitally. This is essential prior knowledge for this unit.

Lessons to Remove/Modify

- Combine Lessons 2 and 3.
- Combine Lessons 6 and 7.
- Optional: Remove Lesson 14 if needed.

BPS Lesson Modifications:

- Keep As Is: 1,4-10,12-14
- Combine Lesson 2+3
- Add in 4 Practice Problems Days (After 4,8,12 and 14)

Family Overview

https://accessim.org/6-8/grade-8/unit-3?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
8.3.1	represent scale label	constant of proportionality
8.3.2	equation	

Aligned Unit Materials, Resources, and Technology

Provide access as needed throughout the unit:

- Colored pencils
- Geometry toolkits (ongoing)
- Graduated cylinders
- Graph paper
- Math Community Chart
- Straightedges

8.3.3	rate of change	equation
8.3.5	linear relationship constant rate rate of change	slope
8.3.6	vertical intercept y-intercept	
8.3.7	initial (value or amount)	Constant rate
8.3.8	relate	
8.3.9	horizontal intercept x-intercept	
8.3.10		rate of change vertical intercept y-intercept
8.3.12	constraint	horizontal line vertical line
8.3.13	solution to an equation with two variables variable combination set of solutions	

- Teacher's collection of objects
- Tools for creating a visual display
- Water

Lesson	Materials to Gather	Materials to Copy
Lesson 2	• Straightedges: Lesson • Straightedges: Activity 2	Proportional Relationships Cards (1 copy for every 4 students): Activity 1
Lesson 3		Graphing Proportional Relationships Cards (1 copy for every 2 students): Activity 1
Lesson 4	• Math Community Chart: Activity 1 • Tools for creating a visual display: Activity 1	
Lesson 5	• Graph paper: Activity 1 • Straightedges: Activity 1, Activity 2	
Lesson 6		Slopes, Vertical Intercepts, and Graphs Cards (1 copy for every 2 students): Activity 2
Lesson 7	• Graduated cylinders: Activity 1 • Straightedges: Activity 1 • Teacher's collection of objects: Activity 1 • Water: Activity 1	
Lesson 8	Geometry toolkits: Warm-up	Translating a Line Cards (1 copy for every 2 students): Activity 2
Lesson 9	Straightedges: Activity 1	
Lesson 11	Straightedges: Activity 1, Activity 2	Making Designs Cards (1 copy for every 2 students): Activity 1
Lesson 12	Straightedges: Activity 1, Activity 2	
Lesson 13	• Colored pencils: Activity 2 • Graph paper: Activity 2 • Straightedges: Activity 2	
Lesson 14		I'll Take an X Please Cards (1 copy for every 2 students): Activity 2

Opportunities for Interdisciplinary Connections:	Anticipated misconceptions:
Physical Science: The unit uses helium balloons and their buoyancy to explore rates of change and vertical intercepts	**Scale Misinterpretation:** One graph may look steeper than another, but if the axes are scaled differently, they may represent the same relationship See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:	Connections to Future Units:

Essential prior concepts to engage with this unit:

- This unit builds heavily on the work of Grade 7 Unit 2 and Grade 8 Unit 2. In Grade 7 Unit 2, students dive deep into different representations of proportional relationships and understand the constant of proportionality.
- At the end of Grade 8 Unit 2, students learned the terms “slope” and “slope triangle,” used the similarity of slope triangles on the same line to understand that any two distinct points on a line determine the same slope, and found an equation for a line with a positive slope and vertical intercept.

Relevant Unit(s)/Lesson(s) to Review:

- Grade 7 Unit 2: Introducing Proportional Relationships

Direct preparation for linear systems in Unit 4. Establishes linear relationships as a special type of function explored in Unit 5

Differentiation through *Universal Design for Learning*

Engagement:

- Promote self-regulation by having students self-assess their confidence that their description matches a chosen line (Lesson 15, Activity 1)

Representation:

- Develop language and symbols by displaying vocabulary like "vertical intercept" with diagrams (Lesson 6, Activity 1)

Action & Expression:

- Support organizational skills by chunking the task of marking bug positions into discrete steps (Lesson 1, Activity 2)

Related *CELP standards* aligned to Learning Targets:

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR5: Co-Craft Questions (Lessons 1, 5, 8, 11, 15)
- MLR7: Compare and Connect (Lessons 1, 5, 8, 10, 12)
- MLR6: Three Reads (Lessons 2, 4, 6, 13, 14)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as representing, generalizing, and explaining. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Represent

- Situations involving proportional relationships (Lesson 1).
- Constants of proportionality in different ways (Lesson 3).
- Slope using expressions (Lesson 10).
- Linear relationships using graphs, tables, equations, and verbal descriptions (Lesson 5).
- Situations using negative slopes and slopes of zero (Lesson 9).
- Situations by graphing lines and writing equations (Lesson 13).
- Situations involving linear relationships (Lesson 15).

Generalize

- Categories for graphs (Lesson 2).
- About equations and linear relationships (Lesson 7).
- In order to make predictions about the slope of lines (Lesson 10).

Explain

- How to graph proportional relationships (Lesson 3).
- How to use a graph to determine information about a linear situation (Lessons 5 and 6).
- How to graph linear relationships (Lesson 10 and 11).
- How slope relates to changes in a situation (Lesson 11).

Sentence Frames and Stems

Section A

- The relationship between _____ and _____ is proportional because ...
- The equation _____ represents this proportional relationship because ...
- To create a graph of a proportional relationship, first I _____, then I ...
- I can substitute the value _____ into the equation _____ to find the value of _____.

Section B

- The graphs of the lines with equations _____ and _____ are/aren't parallel. I know because in the equations ...
- The slope of the line is _____ because ...
- The slope in this situation is _____ and represents _____.
- The y-intercept of the line is _____ and represents _____.
- The equation _____ represents this situation because ...

Section C

- I used _____ to represent the linear relationship between _____ and _____ because ...
- The slope in this situation is _____ and represents _____.
- To draw a line with a slope _____ and the point _____ on the line, first I _____, then I ...
- The equation _____ describes the line because ...

Section D

- The points ... are solutions to the equation _____ because ...
- The pair of values _____ do/do not satisfy the equation _____ because ...

Section E

- The equation _____ represents this situation because ...
- The account starts at _____ and increases/decreases by _____ per _____.

Unit Outline

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Proportional Relationships (Lessons 1-4)	**Learning Target #1** Create an equation and a graph to represent proportional relationships, including an appropriate scale and axes. **Learning Target #2** Interpret multiple representations of a proportional relationship in context.	**Lesson 1 Understanding Proportional Relationships** • I can graph a proportional relationship from a story. • I can use the constant of proportionality to compare the pace of different animals. **Lesson 2 Graphs of Proportional Relationships** • I can graph a proportional relationship from an equation. • I can tell when two graphs are of the same proportional relationsh even if the scales are different. **Lesson 3 Representing Proportional Relationships** • I can scale and label coordinate axes in order to graph a proportio relationship. **Lesson 4 Comparing Proportional Relationships** • I can compare proportional relationships represented in different ways.
Checkpoint A	***Responding to Student Thinking*** • **Problem 1 & 2:** More Chances: Students will have more opportunities to develop this understanding later lessons. There is no need to slow down or add additional work to review this concept at this tim	
Section B Representing Linear Relationships (Lessons 5-8)	**Learning Target #3** Create and compare graphs that represent linear relationships with the same rate of change but different initial values. **Learning Target #4** Create an equation that represents a linear relationship. **Learning Target #5** Interpret the slope and y -intercept of the graph of a line in context.	**Lesson 5 Introduction fo Linear Relationships** • I can find the rate of change of a linear relationship by figuring ou the slope of the line representing the relationship. **Lesson 6 More Linear Relationships** • I can interpret the vertical intercept of a graph of a real-world situation. • I can match graphs to the real-world situations they represent by identifying the slope and the vertical intercept. **Lesson 7 Representations of Linear Relationships** • I can use patterns to write a linear equation to represent a situati • I can write an equation for the relationship between the total volu in a graduated cylinder and the number of objects added to the graduated cylinder. **Lesson 8 Translating to y=mx+b**

		• I can explain where to find the slope and vertical intercept in both equation and its graph. • I can write equations of lines using y=mx+b.
Checkpoint B	***Responding to Student Thinking*** • **Problem 1:** Points to Emphasize: If most students struggle with interpreting the slope of a line in contex revisit the concept of rate of change. For example, in the section referred to here, discuss the similarity between graphing and interpreting negative rates of change and positive rates of change. ○ Grade 8, Unit 3, Section C Finding Slopes	
Section C Finding Slope (Lessons 9-12)	**Learning Target #6** Create multiple representations of a linear relationship, including a graph, equation, and table. **Learning Target #7** Interpret the slope of a non-increasing line in context.	**Lesson 9 Slopes Don't Have to ba Positive** • I can create a graph of a situation that has a negative slope. • I can determine if a situation or a graph has a slope that is positive negative, or zero and explain how I know. **Lesson 10 Calculating Slope** • I can calculate positive and negative slopes given two points on th line. **Lesson 11 Line Designs** • I can describe a line precisely enough that another student can dr it. **Lesson 12: Equations of All Kinds of Line** • I can write equations of lines that have a positive or a negative slo • I can write equations of vertical and horizontal lines.
Checkpoint C	***Responding to Student Thinking*** • **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of interpreting slope in context. If most students struggle, make time to revisit related work in the section referred to here. See the Course Guide for ideas to help students re-engage with earlier work.	
Section D Linear Equations (Lessons 13-14)	**Learning Target #8** Determine pairs of values that satisfy or do not satisfy a linear relationship using an equation or graph.	**Lesson 13 Solutions to Linear Equations** • I know that the graph of an equation is a visual representation of the solutions to the equation. • I understand what the solution to an equation in two variables is.. **Lesson 14 More Solutions to Linear Equations** • I can find solutions (x,y) to linear equations given either the x - o -value to start from.
Checkpoint D	***Responding to Student Thinking*** • **Problem 1:** Points To Emphasize: If most students struggle with determining whether or not a pair of values satisfies a linear relationship, revisit the concept of what it means to be a solution to an equation For example, in the activity referred to here, emphasize how to check that the coordinates of the point intersection of two lines satisfies the equations of both lines. ○ Grade 8, Unit 4, Lesson 12, Activity 2 Passing on the Trail	
Section E Let's Put it to Work (Lessons 15)	**Learning Target #9** Describe (orally) limitations of a graphical representation of a situation based on real-world constraints on the quantities. **Learning Target #10** Interpret the graph of a linear equation in context, including slope, intercept, and solution, in contexts using multiple representations of non-proportional linear relationships.	**Lesson 15 Using Linear Relations to Solve Problems** • I can write linear equations to reason about real-world situations.
End of Unit Assessment		

Unit Title:

Unit 4: Linear Equations and Linear Systems

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.EE.A	Lesson 9	8.EE.C 8.EE.C.7 8.EE.C.8
Lesson 2	8.EE.C	Lesson 10	8.EE.C 8.EE.C.8
Lesson 3	8.EE.C 8.EE.C.7	Lesson 11	8.EE.C.8
Lesson 4	8.EE.C 8.EE.C.7	Lesson 12	8.EE.C.8 8.EE.C.8.a 8.EE.C.8.b
Lesson 5	8.EE.C 8.EE.C.7	Lesson 13	8.EE.C.8 8.EE.C.8.a
Lesson 6	8.EE.C.7 8.EE.C.7.b	Lesson 14	8.EE.C.8
Lesson 7	8.EE.C.7.a	Lesson 15	8.EE.C.8 8.EE.C.8.b 8.EE.C.8.c
Lesson 8	8.EE.C.7.a	Lesson 16	8.EE.C.8.c

Essential Question(s):

- How can algebraic moves be used to solve complex linear equations?
- How can the structure of an equation indicate whether it has one, zero, or infinitely many solutions?
- What does it mean to find a solution to a system of equations?

Enduring Understanding(s):

- Equivalent equations are created by performing the same operations on both sides to maintain balance (adding, subtracting, multiplying, or dividing by the same nonzero value) or by using properties like the distributive property to combine like terms
- An equation has one solution if variable coefficients are different, no solution if variable coefficients are the same but constants differ, and infinitely many solutions if both sides are identical
- A solution to a system of equations is a pair of values (x,y) that makes both equations true at the same time; graphically, this corresponds to the point where the two lines intersect

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 6)
CFA 2: Checkpoint B (after lesson 9)
CFA 3 Checkpoint C (after lesson 15)
EoU: Assessment A

Pacing for Unit

20 Days (15 Instructional Days, 3 Practice Days, 1 Review and 1 Assessment Day)

Lessons to Add/Review

- Combine and add 7.6.7 and 7.6.8
- 7.6.9
- 7.6.10
- 7.6.11

Lessons to Remove/Modify

- Remove 8.4.1: This introductory lesson can be skipped because the inclusion of the lessons from grade 7 addresses the material in more depth.
- Remove 8.4.8: This lesson contains an optional activity.
- Remove 8.4.15: This lesson focuses on an Info Gap that is not necessary to understand the concepts of the unit.
- Remove 8.4.16: This lesson is an application of the concepts from the unit. It can be moved to outside of class.

BPS Lesson Modifications:

- Teach Lesson 1-15
- Add in 3 Practice Problems days (After 6,9 and 14)
- 1 Day of Review
- 1 Day of Assessment

Family Overview

https://accessim.org/6-8/grade-8/unit-4?a=family

Integration of Technology:

- Desmos Online Graphing Calculator

- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

New Terminology

Lesson	receptive	productive
8.4.1	representation equivalent expression	
8.4.2	expression	
8.4.3	solution to an equation distribute	
8.4.4	substitute	equation
8.4.5	term like terms distributive property factor	
8.4.6		term like terms distribute common denominator
8.4.7	no solution (only) one solution	
8.4.8	constant term coefficient linear equation infinitely many solutions	expression variable
8.4.11	ordered pair	
8.4.12	system of equations solution to a system of equations	
8.4.13	substitution	substitute no solution (only) one solution infinitely many solutions
8.4.14	algebraically	
8.4.15		system of equations substitution

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.4.2 Digital Applet: Keeping the Equation Balanced
- 8.4.12 Digital applets: Systems of Equations
- 8.4.13 Digital Applet: Different Types of Systems

Provide access as needed throughout the unit:

- Math Community Chart
- Scissors
- Straightedges
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
1	Math Community Chart: Activity 1	Card Sort Matching Equation Moves Cards (1 copy for every 2 students): Activity 1
8		Card Sort Matching Equation Moves Cards (1 copy for every 2 students): Activity 1
10	Math Community Chart: Activity 1	
11	Straightedges: Activity 1, Activity 2	
12	Straightedges: Activity 1, Activity 2	
13	• Scissors: Activity 2 • Straightedges: Activity 2	Different Types of Systems Handout (1 copy for every 2 students): Activity 2
15		Racing and Play Tickets Cards (1 copy for every 4 students): Activity 1
16	Tools for creating a visual display: Activity 1	

Opportunities for Interdisciplinary Connections:

Economics: The unit introduces "Supply and Demand" to provide a context for finding the intersection of two linear models

Anticipated misconceptions:

Unacceptable Division: Students may try to "divide each side by x," which can lead to losing a solution (like x=0) or creating an untrue statement (2=6)

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- In this unit, students build on their grade 6 and 7 work with equivalent expressions and equations with one occurrence of one variable, learning algebraic methods to solve linear equations with multiple occurrences of one variable. Students learn to use algebraic methods to solve systems of linear equations in two variables, building on their grade 7 and 8 work with graphs and equations of linear relationships. Understanding of linear relationships is, in turn, built on the understanding of proportional relationships developed in grade 7 that connected ratios and rates with lines and triangles.

Connections to Future Units:

Solving systems of equations provides the algebraic foundation for mathematical modeling in Unit 6 and future courses.

Relevant Unit(s)/Lesson(s) to Review:
- Grade 7 Unit 6: Expressions, Equations, and Inequalities

Differentiation through *Universal Design for Learning*

Engagement:
- Develop effort and persistence by providing sentence frames to support peer collaboration during discussions on solution sets
  (Lesson 7, Activity 2 Launch)

Representation:
- Use color coding and annotations to highlight connections between connected variables through substitution
  (Lesson 14, Activity 1 Synthesis)

Action & Expression:
- Support organizational skills by chunking the card sort task into more manageable parts
  (Lesson 3, Activity 1 Launch)

Related *CELP standards* aligned to Learning Targets:

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:
- MLR2: Collect and Display (Lessons 1, 3, 4, 7, 9)
- MLR7: Compare and Connect (Lessons 3, 4, 5, 8, 10)
- MLR8: Discussion Supports (Lessons 3, 5, 6, 7, 8, 10, 13, 14, 15, 16)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as critiquing, justifying, and generalizing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Critique
- Strategies for writing equivalent equations (Lesson 1).
- Reasoning about maintaining balance in equations (Lesson 3).
- Solutions of linear equations (Lessons 4 and 5).
- Reasoning about structures of systems of equations (Lesson 14).
- Explanations of solutions (Lesson 16).

Justify
- Strategies for writing equivalent equations (Lessons 1 and 5).
- Predictions about maintaining balance (Lesson 2).
- Predictions about solutions of linear equations (Lesson 6).

Generalize
- About the structures of equations that have one, infinite, and no solutions (Lessons 7 and 8).
- About the structures of systems of equations (Lessons 14 and 15).

Sentence Frames and Stems

Section A
- The moves … show that the equation _____ is equivalent to the equation _____.
- To solve the equation _____, the first move was to _____ on both sides, then …
- To find the unknown weight on the hanger diagram, first I _____, then I …
- I know that equation _____ will have a positive/negative/zero solution because …

Section B
- The equation _____ has _____ solution(s). I know this because …
- The equation _____ represents …
- The solution _____ to the equation _____ makes sense because …

Section C

- The system of equations has _____ solution(s). I know this because ...
- The solution to the system of equations is _____ because ...
- This situation can be represented by the system of equations _____ because ...
- To solve the system of equations, first I _____, then I ...

Section D

- This situation can be represented by the system of equations _____ because ...
- To solve the system of equations, first I _____, then I ...
- The solution to the system of equations is _____ because ...

Unit Outline

In this unit, students work with writing equivalent equations and use reasoning to solve equations for a variable. Then students solve systems of linear equations using graphic and algebraic methods.

The unit begins with a focus on moves that can be done to write equivalent equations. At first, students use hanger diagrams as an intuitive representation of equality and represent their reasoning by labeling arrows that connect equivalent representations. With the reintroduction of negative values, students move away from hanger diagrams to algebraic equations and writing equivalent equations with the intention of solving for a variable.

Next, students examine the conditions under which equations could have 0, 1, or infinite solutions as a transition to thinking about similar situations involving systems of equations. Students finish the unit by examining systems of equations graphically and then finding solutions algebraically. They build on their understanding that the line representing an equation with 2 variables is made up of coordinate pairs that make the equation true. They find that the intersection of 2 lines is the point that makes both equations for the system true. Students also recognize when systems have no solution or infinite solutions based on the graphs and the slope and intercept.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Equivalent Equations (Lessons 1-6)	**Learning Target #1** Write equivalent equations and describe the moves that are used. **Learning Target #2** Write equivalent equations to solve linear equations in one variable.	**Lesson 1 Tiling the Plane** • I can describe moves that change one equation into an equivalen equation. **Lesson 2 Keeping the Equation Balanced** • I can add or remove blocks from a hanger and keep the hanger balanced. • I can represent balanced hangers with equations. **Lesson 3 Balanced Moves** • I can add, subtract, multiply, or divide each side of an equation by same expression to get a new equation with the same solution. **Lesson 4 More Balanced Moves** • I can make sense of multiple ways to solve an equation. **Lesson 5 Solving Any Linear Equation** • I can solve an equation where the variable appears on both sides. **Lesson 6 Strategic Solving** • I can solve linear equations in one variable.
Checkpoint A	***Responding to Student Thinking*** • **Problem 1 & 2:** More Chances: Students will have more opportunities to develop this understanding later lessons. There is no need to slow down or add additional work to review this concept at this tim	
Section B Linear Equations in One Variable (Lessons 7-9)	**Learning Target #3** Describe features of linear equations that have one solution, no solution, or many solutions. **Learning Target #4** Interpret the solution of an equation in one variable in context.	**Lesson 7 All, Same, or No Solutions** • I can determine whether an equation has no solutions, one solution, or infinitely many solutions. **Lesson 8 How Many Solutions?** • I can solve equations with different numbers of solutions. **Lesson 9 When Are They the Same?** • I can use an expression to find when two things, like height are the same in a real-world situation.
Checkpoint B	***Responding to Student Thinking*** • **Problem 1:** Points to Emphasize: If students struggle to connect an equation to the number of solutions revisit the idea when a similar situation arises for systems of equations. For example, the inclusion of graphs to see why there are no solutions can help make the connection between coefficients and slope ○ Grade 8, Unit 4, Lesson 13 Solving Systems of Equations	

	● **Problem 2:** Points to Emphasize: If students struggle to solve the equation, make time for students to practice solving linear equations, especially those involving the distributive property. For example, encourage students to fully solve this practice problem: ○ Grade 8, Unit 4, Lesson 10, Practice Problem 4	
Section C Systems of Linear Equations (Lessons 10-15)	**Learning Target #5** Categorize systems of equations, including systems with infinitely many or no solutions, and calculate the solution for a system using a variety of strategies. **Learning Target #6** Comprehend that solving a system of equations means finding values of the variables that make both equations true at the same time. **Learning Target #7** Create a system of equations that represents a situation and interpret the solution in context.	**Lesson 10 On or Off the Line?** ● I can identify ordered pairs that are solutions to an equatio ● I can interpret ordered pairs that are solutions to an equati **Lesson 11 On Both of the Lines** ● I can use graphs to find an ordered pair that two real-world situations have in common. **Lesson 12 Systems of Equations** ● I can explain the solution to a system of equations in a real-world context. ● I can explain what a system of equations is. ● I can make graphs to find an ordered pair that two real-wor situations have in common. **Lesson 13** ● I can graph a system of equations. ● I can solve systems of equations using algebra. **Lesson 14 Solving More Systems** ● I can use the structure of equations to help me figure out h many solutions a system of equations has. **Lesson 15 Writing Systems of Equations** ● I can write a system of equations from a real-world situatio
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: If students struggle to classify the number of solutions for a system, make tim for students to revisit what a solution for a system means for each equation, in any situation given, and graphically. For example, revisit the situation with bug passing. Ask students to write a system for the situation and to interpret the intersection point in all 3 ways. Then, ask students what it might look like i the bugs never passed or were together the entire time. ○ Accelerated 7, Unit 5, Lesson 13, Activity 1 Bugs Passing in the Night ● **Problem 2:** Points to Emphasize: If students struggle to write a system of equations to represent a situation, move more slowly through the practice problems and activities related to the idea. For examp in this activity, ask students to identify the variables and constants involved and then to combine them i an equation for each person in the scenarios: ○ Grade 8, Unit 4, Lesson 16, Activity 2 Cycling, Fundraising, Working, and ___?	
Section D Let's Put it to Work (Lessons 16)	**Learning Target #8** Calculate the solution to a system of equations in context, and present (using words and other representations) the solution method. **Learning Target #9** Create a system of equations to solve a problem in context. **Learning Target #10** Critique (orally) peer solutions to a system of equations.	**Lesson 16** ● I can use a system of equations to represent a real-world situatio and answer questions about the situation.
End of Unit Assessment		

Unit Title:

Unit 5: Functions and Volume

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	8.F.A.1	Lesson 12	8.G.8.G,C,9C
Lesson 2	8.F.A.1	Lesson 13	8.G,C,9
Lesson 3	8.F.A 8.F.A.1	Lesson 14	8.G.C.9
Lesson 4	8.F.A.1 8.F.A.3	Lesson 15	8.G.C.9
Lesson 5	8.F.A.1 8.F.B.3	Lesson 16	8.G.C.9
Lesson 6	8.F.B.5	Lesson 17	8.F.A.1 8.F.A.3 8.F.B 8.G.C 8.G.C.9
Lesson 7	8.F.A.2 8.F.A.3	Lesson 18	8.F.A.3 8.F.B 8.G.C.9
Lesson 8	8.F.A.2 8.F.A.3 8.F.A.4	Lesson 19	8.G.C 8.G.C.9
Lesson 9	8.F.B.4	Lesson 20	8.G.C 8.G.C.9
Lesson 10	8.F.B 8.F.B.4 8.F.B.5	Lesson 21	8.G.C.9
Lesson 11	8.F.B 8.F.B.4		

Essential Question(s):

- What is a mathematical function, and how is it represented?
- How are the volume formulas for cylinders, cones, and spheres related?
- How does changing a single dimension (like radius or height) affect the volume of a 3D object?

Enduring Understanding(s):

- A function is a rule that assigns to each allowable input exactly one output; it can be represented by verbal descriptions, tables, equations, or graphs
- The volume of a cylinder is πr^2h, a cone with the same base and height has exactly ⅓ that volume, and a sphere with the same radius and height ($h=2r$) has ⅔ the volume of that cylinder
- Scaling the height of a cylinder or cone results in a proportional change in volume, but scaling the radius results in a non-proportional change because the radius is squared or cubed in volume formulas

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 2)
CFA 2: Checkpoint B (after lesson 71
CFA 3 Checkpoint C (after lesson 10))
MoU: Assessment A
CFA 4: Checkpoint D (after lesson 17)
CFA 5: Checkpoint E (after lesson 21)
EoU: Assessment A

Pacing for Unit

19 Days

Lessons to Add/Review

- This unit should provide sufficient background to engage with the material on its own. If additional resources are needed to increase familiarity with proportional relationships, Grade 7 Unit 2 may be useful to revisit.

Lessons to Remove/Modify

- Remove 8.5.6 - Application lesson and activities that can be moved to outside of class for more practice
- Remove 8.5.17 - optional lesson for the unit
- Remove 8.5.18 - optional lesson for the unit
- Move 8.5.22 to outside of class

Family Overview

https://accessim.org/6-8/grade-8/unit-5?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
8.5.1	input output	
8.5.2	function	input

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.5.1 Digital Applet: Guess My Rule
- 8.5.6 Digital Applet: Sketching a Story about a Boy and a Bike
- 8.5.9 Digital Applet: Candlelight & Shadows
- 8.5.11 Digital Applet: Height and Volume

		output depends on
8.5.3	independent variable dependent variable radius	
8.5.5	prediction	
8.5.7	volume cube	
8.5.8	functional relationship linear function	function
8.5.9	mathematical model	prediction
8.5.10	piecewise linear function	linear function constant rate
8.5.11	cylinder three-dimensional	
8.5.12	cone sphere dimension	cylinder cube cubic centimeter rectangular prism
8.5.13	base (of a cylinder or cone) approximation for π	
8.5.14		radius base (of a cylinder or cone)
8.5.16		cone
8.5.19	hemisphere	
8.5.20		sphere
8.5.21	spherical	volume

Provide access as needed throughout the unit:

- Colored pencils
- Graduated cylinders
- Math Community Chart
- Spherical objects
- Straightedges
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
1		Guess My Rule Cards (1 copy for every 4 students): Activity 1
6	Tools for creating a visual display: Activity 2	
7	Math Community Chart: Lesson	
9	Straightedges: Activity 3	
11	Graduated cylinders: Activity 1	
13	Colored pencils: Activity 2	
19	Spherical objects: Activity 2	
21	Tools for creating a visual display: Lesson Math Community Chart: Activity 2	Unknown Dimensions Cards (1 copy for every 4 students): Activity 2
22	Straightedges: Activity 2	

Opportunities for Interdisciplinary Connections:

Music/Acoustics: The relationship between drum size and volume provides a context for exploring round 3D object

Anticipated misconceptions:

Radius in Volume: Students often forget to square or cube the radius in volume formulas, or they use the diameter as the radius

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Prior concepts that will allow students to engage with this unit stem for grades 6 and 7. These concepts are:
  - identifying independent and dependent variables
  - constant of proportionality
  - rate of change
  - slope

Relevant Unit(s)/Lesson(s) to Review:

- Grade 7 Unit 2: Introducing Proportional Relationships

Connections to Future Units:

Content serves as a lead-in to nonlinear relationships and advanced function study in high school.

Differentiation through *Universal Design for Learning*

Engagement:

- Recruit interest by inviting students to generate a list of personal examples with negative rates of change (Lesson 10, Activity 3 Synth)

Representation:

- Internalize comprehension by providing a range of different-sized physical containers for height/volume testing (Lesson 11, Activity 2 Launch)

Action & Expression:

- Provide access to digital applets to fill digital cylinders and collect data precisely (Lesson 11, Activity 1 Launch)

Related CELP standards aligned to Learning Targets:

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 2, 8, 11, 14, 17, 18)
- MLR5: Co-Craft Questions (Lessons 4, 7, 10, 12, 13, 16)
- MLR7: Compare and Connect (Lessons 1, 6, 7, 8, 12)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes such as generalizing, justifying, and comparing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Generalize

- about what happens to inputs for each rule (Lesson 1)
- about dimensions of cylinders (Lesson 14)
- about the relationship between the volumes of cylinders and cones (Lesson 15)
- about dimensions of cones (Lesson 16)
- about volumes of spheres, cones, and cylinders as functions of their radii (Lesson 21)

Justify

- claims about what can be determined from given information (Lesson 2)
- claims about volumes of cubes and spheres based on graphs (Lesson 7)
- claims about approximately linear relationships (Lesson 10)
- reasoning about the volumes of spheres and cones (Lesson 21)

Compare

- different representations of functions (Lesson 3)
- features of graphs, equations, and situations (Lesson 4)
- features of a situation with features of a graph (Lesson 6)
- temperatures shown on a graph with different temperatures given in a table (Lesson 7)
- the volumes of cones with the volumes of cylinders (Lesson 16)
- methods for finding and approximating the volume of a sphere as function of its radius (Lesson 20)

Sentence Frames and Stems

Section A

- The rule between the input and the output of the function is ____ because …
- If the input of the function is ____, then the output must be ____ because the rule is …

Section B

- The equation _____ represents a function because …
- The output of the function when the input is ____ is ____ because …
- To draw the graph of a function that represents ____, first I ____, then I …
- The graph represents a function because …

Section C

- In the piecewise function, the rate of change from ____ to ____ is ____.

- The rate of change from ____ to ____ means _____.
- From ____ to ____ on the graph, ____ increases/decreases, which means …
- The linear equation ____ can model the function because …

Section D

- I know the volume of the cylinder/cone is ___, and the radius of the base is ___, so the height must be ___ because …
- The volume of the cylinder is ____ because …
- The volume of the cone is ____ because …
- As the radius of the base increases by ____, the volume of the cylinder/cone increases by _____ because …

Section E

- When the radius of the _____ is changed by _____, the volume …
- The volume of the hemisphere is _____ because …
- The volume of the sphere is _____ because …

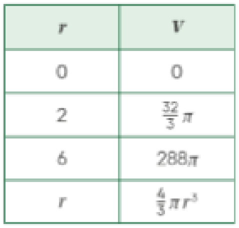
Section F

- The volume of a sphere with radius _____ is _____ the volume of a sphere with radius _____ because …
- The _____ can hold the highest volume of water because …

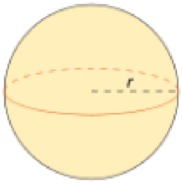
Unit Outline

In this unit, students are introduced to the concept of a function as a relationship between “inputs” and “outputs” in which each allowable input determines exactly one output.

In the first three sections of the unit, students work with relationships that are familiar from previous grades or units (perimeter formulas, proportional relationships, linear relationships), expressing them as functions. They study the different ways functions can be represented, making connections between the representations and interpreting what they mean in context. Linear functions are a focus of the third section, and students will continue to work with linear functions in a later unit to model data. The use of function notation is left for a future course.



r	V
0	0
2	$\frac{32}{3}\pi$
6	288π
r	$\frac{4}{3}\pi r^3$



In the remaining three sections of the unit, students build on their knowledge of the formula for the volume of a right rectangular prism from grade 7, learning formulas for volumes of cylinders, cones, and spheres. Students express functional relationships described by these formulas as equations, focusing on situations involving proportional relationships. They use these relationships to reason about how the volume of a figure changes as one of its dimensions changes, transforming algebraic expressions to get the information they need. In future courses, students will continue this thinking as they study nonlinear relationships and question how, for example, the volume of a sphere changes as the radius increases.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Inputs and Outputs (Lessons 1-2)	**Learning Target #1** Comprehend the structure of a function as having one and only one output for each allowable input.	**Lesson 1 Inputs and Outputs** ● I can write rules when I know input-output pairs. ● I know how an input-output diagram represents a rule. **Lesson 2 Introduction to Functions** ● I know that a function is a rule with exactly one output for each allowable input. ● I know that if a rule has exactly one output for each allowable inpu then the output depends on the input.
Checkpoint A	*Responding to Student Thinking* More Chances: Students will have more opportunities to develop this understanding in later lessons. There is need to slow down or add additional work to review this concept at this time.	
Section B Representing and Interpreting Functions (Lessons 3-7)	**Learning Target #2** Draw the graph of a function that represents a context, and explain which quantity is a function of which. **Learning Target #3** Interpret multiple representations of functions, including graphs, tables, and equations, and explain how to find information in each type of representation.	**Lesson 3 Equations for Functions** ● I can find the output of a function when I know the input. ● I can name the independent and dependent variables for a given function and represent the function with an equation. **Lesson 4 Tables, Equations and Graphs of Functions** ● I can identify graphs that do, and do not, represent functions. ● I can use a graph of a function to find the output for a given input and to find the input(s) for a given output. **Lesson 5 More graphs of Functions** ● I can explain the story told by the graph of a function. **Lesson 6 Even More Graphs of Functions** ● I can draw the graph of a function that represents a real-world situation. **Lesson 7 Connecting Representations of Functions**

		● I can compare inputs and outputs of functions that are represent in different ways.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time. ● **Problem 2:** Points To Emphasize: If most students struggle working with drawing a graph of a function t represents a context, focus on this connection as opportunities arise. For example, in the Lesson Synthe of the lesson referred to here, invite the students that share to narrate how they interpreted the graph their partner made as they point to the shape of the container they drew from the graph. ○ Grade 8, Unit 5, Lesson 11 Filling Containers	
Section C Linear Functions and Rates of Change (Lessons 8-10)	**Learning Target #4** Calculate the different rates of change of a piecewise linear function using a graph, and interpret the rates of change in context. **Learning Target #5** Comprehend that any linear function can be represented by an equation in the form $y=mx+b$, where m and b are the rate of change and initial value of the function, respectively.	**Lesson 8 Linear Functions** ● I can determine whether a function is increasing or decreasing based on whether its rate of change is positive or negative. ● I can explain in my own words how the graph of a linear function relates to its rate of change and initial value. **Lesson 9 Linear Models** ● I can decide when a linear function is a good model for data and when it is not. ● I can use data points to model a linear function. **Lesson 10 Piecewise Linear Functions** ● I can create graphs of nonlinear functions with pieces of linear functions.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** More Chances: Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time. ● **Problem 2:** Points to Emphasize: By this point in the unit, there should be some student mastery of writ linear equations and interpreting linear graphs. If most students struggle, make time to revisit this Cool-down. For example, after the Warm-up of the lesson referred to here, invite 2–3 students to share their equations for Program B, graphing each for all to see. ○ Grade 8, Unit 5, Lesson 11 Filling Containers	
Mid-Unit Assessment		
Section D Cylinders and Cones (Lessons 11-16)	**Learning Target #6** Calculate the value of one dimension of a cylinder or cone, and explain the reasoning. **Learning Target #7** Calculate the volume of a cylinder or cone.	**Lesson 11 Filling Containers** ● I can collect data about a function and represent it as a graph. ● I can describe the graph of a function in words. **Lesson 12 How Much Will Fit?** ● I know that volume is the amount of space contained inside a three-dimensional figure. ● I recognize the following three-dimensional shapes: cylinder, cone rectangular prism, and sphere. **Lesson 13 The Volume of a Cylinder** ● I can find the volume of a cylinder in mathematical and real-world situations. ● I know the formula for the volume of a cylinder. **Lesson 14 Finding Cylinder Dimensions** ● I can find missing information about a cylinder if I know its volume and some other information. **Lesson 15 The Volume of a Cone** ● I can find the volume of a cone in mathematical and real-world situations. ● I know the formula for the volume of a cone. **Lesson 16 Finding Cone Dimensions** ● I can find missing information about a cone if I know its volume ar some other information.
Checkpoint D	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with using the formula for volume of a cylind revisit this skill throughout the next section. For example, during the Activity Synthesis of the activity referred to here, invite 1–3 students to share how they calculated the volume of the cylinder. ○ Grade 8, Unit 5, Lesson 19, Activity 3 Estimating Hemispheres ● **Problem 2:** Points to Emphasize: If most students struggle with calculating the radius of the cone, focus this type of solving as opportunities arise. For example, in the Warm-up referred to here, invite students calculate the radius of the cone if the volume was 9π or 72π ($r=3$ or $r=6$).	

	○ Grade 8, Unit 5, Lesson 19, Activity 1 Notice and Wonder: Two Shapes	
Section E Dimensions and Spheres (Lessons 17-21)	**Learning Target #8** Calculate the volume of a sphere. **Learning Target #9** Solve problems involving cones, cylinders, and spheres.	**Lesson 17 Scaling One Dimension** ● I can create a graph of the relationship between volume and heig for all cylinders and cones with a fixed radius. ● I can explain in my own words why changing the height by a scale factor changes the volume by the same scale factor. **Lesson 18 Scaling Two Dimensions** ● I can create a graph representing the relationship between volum and radius for all cones (or cylinders) with a fixed height. ● I can explain in my own words why changing the radius by a scale factor changes the volume by the scale factor squared. **Lesson 19 Estimating a Hemisphere** ● I can estimate the volume of a hemisphere by calculating the volu of a shape I know is larger and the volume of a shape I know is smaller. **Lesson 20 Volume of a Sphere** ● I can find the volume of a sphere when I know the radius. **Lesson 21 Cylinders, Spheres and Cones** ● I can find the radius of a sphere if I know its volume. ● I can solve mathematical and real-world problems about the volu of cylinders, cones, and spheres.
Checkpoint E	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: If most students struggle with using the formula for volume, make time to some or all of this optional lesson: ○ Grade 8, Unit 5, Lesson 22 Volume as a Function of . . . ● **Problem 2:** Press Pause: If most students struggle with using formulas to order the four shapes by volume, make time to do some or all of the optional lesson referred to here: ○ Grade 8, Unit 5, Lesson 22 Volume as a Function of . . .	
Section F Let's Put it To Work (Lesson 22)	**Learning Target #10** Describe (orally) how a change in the radius of a sphere affects the volume. **Learning Target #11** Interpret (orally and in writing) functions that represent the volumes of spheres, cones, and cylinders, using different representations.	**Lesson 22 Volume of a Function of...** ● I can compare functions about volume represented in different ways.
End of Unit Assessment		

Unit Title:

Unit 6: Associations in Data

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	8.SP.A.1	Lesson 7	8.SP.A.1
Lesson 2	8.SP.A.1	Lesson 8	8.SP.A.1 8.SP.A.2 8.SP.A.3
Lesson 3	8.SP.A.1 8.SP.A.3	Lesson 9	8.SP.A.4
Lesson 4	8.SP.A.1 8.SP.A.2	Lesson 10	8.SP.A.4
Lesson 5	8.SP.A.1 8.SP.A.2	Lesson 11	8.SP.A
Lesson 6	8.SP.A.1 8.SP.A.2 8.SP.A.3		

Essential Question(s):

- How can scatter plots be used to identify associations between two numerical variables?
- What is the purpose of fitting a line to data in a scatter plot?
- How do we identify associations in categorical data?

Enduring Understanding(s):

- Scatter plots show the relationship between two variables; associations can be described as positive (both increase), negative (one increases as the other decreases), linear, or non-linear
- A fitted line, or linear model, is used to describe the general trend of the data and make predictions about the dependent variable based on given values of the independent variable
- Associations in categorical data are found by comparing relative frequencies in two-way tables or segmented bar graphs; an association exists if frequencies within categories are significantly different

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 3)
CFA 2: Checkpoint B (after lesson 8)
CFA 3 Checkpoint C (after lesson 10)
EoU: Assessment A

Pacing for Unit

12 Days

Lessons to Add/Review

- None

Lessons to Remove/Modify

- Move to outside of class 8.6.11, culminating lesson incorporating work from the unit

Family Overview

https://accessim.org/6-8/grade-8/unit-6?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

New Terminology

Bold = brand new, use glossary

Lesson	receptive	productive
8.6.1	scatter plot	
8.6.2	data display attribute	numerical data categorical data
8.6.4	outlier predict overpredict underpredict linear model	
8.6.5	positive association negative association linear association	
8.6.6	nonlinear association no association fitted line	

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.6.2 Digital Applet: Scatter Plots

Provide access as needed throughout the unit:

- Books
- Colored pencils
- Copies of blackline masters
- Dried linguine pasta (We specified linguine since it is flatter and less likely to roll around than spaghetti.)
- Math Community Chart
- Measuring tapes
- Pre-printed cards, cut from copies of the blackline master
- Rulers marked with centimeters
- Scale IA digital scale that can show measurements in grams, kilograms, ounces, or pounds)
- Stopwatches
- Straightedges

8.6.7	cluster	
8.6.8		independent variable dependent variable positive association negative association linear association
8.6.9	segmented bar graph relative frequency two-way (frequency) table	
8.6.11		scatter plot

Lesson	Materials to Gather	Materials to Copy
1	Copies of blackline masters: Activity 2	Tables and Their Scatter Plots Handout (1 copy for every 2 students): Activity 2
2	• Books: Activity 1 • Measuring tapes: Activity 1 • Rulers marked with centimeters: Activity 1 • Scale: Activity 1	
5	• Dried linguine pasta: Activity 1 • Straightedges: Activity 1	
7	Pre-printed cards, cut from copies of the blackline master: Activity 1	Scatterplot City Cards (1 copy for every 1 student): Activity 1
8	• Dried linguine pasta: Activity 1 • Straightedges: Activity 1	
9	Pre-printed cards, cut from copies of the blackline master: Activity 1	Matching Representations Cards (1 copy for every 2 students): Activity 1
10	• Colored pencils: Activity 2 • Straightedges: Activity 2	
11	Stopwatches: Activity 1	

Opportunities for Interdisciplinary Connections:

- **Geology:** Students analyze data from Old Faithful to look for patterns in geyser eruption times.
- **Zoology:** Scatter plots model the relationship between a dog's stride length and its speed

Anticipated misconceptions:

Relative Frequency Errors: Students may divide by the table total instead of the row or column total when looking for associations

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- Interpreting dot plots, histograms, and box plots
- Identifying independent and dependent variables
- Analyzing positive and negative slopes

Relevant Unit(s)/Lesson(s) to Review:
- Grade 6 Unit 8: Data Sets and Distributions
- Grade 7 Unit 8: Probability and Sampling

Connections to Future Units:

Lays the foundation for statistics and bivariate data analysis in high school courses.

Differentiation through *Universal Design for Learning*

Engagement:
- Develop effort and persistence by providing sentence frames for comparing different scatter plots (Lesson 7, Activity 2 Launch)

Representation:
- Internalize comprehension through the use of multiple examples and non-examples of non-similar polygons (Lesson 7, Activity 2 Launch)

Action & Expression:
- Support organizational skills by chunking data tasks to check for understanding within the first few minutes (Lesson 1, Activity 2 Launch)

Related *CELP standards* aligned to Learning Targets:

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English

Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR2: Collect and Display (Lessons 7, 9, 10)
- MLR7: Compare and Connect (Lessons 2, 6, 7, 8, 9)
- MLR8: Discussion Supports (Lessons 1, 4, 5, 8, 10)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes such as explaining, representing, and interpreting. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Explain

- how to estimate using available data (Lesson 1)
- how to use tables and scatter plots to make estimates and predictions (Lesson 3)
- the meaning of slope for a situation (Lesson 6)
- how to use lines to show associations, identify outliers, and answer questions (Lesson 8)

Represent

- data in organized ways (Lesson 1)
- data using two-way tables, bar graphs, and segmented bar graphs (Lessons 9 and 10)
- data using scatter plots (Lesson 11)

Interpret

- situations and graphs involving bivariate data (Lesson 2)
- tables and scatter plots of bivariate data (Lesson 3)
- tables, scatter plots, equations, and situations involving bivariate data (Lesson 4)

Sentence Frames and Stems

Section A

- Each point on the scatter plot represents _____ and _____.
- The data in this scatter plot represent ...
- I can locate a specific data point on a scatter plot by ...

Section B

- The association between _____ and _____ is _____ because ...
- The outlier in the data set is _____ because ...
- The linear equation _____ would be a good fit for this data because ...
- If the _____ increases by 1 _____ , the model predicts that _____ increases/decreases by _____ .
- To draw a line that best fits the data, first I _____, then I ...

Section C

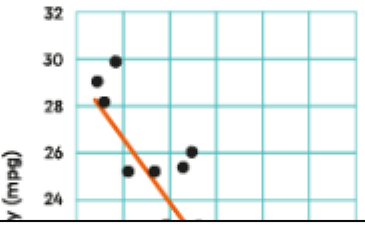
- Using the data shown in the _____, I can determine that ...
- To find the missing values in the table, first I _____, then I ...
- The percentage of _____ that _____ is _____ because ...
- I created a _____ to show the association between _____ and _____ is _____.

Section D

- Comparing Time 1 to Time 2, there is a _____ association because ...
- The _____ was most helpful to determine if there was an association because ...

Unit Outline

In this unit, students analyze bivariate data. They will use scatter plots and fitted lines to analyze numerical data, and two-way tables, bar graphs, and segmented bar graphs to analyze categorical data. Students advance their understanding of lines by examining slopes in the context of data. They will revisit these data analysis topics in a later course in more depth. At this level, students should be able to construct and interpret points on a scatter plot, informally fit linear models to data, interpret a given linear model in the context of data, and generally recognize patterns of association using relative frequencies in a two-way table.



In prior grades, students analyzed data collected about one variable using dot plots, histograms, and box plots. This unit expands on that by considering the possible influence of a second variable on measurements about individuals.
In the first section, students are introduced to scatter plots and are reminded how to interpret points on a graph using a context. They also begin to recognize general trends in data.

In the second section, students look more closely at associations in data by informally drawing lines that model the general trend of the data. They also classify associations as positive, negative, linear, and non-linear by looking at the shape of the data in a scatter plot.

In the third section, students look at categorical data using two-way tables and relative frequencies. They then informally look at the relative frequencies to notice whether the variables are associated or not.

The unit ends with a lesson in which students collect and analyze numerical data using a scatter plot, then categorize the data based on a threshold and analyze the categories based on a two-way table.

Lesson Sequence	**Learning Target(s)**	**Success Criteria/Assessment**
Section A Does This Predict That? (Lessons 1-3)	**Learning Target #1** Create a scatter plot from a table of data, and describe the trend of the data. **Learning Target #2** Interpret a point on a scatter plot in context.	**Lesson 1 Organizing Data** ● I can organize data to see patterns more clearly. **Lesson 2 Plotting Data** ● I can draw a scatter plot to show data that has two paired variable **Lesson 3 What a Point in a Scatter Plot Means** ● I can describe the meaning of a point in a scatter plot in context.
Checkpoint A	***Responding to Student Thinking*** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is need to slow down or add additional work to review this concept at this time.	
Section B Associations in Numerical Data (Lessons 4-8)	**Learning Target #3** Describe the relationship between two variables using a line fit to data on a scatter plot. **Learning Target #4** Draw a linear model to fit data in a scatter plot, and describe features of a line that fits data well. **Learning Target #5** Interpret features of data on a scatter plot, including linear and non-linear association, outliers, slope of a linear model, and clustering.	**Lesson 4 Fitting a Line to Data** ● I can pick out outliers on a scatter plot. ● I can use a model to predict values for data. **Lesson 5 Describing Trends of Scatter Plots** ● I can draw a line to fit data in a scatter plot. ● I can say whether data in a scatter plot has a positive or negative association (or neither). **Lesson 6 The Slope of a Fitted Line** ● I can use the slope of a line fit to data in a scatter plot to say how variables are connected in real-world situations. **Lesson 7 Observing More Patterns in Scatter Plots** ● I can pick out clusters in data from a scatter plot. ● I can use a scatter plot to decide if two variables have a linear association. **Lesson 8 Analyzing Bivariate Data** ● I can analyze a set of data to determine associations between tw variables.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of slope and its meaning. If students struggle, make time to revisit related work in the referenced lesson. See the Cours Guide for ideas to help students re-engage with earlier work. For example, revisit contexts from linear situations throughout this course and ask students to determine the slope and interpret its meaning. ● **Problem 2**: More Chances: Students will have more opportunities to understand the mathematical idea addressed here. There is no need to slow down or add additional work to the next lessons.	
Section C Associations in Categorical Data (Lessons 9-10)	**Learning Target #6** Calculate relative frequencies, and describe associations between variables using a relative frequency table. **Learning Target #7** Create a two-way table and a segmented bar graph that represent relative frequencies,	**Lesson 9 Looking for Associations** ● I can identify the same data represented in a bar graph, a segmen bar graph, and a two-way table. ● I can use a two-way frequency table or relative frequency table t find associations among variables. **Lesson 10 Using Data Displays to Find Associations** ● I can create relative frequency tables, bar graphs, and segmente bar graphs from frequency tables to find associations among variables.

	and interpret the frequencies in context.	
Checkpoint C	***Responding to Student Thinking*** ● More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section D Let's Put it to Work (Lessons 11)	**Learning Target #8** Compare and contrast (orally) representations of bivariate data, including scatter plots, two-way tables, segmented bar graphs, and relative frequency tables. **Learning Target #9** Describe (orally and in writing) associations in bivariate data using different representations of the same data.	**Lesson 11 Gone in 30 Seconds** ● I can collect data and analyze it for associations using scatter plot two-way tables, and segmented bar graphs.
End of Unit Assessment		

Unit Title:

Unit 7: Exponents and Scientific Notation

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1		Lesson 9	8.EE.A.3
Lesson 2	8.EE.A.1	Lesson 10	8.EE.A.3 8.EE.A.4
Lesson 3	8.EE.A.1	Lesson 11	8.EE.A.1 8.EE.A.3 8.EE.A.4
Lesson 4	8.EE.A.1	Lesson 12	8.EE.A.3 8.EE.A.4
Lesson 5	8.EE.A.1	Lesson 13	8.EE.A.4
Lesson 6	8.EE.A.1	Lesson 14	8.EE.A.1 8.EE.A.3 8.EE.A.4
Lesson 7	8.EE.A.1	Lesson 15	8.EE.A.4
Lesson 8	8.EE.A.1	Lesson 16	8.EE.A.3 8.EE.A.4

Essential Question(s):

- How do exponent rules simplify expressions with powers of 10?
- What do zero and negative exponents represent?
- How does scientific notation help in calculating with very large or very small numbers?

Enduring Understanding(s):

- Exponent rules for multiplication, division, and powers of powers provide efficient ways to generate equivalent numerical expressions
- 10^0 is defined as 1, and 10^{-n} represents $1/10^n$, allowing the decimal place value system and very small numbers to be represented using powers of 10
- Scientific notation expresses numbers as a product of a power of 10 and a factor between 1 and 10, making it easier to estimate, compare, and perform arithmetic with quantities of vastly different magnitudes

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 5)
CFA 2: Checkpoint B (after lesson 8)
CFA 3: Checkpoint C (after lesson 12)
CFA 4: Checkpoint D (after lesson 15)
EoU: Assessment A

Pacing for Unit

16 Days

Lesson to Review/Add

- None

Lesson to Modify/Remove

- Move to outside of class 8.7.16: culminating lesson incorporating work from the unit

Family Overview

https://accessim.org/6-8/grade-8/unit-7?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

New Terminology

Bold = brand new, use glossary

Lesson	receptive	productive
8.7.1	exponent power factor reciprocal	repeated multiplication
8.7.2	powers of 10	
8.7.3	base (of an exponent) power of powers	
8.7.4	expanded positive exponent zero exponent	
8.7.5	negative exponent	positive exponent
8.7.6		exponent base (of an exponent)

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.7.1 Activity 2: Doubling Coins
- 8.7.2 Activity 2 Applet: Zoom
- 8.7.10 Activity 1 & 2 Applets: Comparing Large Numbers with a Number Line, The Speeds of Light

Provide access as needed throughout the unit:

- Blank paper
- Math Community Chart
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
8	Tools for creating a visual display: Activity 2	
9		Using Powers of 10 to Describe Cards (1 copy for every 6 students): Activity 2

		power zero exponent
8.7.7	reciprocal evaluate	factor power of powers negative exponent
8.7.8	square (of a number)	
8.7.9	billion trillion multiple of	
8.7.10	integer	
8.7.12		multiple of
8.7.13	scientific notation	integer
8.7.14		powers of 10 billion trillion
8.7.15		scientific notation

12	Math Community Chart: Activity 1	
13	Blank paper	Scientific Notation Matching Cards (1 copy for every 4 students): Activity 2
14		Distances in the Solar System Cards (1 copy for every 4 students): Activity 2
16		Old Hardware New Hardware Handout (1 copy for every 2 students): Activity 1

Opportunities for Interdisciplinary Connections:

Epidemiology: Students model the spread of information or viruses in "Going Viral"

Anticipated misconceptions:

Negative Exponent Meaning: Students often think 10^{-3} is a negative number rather than a small positive fraction (1/1,000)

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- expressions that have positive whole-number exponents and whole-number, fraction, or variable bases

Relevant Unit(s)/Lesson(s) to Review:
- Grade 6 Unit 6: Expressions and Exponents

Connections to Future Units:

Preparation for exponential growth and decay and logarithmic functions.

Differentiation through *Universal Design for Learning*

Engagement:
- Provide tools like blank tables or graphing software to calculate interest compounding (Unit 7 BPS modification - context of Lesson 16)

Representation:
- Support structure by color coding connections between expressions, expanded forms, and single powers (Lesson 4, Activity 1 Launch)

Action & Expression:
- Support memory and conceptual processing through a whole-class "think-aloud" demonstration of card descriptions (Lesson 9, Activity 2 Launch)

Related *CELP standards* aligned to Learning Targets:

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:
- MLR2: Collect and Display (Lessons 3, 6, 9)
- MLR8: Discussion Supports (Lessons 2, 3, 5, 6, 9, 10, 12, 13, 14, 15)
- MLR1: Stronger and Clearer Each Time (Lessons 3, 8, 12)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes such as critiquing, representing, and justifying. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Critique
- reasoning about powers of powers (Lesson 3)
- reasoning about zero exponents (Lesson 4)
- applications of exponent rules (Lesson 7)
- reasoning about scientific notation (Lesson 15)

Represent
- situations using exponents (Lesson 1)
- large and small numbers using number lines, exponents, and decimals (Lesson 9–11)
- situations comparing quantities expressed in scientific notation (Lesson 14)

Justify
- reasoning about multiplying powers of 10 (Lesson 2)
- reasoning about powers of powers (Lesson 3)
- reasoning about dividing powers of 10 (Lesson 4)
- whether or not expressions are equivalent to exponential expressions (Lesson 6)
- reasoning about situations comparing powers of 10 (Lesson 12)

Sentence Frames and Stems

Section A
- The expression _____ is equivalent to _____ because …
- Using the rule for _____ powers, I know that _____ is equal to _____.
- The rule for _____ powers makes sense because …

Section B
- The expression _____ is equivalent to _____ because …
- Using the rule for _____ powers, I know that _____ is equal to _____.
- To simplify the expression with powers _____, first I _____, then I …

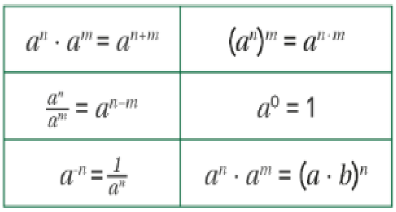
Section C
- Using scientific notation, the value _____ can be represented as _____.
- It's helpful to be able to write values like _____ as _____ using scientific notation because …
- Using a number line to plot the value _____ given in scientific notation, I must first _____, then I …
- I used the expression _____ to represent this scenario and found the value of _____ to be _____.

Section D
- I know the value _____ is/is not written in scientific notation because …
- I used the expression _____ to represent this scenario and found the value of _____ to be _____.

Section E
- I know _____ can store _____ times as much as Apollo because …
- The _____ processor is _____ times as fast as the Apollo.
- _____ has _____ times the memory of the Apollo.

Unit Outline

In this unit, students deepen their understanding of exponents, powers of 10, and place value before being introduced to scientific notation. They build on work done in a previous course where students focused on whole-number exponents with whole-number, fraction, decimal, or variable bases, but did not formulate rules regarding the use of exponents.



$a^n \cdot a^m = a^{n+m}$	$(a^n)^m = a^{n \cdot m}$
$\frac{a^n}{a^m} = a^{n-m}$	$a^0 = 1$
$a^{-n} = \frac{1}{a^n}$	$a^n \cdot a^m = (a \cdot b)^n$

Students begin this unit by identifying patterns that emerge when multiplying and dividing powers of 10, and when raising powers of 10 to another power. Students generalize these patterns to develop exponent rules. They extend these rules to see why 10^0 must be equal to 1 and to understand what negative exponents mean.

Next, students determine that the rules developed for powers of 10 also work with other bases, as long as the bases in both expressions are the same. They observe a new rule that applies when multiplying bases that are different if the exponents are the same.

In the next section, students return to working with powers of 10 as they use multiples of powers of 10 to describe magnitudes of very large and very small quantities, such as the distance from Earth to the sun in kilometers or the mass of a proton in grams. Students plot these large and small values on number lines labeled using exponents and see how these numbers can be expressed in different ways — for example as $75 \cdot 10^5$ or $7.5 \cdot 10^6$.

After building a foundation connecting powers of 10 with place value, students are finally introduced to scientific notation as a specific and useful way of writing numbers as a power of 10. They compute sums, differences, products, and quotients of numbers written in scientific notation to make additive and multiplicative comparisons, estimate quantities, and make measurement conversions.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Exponent Rules (Lessons 1-5)	**Learning Target #1** Use exponent rules to generate equivalent numerical expressions for powers of 10.	**Lesson 1 Exponent Review** • I can use exponents to describe repeated multiplication. • I understand the meaning of a term with an exponent. **Lesson 2 Multiplying Powers of Ten** • I can explain and use a rule for multiplying powers of 10. **Lesson 3 Powers of Powers of Ten** • I can explain and use a rule for raising a power of 10 to a power. **Lesson 4 Dividing Powers of Ten** • I can evaluate 10^0 and explain why it makes sense. • I can explain and use a rule for dividing powers of 10. **Lesson 5 Negative Exponents of Powers of 10** • I can use the exponent rules with negative exponents. • I know what it means if 10 is raised to a negative power.
Checkpoint A	***Responding to Student Thinking*** **Problem 1 & 2:** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time.	
Section B More Exponent Rules (Lessons 6-8)	**Learning Target #2** Use exponent rules to generate equivalent numerical expressions for expressions with different bases and bases other than 10.	**Lesson 6 What About Other Bases** • I can use the exponent rules for bases other than 10. **Lesson 7 Practice with Rational Bases** • I can change an expression with a negative exponent into an equivalent expression with a positive exponent. • I can choose an appropriate exponent rule to rewrite an expressi to have a single exponent **Lesson 8 Combining Bases** • I can use and explain a rule for multiplying terms that have differe bases but the same exponent.
Checkpoint B	***Responding to Student Thinking*** • **Problem 1:** Points to Emphasize: If most students struggle with identifying equivalent exponential expressions, revisit the exponent rules in this practice problem: ○ Grade 8, Unit 7, Lesson 13, Practice Problem 5 • **Problem 2: :**Points to Emphasize: If most students struggle with multiplying expressions with different bases, revisit this concept in this practice problem: ○ Grade 8, Unit 7, Lesson 10, Practice Problem 6 • **Problem 3:** Points to Emphasize: If most students struggle with explaining why expressions with differe bases can not be multiplied if they do not have the same exponent, revisit this concept in this practice problem: ○ Grade 8, Unit 7, Lesson 14, Practice Problem 5	
Section C Large and Small Numbers (Lessons 9-12)	**Learning Target #3** Compare very large or very small quantities expressed as a multiple of a power of 10. **Learning Target #4** Use exponent rules and powers of 10 to solve problems in context.	**Lesson 9 Describing Large & Small Numbers Using Powers of Te** • Given a very large or very small number, I can write an expression equal to it using a power of 10. **Lesson 10 Representing Large Numbers on a Number Line** • I can plot a multiple of a power of 10 on such a number line. • I can subdivide and label a number line between 0 and a power of with a positive exponent into 10 equal intervals. • I can write a large number as a multiple of a power of 10. **Lesson 11 Representing Small Numbers on a Number Line** • I can plot a multiple of a power of 10 on such a number line. • I can subdivide and label a number line between 0 and a power of with a negative exponent into 10 equal intervals. • I can write a small number as a multiple of a power of 10. **Lesson 12 Applications with Arithmetic With Powers of Ten** • I can apply what I learned about powers of 10 to answer question about real-world situations.
Checkpoint C	***Responding to Student Thinking*** • **Problem 1 & 2:** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time.	

Section D Scientific Notation (Lessons 13-15)	**Learning Target #5** Calculate with numbers in scientific notation and interpret them in context. **Learning Target #6** Identify numbers written in scientific notation, including scientific notation that has been generated by technology.	**Lesson 13 Definition of Scientific Notation** ● I can tell whether or not a number is written in scientific notation. **Lesson 14 Estimating with Scientific Notation** ● I can multiply and divide numbers given in scientific notation. ● I can use scientific notation and estimation to compare very large very small numbers. **Lesson 15 Adding and Subtracting with Scientific Notation** ● I can add and subtract numbers given in scientific notation.
Checkpoint D	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: If most students struggle with identifying numbers written in scientific notatio make time to revisit related work in the lesson referred to here. See the Course Guide for ideas to help students re-engage with earlier work. ○ Grade 8, Unit 7, Lesson 13 Definition of Scientific Notation ● **Problem 2:** Points to Emphasize If students struggle to find the surface area, emphasize ways to find th area, struggle with arithmetic with numbers written in scientific notation, make time to revisit related w in the lesson referred to here. See the Course Guide for ideas to help students re-engage with earlier w ○ Grade 8, Unit 7, Lesson 15 Adding and Subtracting with Scientific Notation	
Section E Let's Put it To Work (Lessons 16)	**Learning Target #7** Use scientific notation to compare quantities in context, and describe (orally) how using scientific notation helps with making comparisons between very large and very small quantities.	**Lesson 16 Is a Smart Phone Enough to Get to the Moon** ● I can use scientific notation to compare different amounts and answer questions about real-world situations.
End of Unit Assessment		

Unit Title:

Unit 8: Pythagorean Theorem and Irrational Numbers

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1		Lesson 10	8.G.B 8.G.B.6
Lesson 2	8.NS.A 8.NS.A.2	Lesson 11	8.EE.A.2 8.G.B.7 8.NS.A
Lesson 3	8.EE.A.2 8.F.B	Lesson 12	8.G.B 8.G.B.7
Lesson 4	8.EE.A.2 8.NS.A	Lesson 13	8.G.B.8
Lesson 5	8.EE.A.2 8.NS.A.2	Lesson 14	8.EE.A.2 8.NS.A.2
Lesson 6	8.EE.A.2 8.NS.A.2	Lesson 15	8.EE.A.2 8.NS.A.2
Lesson 7	8.G.B 8.G.B.7	Lesson 16	8.EE.A 8.NS.A 8.NS.A.1
Lesson 8	8.G.B 8.G.B.6 8.G.B.7	Lesson 17	8.NS.A.1
Lesson 9	8.G.B.7	Lesson 18	8.G.B.7

Essential Question(s):

- How are square and cube roots defined geometrically?
- How can we estimate the value of an irrational square root?
- How does the Pythagorean Theorem relate the side lengths of right triangles?

Enduring Understanding(s):

- The square root of n is the side length of a square with area n, and the cube root of n is the edge length of a cube with volume n
- Irrational numbers cannot be written as fractions; their values can be approximated on a number line by identifying the two closest whole number squares
- In any right triangle with legs a and b and hypotenuse c, the relationship $a^2+b^2=c^2$ holds; this can be used to find unknown lengths and distances in 2D and 3D contexts

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 6)
CFA 2: Checkpoint B (after lesson 13)
CFA 3: Checkpoint C (after lesson 15)
CFA 4: Checkpoint D (after lesson 17)
EoU: Assessment A

Pacing for Unit

17 Days

Lesson to Review/Add
- None

Lesson to Remove/Modify
- Move to outside of class 8.8.16: culminating lesson incorporating work from the unit

Family Overview

https://accessim.org/6-8/grade-8/unit-8?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

New Terminology
Bold = brand new, use glossary

Lesson	receptive	productive
8.8.2	square root	square (of a number)
8.8.3	irrational number square root symbol	rational number
8.8.4	diagonal decimal approximation	
8.8.5		square root square root symbol
8.8.6	Pythagorean Theorem hypotenuse legs	right triangle
8.8.9	converse of the Pythagorean Theorem	Pythagorean Theorem
8.8.10	edge length	hypotenuse

Aligned Unit Materials, Resources, and Technology

Digital Applets
- 8.8.1 Digital Applet: Making Squares
- 8.8.2 Digital Applet: The Sides and Areas of Tilted Squares
- 8.8.8 Digital Applet: A Transformational Proof

Provide access as needed throughout the unit:
- Blank paper
- Compasses
- Four-function calculators
- Geometry toolkits
- Math Community Chart
- Scientific calculators
- Scissors
- Tracing paper

Lesson	Materials to Gather	Materials to Copy

		legs
8.8.12	cube root	
8.8.13		cube root edge length
8.8.14	repeating decimal decimal representation finite decimal expansion	
8.8.15	infinite decimal expansion	irrational number repeating decimal

1		Making Squares Cutouts (1 copy for every 2 students): Activity 2
2	• Geometry toolkits: Activity 1, Activity 2 • Tracing paper: Activity 1, Activity 2	
3	• Geometry toolkits: Activity 1, Activity 3 • Tracing paper: Activity 1 • Four-function calculators: Activity 2	
4	• Geometry toolkits: Activity 2 • Tracing paper: Activity 2 • Four-function calculators: Activity 4	
5	• Compasses: Activity 2 • Geometry toolkits: Activity 2 • Four-function calculators: Activity 3	
8	• Blank paper: Lesson • Scissors: Activity 3	A Transformational Proof Cutouts (1 copy for every 2 students): Activity 3
9	Blank paper: Lesson	
12	Math Community Chart: Activity 2	Pythagorean Theorem Cards (1 copy for every 2 students): Activity 2
14	Math Community Chart: Activity 3	Rooted in the Number Line Cards (1 copy for every 2 students): Activity 3
17		Some Numbers Are Rational Cards (1 copy for every 2 students): Activity 2
18	Scientific calculators: Activity 2, Activity 3	

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
Civil Engineering: The geometry of the Golden Gate Bridge is used to introduce the practical application of square roots and the Pythagorean Theorem	**Distance Calculation:** Students may make sign errors when calculating distances on a coordinate plane, such as subtracting a negative coordinate incorrectly See teacher's guide for specific misconceptions aligned to each lesson.
Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: • expressions that have positive whole-number exponents and whole-number, fraction, or variable bases **Relevant Unit(s)/Lesson(s) to Review:** • Grade 6 Unit 6: Expressions and Equations	Essential for high school geometry and understanding the real-number system.

Differentiation through *Universal Design for Learning*

Engagement:

- Develop effort and persistence by reviewing previous successes with area tables to provide an entry point for cube roots (Lesson 14, Activity 1 Launch)

Representation:

- Support language and symbols through a kinesthetic representation of the number line using a clothesline and cards (Lesson 15, Activity 2 Synth)

Action & Expression:

- Support organizational skills by providing a blank two-column table to list x- and y-values for perimeter sets (Lesson 12, Activity 1 Synth)

Related *CELP standards* aligned to Learning Targets:

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 5, 8, 13, 14, 17, 18)
- MLR2: Collect and Display (Lessons 2, 9, 11, 14, 15, 16, 17, 21)
- MLR7: Compare and Connect (Lessons 2, 4, 5, 10, 16, 17, 18)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes such as explaining, justifying, and comparing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Explain

- strategies for finding area (Lesson 1)
- strategies for approximating and finding square roots (Lesson 4)
- strategies for finding triangle side lengths (Lesson 6)
- predictions about situations involving right triangles and strategies to verify (Lesson 10)
- strategies for finding distances between points on a coordinate plane (Lesson 11)
- strategies for approximating the value of cube roots (Lesson 13)

Justify

- which squares have side lengths in a given range (Lesson 1)
- ordering of irrational numbers (Lesson 5)
- ordering of hypotenuse lengths (Lesson 9)

Compare

- rational and irrational numbers (Lesson 3)
- lengths of diagonals in rectangular prisms (Lesson 10)
- strategies for approximating irrational numbers (Lesson 15)

Sentence Frames and Stems

Section A

- _____ is an irrational number because ...
- The square root of _____ must be _____ because ...
- The solution to the equation _____ is _____ because ...
- To place the square root of _____ on a number line, first I _____, then I ...

Section B

- The distance between point _____ and point _____ is _____ because ...
- If the leg lengths of the right triangle are _____ and _____, then the hypotenuse must be _____ because ...
- The side lengths _____, _____, and _____ make a right triangle because ...
- I used the equation _____ to find the missing side length of the right triangle. The missing side length is _____.

Section C

- If the volume of a cube is _____, the edge length must be _____ because ...
- The cube root of _____ must be _____ because ...
- To place the cube root of _____ on a number line, first I _____, then I ...

- The solution to the equation _____ is _____ because ...

Section D

- _____ is a rational number because ...
- The number _____ is rational because it can be written as the fraction _____.
- _____ is an irrational number because ...
- To place _____ on a number line, first I _____, then I ...

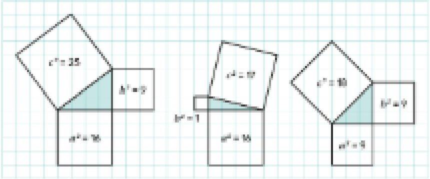
Section E

- The equation _____ represents this situation because ...
- The missing length in this situation is _____ because ...

Unit Outline

This unit introduces students to irrational numbers with a focus on connecting geometric and algebraic representations of square roots, cube roots, and the Pythagorean Theorem.

In the first section, students extend work from grade 6, composing and decomposing shapes to find the areas of tilted squares. They see "square root of n" and $\sqrt{n}$ to mean the side length of a square with area n square units, and understand that finding the solution to equations of the form $x^2=n$ means determining which values of x make the equation true. Students learn and use definitions for "rational number" and "irrational number," learn (without proof) that $\sqrt{2}$ is irrational, and plot square roots on the number line.



In the second section, students continue using tilted squares as they investigate relationships between side lengths of right and non-right triangles. Students are encouraged to notice patterns among the triangles before being shown geometric and algebraic proofs of the Pythagorean Theorem. They use the Pythagorean Theorem and its converse to solve problems in two and three dimensions, for example, to determine lengths of diagonals of rectangles and right rectangular prisms, and to estimate distances between points in the coordinate plane.

In the third section, students see that "cube root of n" and $\sqrt[3]{n}$ mean the side length of a cube with volume n cubic units. They also represent a cube root as a decimal approximation and as a point on the number line.

In the fourth section, students consider the decimal expansions of rational and irrational numbers. They learn how to rewrite fractions as a repeating decimal, how to rewrite a repeating decimal as a fraction, and reinforce their understanding that irrational numbers have a place on the number line even if they cannot be written as a fraction of integers.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Side Lengths and Areas of Squares (Lessons 1-6)	**Learning Target #1** Comprehend the term "irrational number" to mean a number that is not rational and that $\sqrt{2}$ is an example of an irrational number. **Learning Target #2** Comprehend the term "square root of n" and the notation $\sqrt{2}$ to mean the side length of a square whose area is n square units. **Learning Target #3** Use the square root symbol to represent solutions to equations of the form $x^2=n$ and represent the square root as a point on the number line.	**Lesson 1 Areas of Squares** • I can find the area of a tilted square on a grid by using methods lik "decompose and rearrange" and "surround and subtract." • I can find the area of a triangle. **Lesson 2 Side Lengths and Areas** • I can explain what a square root is. • If I know the area of a square, I can express its side length using square root notation. **Lesson 3 Square Roots** • I can find exact and approximate side lengths of squares. • I know what an irrational number is and can give an example. **Lesson 4 Rational and Irrational Numbers** • I know what a rational number is and can give an example. • I can find a decimal approximation for square roots. **Lesson 5 Square Roots on the Number Line** • I can plot square roots on the number line. • When I have a square root, I can reason about which two whole numbers it is between. **Lesson 6 Reasoning About Square Roots** • When I have a square root, I can reason about which two whole numbers it is between.
Checkpoint A	***Responding to Student Thinking*** **Problem 1, 2, & 3:** More Chances: Students will have more opportunities to develop this understanding in late lessons. There is no need to slow down or add additional work to review this concept at this time.	
Section B The Pythagorean Theorem (Lessons 7-13)	**Learning Target #4** Calculate the distance between two points in the coordinate plane	**Lesson 7 Finding Side Lengths of Triangles** • I can explain what the Pythagorean Theorem says. **Lesson 8 A Proof of the Pythagorean Theorem** • I can explain why the Pythagorean Theorem is true.

	by using the Pythagorean Theorem. **Learning Target #5** Explain an area-based algebraic proof of the Pythagorean Theorem. **Learning Target #6** Use the Pythagorean Theorem to calculate unknown side lengths of right triangles and to solve problems within a context.	**Lesson 9 Finding Unknown Side Lengths** ● If I know the lengths of two sides, I can find the length of the thir side in a right triangle. ● When I have a right triangle, I can identify which side is the hypotenuse and which sides are the legs. **Lesson 10 The Converse** ● I can explain why it is true that if the side lengths of a triangle satisfy the equation $a^2+b^2=c^2$ then it must be a right triangle. ● If I know the side lengths of a triangle, I can determine if it is a rig triangle or not. **Lesson 11 Applications of the Pythagorean Theorem** ● I can use the Pythagorean Theorem to solve problems. **Lesson 12 More Applications of the Pythagorean Theorem** ● I can recognize situations where the Pythagorean Theorem can b used to solve a problem. **Lesson 13 Finding Distances in the Coordinate Plane** ● I can find the distance between two points in the coordinate plan ● I can find the length of a diagonal line segment in the coordinate plane.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1**: Press Pause: By this point in the unit, there should be some student mastery with using the Pythagorean Theorem. If most students struggle, revisit related work. For example, in the practice problem referred to here, review how to use the Pythagorean Theorem when finding a leg versus when finding the hypotenuse. See the Course Guide for ideas to help students re-engage with earlier work. ○ Grade 8, Unit 8, Lesson 15, Practice Problem 6 ● **Problem 2:** Points to Emphasize: If most students struggle with finding the distance between two point revisit how constructing a right triangle allows for the use of the Pythagorean Theorem. For example, in the practice problem referred to here, ask students to sketch a graph of the pairs of points when findin the distance between them. ○ Grade 8, Unit 8, Lesson 14, Practice Problem 3 ● **Problem 3:** More Chances: Students will have more opportunities to understand the mathematical idea addressed here. There is no need to slow down or add additional work to the next lessons.	
Section C Side Lengths and Volumes of Cubes (Lessons 14-15)	**Learning Target #7** Coordinate representations of a cube root, including cube root notation, decimal representation, the edge length of a cube of given volume, and a point on the number line.	**Lesson 14 Edge Lengths and Volumes** ● I can approximate cube roots. ● I know what a cube root is. ● I understand the meaning of expressions like $\sqrt[3]{5}$. **Lesson 15 Cube Roots** ● When I have a cube root, I can reason about which two whole numbers it is between.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with determining the side length of a cub given its volume, use the practice problem referred to here to emphasize the relationship between edge length and cube volume. ○ Grade 8, Unit 8, Lesson 16, Practice Problem 6 ● **Problem 2:** Points to Emphasize: If most students struggle with estimating the value of a cube root, revisit strategies for making approximations when working with this in the next section. For example in the Activity Synthesis of the activity referred to here, ask students to approximate the location of additional cube root values and place them on the number line. ○ Grade 8, Unit 8, Lesson 16, Activity 3 Rational Numbers as Decimals	
Section D Decimal Representation of Rational and Irrational Numbers (Lessons 16-17)	**Learning Target #8** Represent rational numbers as equivalent decimals and fractions.	**Lesson 16 Decimal Representations of Rational Numbers** ● I can write a fraction as a repeating decimal. ● I understand that every number has a decimal expansion. **Lesson 17 Infinite Decimal Expansions** ● I can write a repeating decimal as a fraction. ● I understand that every number has a decimal expansion.
Checkpoint D	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: If most students struggle with representing a fraction as a decimal, make time to review long division when reviewing the practice problem referred to here. The Course Guide provide additional ideas for revisiting earlier work. ○ Grade 8, Unit 8, Lesson 17, Practice Problem 2 ● **Problem 2:** Press Pause: If most students struggle with representing a repeating decimal as a fraction, make time to review the steps for converting when reviewing the practice problem referred to here. Th Course Guide provides additional ideas for revisiting earlier work.	

	○ Grade 8, Unit 8, Lesson 17, Practice Problem 3	
Section E Let's Put it To Work (Lesson 18)	**Learning Target #9** Apply ratios and the Pythagorean Theorem to solve a problem involving the aspect ratio of screens or photos, and explain (orally) the reasoning. **Learning Target #10** Describe (in writing and using other representations) characteristics of rectangles with the same aspect ratio or with different aspect ratios.	**Lesson 18 When is the Same Size Not the Same Size?** ● I can apply what I have learned about the Pythagorean Theorem solve a more complicated problem. ● I can decide what information I need to know to be able to solve real-world problem using the Pythagorean Theorem.
End of Unit Assessment		

Course Title	**Content Area**	**Grade Level**	**Credit (if applicable)**
Grade 8 Math: Algebra +	**Mathematics**	**Grade 8**	**N/A** *(If course is passed (65% or higher), eligible for 1.0 HS Math Credit after completing 3 credits of HS Math)*

Course Description

This Algebra 1 course develops students' understanding of algebraic relationships, progressing systematically from linear through exponential and quadratic functions. Beginning with linear equations and systems, students learn to create, graph, and solve equations in both one and two variables. They then extend these concepts to inequalities and systems of inequalities, learning to represent and interpret constraints in context. Throughout these initial units, students also analyze bivariate data and develop linear models, connecting algebraic representations to real-world situations.

The middle portion of the course formalizes students' understanding of functions as mathematical relationships. Students learn to use function notation, analyze key features of graphs, and interpret different representations of functions. This foundation enables them to explore exponential functions, where they contrast exponential and linear growth, apply properties of exponents, and model real-world growth and decay scenarios. The course concludes with an introduction to quadratic functions, where students analyze different forms of quadratic expressions, graph parabolas, and interpret key features in context.

Throughout the six units, students engage in mathematical practices that develop their ability to problem-solve, model real-world situations, and construct mathematical arguments. The course emphasizes multiple representations of relationships (graphs, equations, tables, and verbal descriptions) and the connections between them.

Aligned Core Resources

CT Core Standards *(aligned to National Common Core Standards)*

Imagine Learning iM Resources (Alg 1, Geom, Alg 2)
BPS teacher login through ClassLink required

https://accessim.org/9-12-aga/algebra-1/course-guide/further-reading?a=teacher
- Empowering All Storytellers: Tips for Engaging Special Populations Using IM® v.360 for Grade 6–12
- Tackling Wordy Problems: How the Three Reads Math Language Routine Supports Access for All Learners
- Think Pair Share
- Math Language Routines: Discourse with a Purpose
- Unlocking Learners' Thinking Using the Mathematical Language Routines

Connection to the *BPS Vision of the Graduate*

Common Core State Standards: Math Practice (MP) Standards
MP 1: Make sense of problems and persevere in solving them.
MP 2: Reason abstractly and quantitatively.
MP 3: Construct viable arguments and critique the reasoning of others.
MP 4: Model with mathematics.
MP 5: Use appropriate tools strategically.
MP 6: Attend to precision.
MP 7: Look for and make use of structure.
MP 8: Look for and express regularity in repeated reasoning.

	Lessons that Showcase Math Practice Standards							
	Unit 1 *Alg 1 U3*	**Unit 2** *Alg 1 U2*	**Unit 3** *Alg 1 U4*	**Unit 4** *Alg 1 U5*	**Unit 5** *G8 U7*	**Unit 6** *Alg 1 U6*	**Unit 7** *G8 Review*	**Unit 8** *Alg 1 U7*
MP 1	1, 10	3, 5, 18	2, 7–9	1, 6, 12, 16, 18	2, 4, 6, 11	3, 9, 21		4, 14, 17
MP 2	3–9	2–4, 6, 10–12, 15, 17	1–3, 6, 7, 9	2–11, 15, 16	15	2, 4, 5, 7–11, 13, 14, 19		1, 3, 6, 7, 12, 14
MP 3	6–7	3, 7, 11, 14–16	–	8, 12	1, 2, 4, 5, 8, 11, 12, 15	1, 3, 10, 12, 17, 19		2, 3, 12, 15–17
MP 4	3, 4, 8–10	1, 4, 9, 10, 12, 19	1, 5, 9	1, 7, 8, 11, 17, 18	16	4, 6–9, 11, 16, 17, 21		7, 17
MP 5	2, 3, 10	1, 9, 11, 12, 15, 17	7, 9	5, 10, 13, 15, 18	3	1, 3, 4, 7, 8, 11, 12, 18, 21		1, 4, 6, 12
MP 6	1, 2, 4, 7	5, 7, 12, 17, 18	8	2, 3, 6–9, 11, 16	3, 4, 9, 10	1, 2, 5, 6, 8, 9, 13, 18, 21		7, 9, 11, 14, 15
MP 7	1, 3, 5–8	2, 3, 7, 11, 13, 17–19	3, 4	4, 9–11, 14	1, 4, 5, 7, 9, 13, 14	2–4, 6, 14, 18, 20		1–5, 8–13, 15–17
MP 8	2	2, 3, 8, 11, 19	4, 5	13–15	2, 3	5, 7, 15, 19, 20		2, 5–7, 9–13, 15

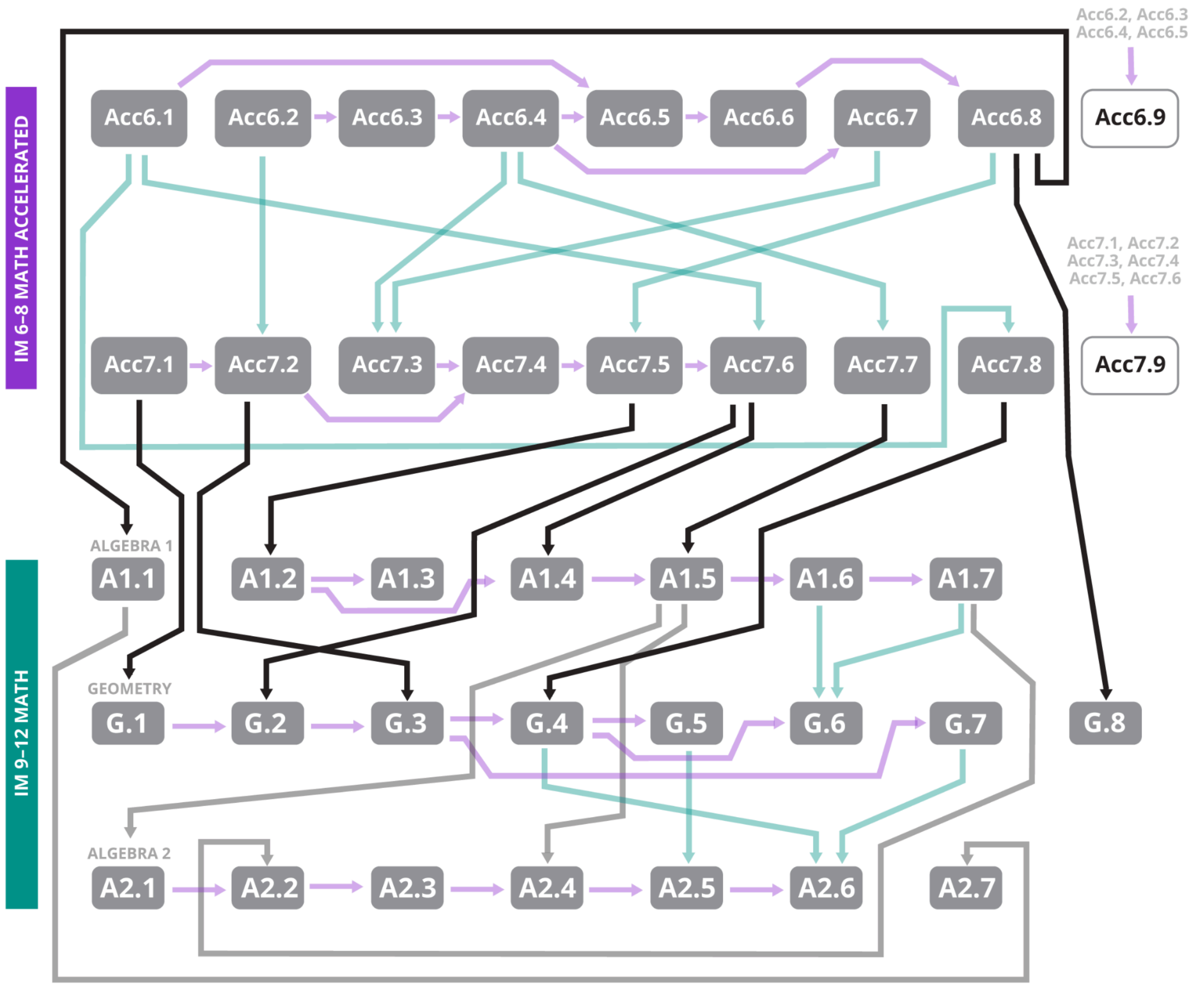
Bristol Public Schools Vision of the Graduate

Problem Solving
- iM's focus on real-world modeling and problem-solving strategies
- Multiple solution pathways are encouraged and explored
- Students develop perseverance through challenging tasks

Critical Thinking
- Students analyze mathematical relationships and justify their reasoning

	● Regular opportunities to critique others' reasoning ● Emphasis on understanding "why" not just "how" Communication and Collaboration ● Structured mathematical discourse is built into lessons ● Students explain their thinking both verbally and in writing ● Many activities involve partner and group work
Link to *Equity Audit*	Equity Curriculum Review Audit (Gr. 8 Alg+)

Additional Course Information:
Knowledge/Skill Dependent courses/prerequisites



Standard Matrix

Standard	**Unit 1** *Alg 1 U3*	**Unit 2** *Alg 1 U2*	**Unit 3** *Alg 1 U4*	**Unit 4** *Alg 1 U5*	**Unit 5** *G8 U7*	**Unit 6** *Alg 1 U6*	**Unit 7** *G8 Review*	**Unit 8** *Alg 1 U7*
8.EE.A.1					2-8, 11, 14			
8.EE.A.3					9-12, 14,1 6			
8.EE.A.4					10-16			
HSA-APR.A								8, 9
HSA-CED.A.1			3	13				
HSA-CED.A.2		1-3, 5, 6				3-7		
HSA-CED.A.3		1-3, 5, 9, 10, 12, 17	1, 3, 5-7, 9					

HSA-CED.A.4		8-11		16				
HSA-REI.A		4, 7, 12						
HSA-REI.A.1		6, 7		5				
HSA-REI.B.3		4, 8, 9	2, 3					
HSA-REI.C		18, 19						
HSA-REI.C.5		16						
HSA-REI.C.6		12-18						
HSA-REI.D.10		5, 10, 11	5					
HSA-REI.D.11				9				
HSA-REI.D.12			4-9					
HSA-SSE.A						9, 17		8, 11
HSA-SSE.A.1		6				5, 7, 17		2, 3
HSA-SSE.A.1.b						18		
HSA-SSE.A.2								8, 9
HSA-SSE.B.3								2, 8, 9, 10, 13
HSA-SSE.B.3.c						18		
HSF-BF.A.1				14, 17,18		11, 15		6
HSF-BF.A.1.a				4,14		2,3,5,15-17		1-7
HSF-BF.A.1.b		2, 14-16 U2 L14						
HSF-BF.B.3				14				12,13, 15,17
HSF-BF.B.4				15-17				
HSF-BF.B.4.a				17				
HSF-IF.A.1				1,2,4				
HSF-IF.A.2				2-5, 12,17		L8, 9, 11, 17,18, 19		3,5,14
HSF-IF.A.3								2
HSF-IF.B				10		8		
HSF-IF.B.4				1-6, 8, 9, 11, 17		1,2,4,6,11-13 , 19		14
HSF-IF.B.5				10-12			8,9,11,19	6,7
HSF-IF.B.6				7-9, 18		10,15		
HSF-IF.C				4,12-14				4, 6, 12, 15-17
HSF-IF.C.7				12		8		12, 13
HSF-IF.C.7.a		10						6, 7, 11, 13-17
HSF-IF.C.7.b				12-14				
HSF-IF.C.7.e					9, 15			
HSF-IF.C.8						18		14
HSF-IF.C.9						2,6,12		14
HSF-LE.A.1						11,19,21		

HSF-LE.A.1.a						20		
HSF-LE.A.1.b						20,21		
HSF-LE.A.1.c						11,21		
HSF-LE.A.2						8,9,11,13,15, 19-21		12
HSF-LE.A.3						1,19		4
HSF-LE.B.5						3-5, 11-13		
HSN-Q.A.1						7,8,11		
HSN-Q.A.2		1	9			17		
HSN-Q.A.3		6				11, 21		
HSS-ID.B.5	1-3							
HSS-ID.B.6	4, 7-10							
HSS-ID.B.6.a	4, 6, 8			17,18		11,21		
HSS-ID.B.6.b	6							
HSS-ID.B.6.c	5,6		17,18					
HSS-ID.C.7	4,5,8,10							
HSS-ID.C.8	7,8,10							
HSS-ID.C.9	9,10							

Unit Links

Grade 8 Algebra +
Unit 1: Two Variable Statistics (iM U3)
Unit 2: Linear Equations and Systems (iM U2)
Unit 3: Linear Inequalities and Systems (iM U4)
Unit 4: Functions (iM U5)
Unit 5: Exponents and Scientific Notation (G8 U7)
Unit 6: Introduction to Exponential Functions (iM U6)
Unit 7: Topics in Grade 8 (BPS)
Unit 8: Introduction to Quadratic Functions (iM U7)
Course Assessment Map

Use of Instructional Time (181 School Days)

- 156 iM Content and Assessment Days
- 6 Climate and Culture Days: 2 days at start of year, 2 shortened days before breaks, and 2 days at end of year
- Midterm Exam: 2 Review Days, 1 Administering
- 9 IAB Days: 1 day Strategic Review and 2 day IAB in fall, winter, and spring
- 4 SBA Days: 1 day Strategic Review and 3 day SBA
- Final Exam: 2 Review Days, 1 Administering

Unit Title:

Unit 1: Two Variable Statistics (iM U3)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	HSS-ID.B.5	Lesson 6	HSN-Q-A.3, HSS-ID.B.6.a, HSS-ID.B.6.b,, HSS-ID.B.6.c
Lesson 2	HSS-ID.B.5	Lesson 7	HSS-ID.B.6, HSS-IDC.8
Lesson 3	HSS-ID.B.5	Lesson 8	HSS-ID.B.6,HSS-ID.B.6.a, HSS-IDC.7, HSS-IDC.8
Lesson 4	HSS-ID.B.6, HSS-ID.B.6.a, HSS-ID.C.7	Lesson 9	HSS-ID.B.6, HSS-IDC.9
Lesson 5	HSS-ID.B.6.a, HSS-ID.C.7	Lesson 10	HSS-ID.B.6, , HSS-IDC.7, HSS-IDC.8, HSS-IDC

Essential Question(s):

- How can I summarize and interpret categorical data from two-way frequency tables to identify trends and possible associations between groups?
- How do I create a scatter plot for two quantitative variables and describe the type and strength of their relationship?
- How can we use a statistical model to make predictions, and to what extent can we trust those predictions?
- What does the slope and intercept of a linear model reveal about the rate of change and starting point in the context of the data?
- What does a correlation coefficient say about the relationship between two variables?
- What is the relationship between correlation and causation?

Enduring Understanding(s):

- Two-way frequency tables organize data into joint, marginal, and conditional frequencies to reveal patterns and associations between categories.
- Scatter plots display the relationship between two quantitative variables, highlighting the type, direction, and strength of their association.
- Plotting residuals helps identify how well a chosen function fits the data and exposes any discrepancies or patterns not captured by the model.
- The slope represents the rate of change between variables, while the intercept indicates the starting point, both of which are essential for understanding the model's real-world meaning.
- The correlation coefficient quantifies the strength and direction of a linear relationship, but it is crucial to remember that correlation does not imply causation.

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 3)

CFA 2: Checkpoint B (after lesson 5)

NOTE: Consider adding a question involving finding the line of best fit using technology and making a prediction using the equation.

CFA 3: Checkpoint C (after lesson 8)

End of Unit Assessment A (after lesson 9)

NOTE: If lesson on residuals is skipped, remove question 1 and question 7 part A from the End of Unit and skip Checkpoint B part 2.

Pacing for Unit

14 Days

Lesson Modifications:

- Remove Activity 1.3: This activity can be moved to practice outside of class.
- Remove Activity 3.3: This activity invites students to invent their own data for imagined variables. It is an additional opportunity for students to explore association, but does not introduce new concepts.
- Remove Lesson 6: This lesson explores residuals. No subsequent lessons address this topic, so if time is an issue, it can be removed.
- Remove Lesson 10: This lesson is optional.

Lessons that might need to be reviewed:

- 8.6.9: Activities 2 and 3
- 8.6.3: Scatter plots
- 8.6.4: Fit lines

Family Overview

https://accessim.org/9-12-aga/algebra-1/unit-3?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

categorical variable, two-way table, variable (statistics), relative frequency table, association, residual, correlation coefficient, negative relationship, positive relationship, strong relationship, weak relationship, causal relationship

Aligned Unit Materials, Resources, and Technology

Digital Applets

- Alg1.3.4 Digital Activity 1: Orange You Glad We're Boxing Fruit?
- Alg1.3.5 Digital Activity 2: Fitting Lines with Technology
- Alg1.3.6 Digital Activity 1: Oranges Return
- Alg1.3.8 Digital Activity 1: Never Know How Far You'll Go

For whole course:

https://accessim.org/9-12-aga/algebra-1/course-guide/required-materials?a=teacher

Provide access as needed throughout the unit:

- Graphing technology (Examples of graphing technology are a handheld graphing calculator, a computer with a graphing calculator application installed, and an internet-enabled device with access to a site like desmos.com/calculator.
- Math Community Chart
- Rulers
- Tools for creating a visual display (Any way for students to create work that can be easily displayed to the class. Examples: Chart paper and markers, whiteboard space and markers, shared online drawing tool, access to a document camera.)

Lesson	Materials to Gather	Materials to Copy
1		Running to the Dentist Cards (1 copy for every 2 students): Activity 2
3	Tools for creating a visual display: Activity 2	
5	Graphing technology: Activity 2	Data Patterns Cards (1 copy for every 2 students): Activity 1
6	Graphing technology: Activity 1	Best Residuals Cards (1 copy for every 2 students): Activity 2
7	Math Community Chart: Activity 1	Scatter Plot Fit Cards (1 copy for every 2 students): Activity 1
8	Graphing technology: Activity 1	
10	• Rulers: Warm-up • Tools for creating a visual display: Activity 1	

Opportunities for Interdisciplinary Connections:

Social Studies & Civic Engagement

- Use two-way tables and relative frequency tables to analyze survey data from community or school elections. Students can explore associations between categorical variables (such as voter age groups or political affiliation) and examine the strength of relationships using the correlation coefficient.

Sports Analytics

- Analyze team or player performance data by creating two-way tables that compare categorical variables like player position or team division with performance metrics (e.g., win/loss records, points scored). Students can calculate relative frequencies and use the correlation coefficient to examine relationships.

Technology and Social Media

- Use survey data about social media usage to explore relationships between categorical variables such as preferred platform (Instagram, Twitter, etc.) and usage frequency. Create two-way tables and relative frequency tables to analyze associations and compute correlation coefficients.

Anticipated misconceptions:

- Many students think all variables are numerical or naturally ordered, not recognizing that categorical (nominal) data simply labels groups.
- Students can get confused if one table has a total and another does not or may try to apply strategies they learned for totals on a table that does not have totals.
- Students may treat relative frequencies as raw counts instead of proportions or percentages.
- Students may have trouble distinguishing between the observed data and the output predicted by the line of best fit.
- Some believe a coefficient of 0 means no relationship at all, that a high correlation implies causation, or that a negative correlation coefficient represents a weaker correlation than 0.
- Some believe that a higher slope implies a stronger correlation or a higher correlation coefficient.
- A common error is believing that correlation directly implies causation without considering other factors.
- Many students draw lines of best fit to either always start from the origin or always go through the first and last points. They may also believe a line of best fit should go through as many points as possible, even curving the line to achieve this.

See teacher's guide for specific misconceptions aligned to each

	lesson.
Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: • Create a scatter plot, and draw lines to fit data in a scatter plot. • Create and interpret a two-way table. **Relevant Unit(s)/Lesson(s) to Review:** • Grade 8 Unit 6: Associations in Data	Unit 2: Linear Equations and Systems (iM unit 2) • Graphing lines • Interpreting the slope and y-intercept Unit 3: Linear Inequalities and Systems (iM Unit 4) • Understanding constraints in data helps interpret inequality boundaries • Analyzing scatter plots prepares students to visualize feasible regions • Interpreting points above/below a line extends to understanding solution regions Unit 4: Functions (iM Unit 5) • Correlation and causation discussions prepare for understanding functional relationships • Analyzing relationships in data sets leads to formal function concepts • Interpreting key features of scatter plots extends to analyzing function graphs

Differentiation through *Universal Design for Learning*

Engagement:

- Brainstorm variable pairs to build off peer ideas
  (Lesson 9, Activity 2 Launch)

Representation:

- Use color coding and annotations to highlight connections between data tables and graphs
  (Lesson 6, Activity 1 Launch)

Action & Expression:

- Chunk tasks into manageable parts to support organizational skills
  (Lesson 1, Activity 1 Launch)

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lesson 9)
- MLR2: Collect and Display (Lesson 6)
- MLR5: Co-Craft Questions (Lesson 10)
- MLR7: Compare and Connect (Lesson 5)
- MLR8: Discussion Supports (Lessons 2, 4, 5, 6, 7, 8)

Sentence Frames and Stems

Section A

- The number of _____ that _____ is _____ because ...
- There is _____ association between _____ and _____ because ...
- The two-way table represents ...
- Using the relative frequency table, I can conclude that ... because ...

Section B

- The scatter plot appears to show a _____ association between _____ and _____ because ...
- A linear model is/is not appropriate for this scatter plot because ...
- For every _____, the number of _____ increases/decreases by _____. This means ... because ...
- The vertical intercept of the scatter plot is about _____. This means ...
- The slope of the linear model is _____ and represents ...
- The residuals of the data set are ... which mean they have _____ variability and can/cannot be represented with a line of best fit.

Section C

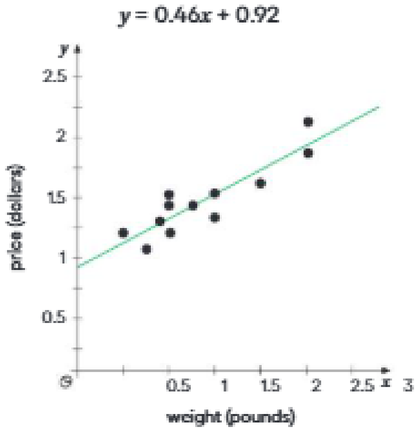
- The correlation coefficient r = _____ means the data are _____ and the scatter plot will appear …
- The data in the scatter plot have a _____ relationship and can/cannot be represented with a line of best fit.
- The relationship between _____ and _____ is/is not causal because …

Section D

- The relationship between _____ and _____ is _____ because …
- The correlation coefficient r = _____ means the data are _____ and the scatter plot will appear …
- The relationship between _____ and _____ is/is not causal because …

Unit Outline

In this unit, students use statistical methods to look for associations in bivariate data. The unit begins with students analyzing categorical data arranged in two-way tables. Students use the relative frequencies of the combinations of those categorical variables to check for evidence of any associations in the data.



The unit then transitions to bivariate numerical data, which are visualized using scatter plots and lines of best fit. Students use technology to compute the lines of best fit and observe how well the linear models match the data. Residuals and correlation coefficients are used to quantify the goodness of fit for linear models.

The unit closes with an exploration of the difference between correlation and causal relationships, and it is also an opportunity to apply this learning to areas of interest, like anthropology and sports.

In grade 8, students informally constructed scatter plots and lines of fit, noticed linear patterns, and observed associations in categorical data using two-way tables. In this unit, students build on this previous knowledge by assessing how well a linear model matches the data by using residuals as well as the correlation coefficient for best-fit lines (found using technology).

There are opportunities to practice concepts from a previous unit by interpreting the slope and intercept of a linear model in context as well as using the models to predict one variable given information about the other.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A: Two-Way Tables Lessons 1-3	**Learning Target #1** I can create relative frequency tables from information given in a two-way table or about a situation **Learning Target #2** I can inspect patterns in relative frequency tables and two-way tables to determine if there is a possible association between two variables of interest.	**Lesson 1 Two-Way Tables** ● I can calculate missing values in a two-way table. ● I can create a two-way table for categorical data given information about a situation. ● I can describe what the values in a two-way table mean in the context of the situation. Checkpoint A Problem 1 End of Unit Problem 5 **Lesson 2 Relative Frequency Tables** ● I can calculate values in a relative frequency table and describe what the values mean in everyday language. **Lesson 3 Associations in Categorical Data** ● I can look for patterns in two-way tables and relative frequency tables to see if there is a possible association between two variables. End of Unit Problem 6
Checkpoint A	Responding to Student Thinking Press Pause: If students struggle to interpret a two-way table or describe why there is no association between the variables, make time to revisit the idea of relative frequency. For example, use the practice problems referred to here to provide additional practice, and discuss them after students attempt them. Algebra 1, Unit 3, Lesson 4, Practice Problem 5 Algebra 1, Unit 3, Lesson 4, Practice Problem 6	
Section B ScatterPlots (Lessons 4-6)	**Learning Target #3** I can comprehend the connection between residuals, variability, and whether or not using a linear model is appropriate.	**Lesson 4 Linear Models** ● I can describe the rate of change and y-intercept for a linear model that represents a situation. Checkpoint B Problem 1 ● I can draw a linear model that fits the data well and use the linear model to estimate values I want to find.

	Learning Target #4 I can interpret the rate of change and vertical intercept for a linear model in the context of a situation.	**Lesson 5 Fitting Lines** ● I can describe the rate of change and y-intercept for a linear model that represents a situation. Checkpoint B End of Unit Problem 3 ● I can use technology to find the line of best fit. **Lesson 6 SKIP** ● I can plot and calculate residuals for a data set and use the information to judge whether a linear model is a good fit.
Checkpoint B	*Responding to Student Thinking* ● Points to Emphasize: If students struggle to interpret the slope and intercept of the linear model in a situation, spend more time practicing the interpretation as opportunities arise over the next few lessons. For example, in the Launch and Activity Synthesis of the activity referred to here, ask students about the meaning of the slope and intercept for the linear model. Algebra 1, Unit 3, Lesson 8, Activity 2 Never Know How Far You'll Go	
Section C: Correlation Coefficients Lessons 7-9	**Learning Target #5** I can describe the strength and sign of the relationship between variables based on the correlation coefficient. **Learning Target #6** I can investigate the relationship between two variables to analyze whether or not the relationship is causal.	**Lesson 7 The Correlation Coefficient** ● I can describe the quality of fit of a linear model using the correlation coefficient. End of Unit Problem 2 ● I can match the correlation coefficient with a scatter plot and linear model. End of Unit Problem 2 **Lesson 8 Using the COrrelation Coefficient** ● I can describe the strength of a relationship between two variables. Checkpoint C ● I can use technology to find the correlation coefficient and explain what the value tells me about a linear model that represents a situation. **Lesson 9 Causal Relationships** ● I can look for connections between two variables to analyze whether or not there is a causal relationship End of Unit Problem 4
Checkpoint C	*Responding to Student Thinking* ● Press Pause If students struggle to describe whether a relationship is causal or not, make time to revisit the idea. For example, begin the next lesson with the practice problem referred to here. Also consider asking students to look for headlines in news stories claiming a causal relationship between variables. ● Algebra 1, Unit 3, Lesson 9, Problem 3	
End of Unit Assessment		

Unit Title:

Unit 2: Linear Equations and Systems (iM U2)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	HSA-CED.A.2HSA-CED.A.3HSN-Q.A.2	Lesson 11	HSA-CED.A.4HSA-REI.D.10
Lesson 2	HSA-CED.A.2HSA-CED.A.3HSF-BF.A.1.b	Lesson 12	HSA-CED.A.3HSA-REI.AHSA-REI.C.6
Lesson 3	HSA-CED.A.2HSA-CED.A.3	Lesson 13	HSA-REI.C.6
Lesson 4	HSA-REI.AHSA-REI.B.3	Lesson 14	HSA-REI.C.6HSF-BF.A.1.b
Lesson 5	HSA-CED.A.2HSA-CED.A.3HSA-REI.D.10	Lesson 15	HSA-REI.C.6HSF-BF.A.1.b
Lesson 6	HSA-CED.A.2HSA-REI.A.1HSA-SSE.A.1	Lesson 16	HSA-REI.C.5HSA-REI.C.6HSF-BF.A.1.b
Lesson 7	HSA-REI.AHSA-REI.A.1	Lesson 17	HSA-CED.A.3HSA-REI.C.6
Lesson 8	HSA-CED.A.4HSA-REI.B.3	Lesson 18	HSA-CED.A.4HSA-REI.CHSA-REI.C.6
Lesson 9	HSA-CED.A.3HSA-CED.A.4HSA-REI.B.3	Lesson 19	HSA-CED.A.2HSA-REI.C
Lesson 10	HSA-CED.A.3HSA-CED.A.4HSA-REI.D.10HSF-IF.C.7.a		

Essential Question(s):

- How can we create equations to represent real-world situations?
- How do the properties of equality and inequality help us solve and justify solutions to equations?
- What does it mean for an equation or system to have one, infinite, or no solutions?
- How can the structure of an algebraic expression help us simplify and interpret it?
- What are the advantages of solving systems of equations graphically versus algebraically?
- How do the properties of numbers influence how we analyze and solve equations?
- What is a solution and how can we find them?
- What does it mean for two equations or systems to be equivalent?

Enduring Understanding(s):

- Mathematical models help us represent and analyze real-world situations.
- The structure of an equation or expression provides insight into its meaning and solution.
- Solving equations and systems of equations requires an understanding of equality and reasoning.
- The number and type of solutions to an equation or system provide important information about relationships.
- Using precise reasoning and mathematical properties ensures valid conclusions.
- A solution is a set of values that satisfies an equation or system, and various methods—such as substitution, elimination, or graphing—help us uncover these values.
- Transforming equations into other equivalent equations can help to find solutions or isolate a particular variable.
- Graphs are visualizations of the solution set to an equation or system of equations.

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 5)
CFA 2: Checkpoint B (after Lesson 11)
CFA 3: Checkpoint C (after Lesson 17)
End of Unit Assessment (after Lesson 17)

Pacing for Unit

21 Days

Lessons to Add or Review:

- Combine 8.4.3 and 8.4.4, particularly Activity 3 in Lesson 3 and Activities 2 and 3 in Lesson 4. Focus on the idea of using the same operation with the expressions on each side of an equation or changing the form of one of the expressions through combining like terms, applying the distributive property, and similar operations
- Combine 8.3.8 and 8.3.9. Introduce $y=mx+b$, and include an activity from Lesson 9 to introduce negative slope.
- 8.3.10: Calculating slope
- 8.3.12: Equations for horizontal and vertical lines
- 8.4.12: Solving systems by graphing

Lesson Modifications:

- Combine Lessons 1 and 2: Use an activity from Lesson 1 to introduce the idea of constraint. Remove Activity 1 from Lesson 2.
- Combine Lessons 8 and 9. (Remove 8.2 and the cool down for Lesson 8, and 9.2).
- Combine Lessons 15 and 16.

Family Overview

https://accessim.org/9-12-aga/algebra-1/unit-2?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

Aligned Unit Materials, Resources, and Technology

constraint, model, equivalent equations, solution to a system of equations, system of equations, substitution, elimination, equivalent systems

Digital Applets
- Alg1.2.5 Digital Activity 2: Graph It!
- Alg1.2.9 Digital Activity 1: Cargo Shipping

Provide access as needed throughout the unit:
- Four-function calculators
- Graphing technology
- Graph paper
- Math Community Chart
- Spreadsheet technology

Lesson	Materials to Gather	Materials to Copy
1	Math Community Chart: Warm-up	
3	Math Community Chart: Warm-up	
5	Graphing technology: Activity 2	
6	Four-function calculators: Activity 2	
8	Four-function calculators: Activity 1	
9	• Four-function calculators: Activity 1 • Spreadsheet technology: Activity 1	
12	Graphing technology: Activity 1, Activity 2	
14	Graphing technology: Activity 2	
15	Graphing technology: Activity 1, Activity 2	
16	Graphing technology: Warm-up, Activity 1	What Comes Next Cards (1 copy for every 2 students): Activity 2
17	Graphing technology: Warm-up, Activity 1	Sorting System Cards (1 copy for every 2 students): Activity 2
18		Linear Systems Cards (1 copy for every 2 students): Activity 2
19	• Graph paper: Activity 1 • Graphing technology: Activity 1	

Opportunities for Interdisciplinary Connections:

Science (Physics & Biology)
- Speed & Acceleration: Writing and solving equations to analyze motion, such as car speeds or running distances.
- Population Growth: Using exponential functions to model bacteria growth or human population changes.

Health & PE
- Exercise & Heart Rate Zones: Using inequalities to determine safe heart rate ranges during workouts.
- Calories & Nutrition: Writing equations to analyze food intake and energy burned.

Business & Financial Literacy
- Loan & Interest Calculations: Using exponential equations to model credit card interest and loan payments.

Anticipated misconceptions:

- Students struggle to correctly define variables and set up equations from word problems.
- Students assume every equation has a single solution and do not recognize no-solution or infinite-solution cases.
- Students believe expressions can be solved like equations, failing to differentiate between simplifying and solving.
- Students do not recognize parallel lines as systems with no solution or identical lines as having infinitely many solutions.
- Students view the equal sign procedurally rather than as a statement of equivalence between two expressions.
- Students often fail to realize they have solved for a variable if they do not get a numerical answer.

See teacher's guide for specific misconceptions aligned to each lesson.

Computer Science

- Coding Basics: Using algebraic expressions in simple coding projects (e.g., game design or automation).

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Solving equations by rewriting them using operations that do not change the equivalence, combining like terms, and applying the distributive property.
- Graphing equations in slope-intercept form and interpreting the slope and vertical intercept in context.
- Solving systems of equations by graphing.

Relevant Units to Review

Grade 7 Bridge

- Unit 4: Equations and Inequalities (G7 ACC U3)
- Unit 5: Expressions and More Equations (G7 ACC U4)
- Unit 8: Linear Relationships (G7 ACC U5)

Connections to Future Units:

Connection to Unit 2: Two-Variable Statistics

- Linear equations from Unit 1 become the basis for linear regression models
- Understanding slope and y-intercept helps students interpret correlation and line of best fit
- Graphing linear equations prepares students to analyze scatter plots and residuals

Connection to Unit 3: Linear Inequalities and Systems

- Methods for solving equations extend to solving inequalities
- Understanding solution sets of equations prepares students for solution regions of inequalities
- System solving strategies adapt to systems of inequalities

Connection to Unit 4: Functions

- Linear equations serve as the first and simplest example of functions
- Input-output relationships in equations become function notation
- Graphing skills extend to analyzing key features of all functions

Connection to Unit 5: Exponential Functions

- Linear growth (constant rate) contrasts with exponential growth (constant ratio)
- Understanding rate of change helps distinguish linear vs. exponential relationships
- Equation solving strategies adapt to exponential equations

Connection to Unit 8: Quadratic Functions

- Linear terms appear within quadratic expressions
- Understanding how to rewrite linear expressions helps with factoring quadratics
- Graphing skills extend to parabolas, with linear functions as a simpler case

Differentiation through *Universal Design for Learning*

Engagement:

- Leverage choice around perceived challenge in tank problems (Lesson 8, Activity 2 Launch)

Representation:

- Create visible connections between mathematical symbols and their real-world meanings (Lesson 1, Activity 2 Launch)

Action & Expression:

- Support working memory with sticky notes or mini whiteboards (Lesson 7, Warm-up Launch)

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:
MLR1: Stronger and Clearer Each Time (Lessons 2, 5, 11, 14)
MLR2: Collect and Display (Lessons 2, 6, 10, 12)
MLR3: Clarify, Critique, Correct (Lessons 3, 14)
MLR4: Information Gap (Lesson 18)
MLR5: Co-Craft Questions (Lessons 4, 10, 18)

MLR6: Three Reads (Lessons 5, 9, 12, 15, 17, 18)
MLR7: Compare and Connect (Lessons 1, 5, 8, 12, 13, 16)
MLR8: Discussion Supports (Lessons 2, 6, 7, 12, 16, 18)

Sentence Frames and Stems

Section A

- _____ is the solution to the equation _____ because ...
- In this situation _____ represents a constraint because ... This means the solution must be _____.
- The equation _____ represents this situation because ...
- In the equation _____, the variable _____ represents _____ and has a value of _____.
- I used the point _____ on the graph to help me answer this question because ...

Section B

- To solve the equation _____ for _____ (variable), first I _____, then I ...
- The equation _____ is equivalent to the equation _____ because ...
- The equation _____ can be represented by the graph because ...
- On the graph of the line, the vertical/horizontal intercept of the line is _____. In this context the point represents ...
- I rearranged the equation _____ to the equivalent equation _____, and found the slope to be _____ which represents ...

Section C

- I know the system of equations has _____ solution(s) because ...
- I chose to solve this system of equations by _____ because ...
- To solve the system of equations, first I _____, then I ...
- On the graph, I can see the solution to the system is _____ because ...

Section D

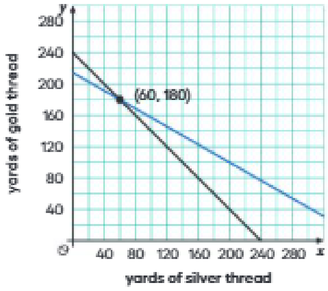
- The equation _____, paired with the given equation _____, creates a system with _____ solution(s) because ...
- To solve the equation _____ for _____ (variable), first I _____, then I ...

Unit Outline

In this unit, students examine solving and graphing linear equations and systems of linear equations.

The unit builds on learning from middle school when students used variables to write equations, manipulated equations using valid moves such as the distributive property, and solved basic systems of linear equations using graphs and substitution.

In the first section, students recall writing equations to represent situations. In the second section, they use valid moves to write equivalent equations that can be used to solve for unknown values or to isolate variables. The third section examines solving systems of equations using graphs, substitution for variables, and elimination of variables. Students use their understanding of writing equivalent equations to understand why each of the methods works for finding the solution.



Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Writing and Modeling with Equations Lesson 1-5	**Learning Target #1** I can interpret solutions to equations in one variable and in two variables. **Learning Target #2** I can recognize that the graph of a linear equation in two variables represents all pairs of values that are solutions to the equation.	**Lesson 1 Planning a Party** - I can explain the meaning of the term "constraints." - I can tell which quantities in a situation can vary and which ones cannot. **Lesson 2 Writing Equations to Model Relationships (Part 1)** - I can tell which quantities in a situation can vary and which ones cannot. Checkpoint A Problem 1 End of Unit Problem 4 *NOTES: End of Unit Problem 4* *Consider changing to a different scenario.* *Idea: Although you can buy an "8in" pizza, the cost structure is not "per inch" in real pizza shops.* *Option 1: Their experience buying pizza is sm, med, lg. Change the verbiage to sm, med, lg* *Option 2: Change the scenario to something where the cost structure is per inch* *Note: IM may be including the number 8 to see if students use that value in their calculations. We can still include extra, irrelevant numerical information in the new scenario.*

		● I can use letters and numbers to write expressions representing the quantities in a situation. Checkpoint A Problem 1 **Lesson 3 Writing Equations to Model Relationships (Part 2)** ● I can use words and equations to describe the patterns I see in a table of values or in a set of calculations. ● When given a description of a situation, I can use representations like diagrams and tables to help make sense of the situation and write equations for it. **Lesson 4 Equations and Their Solutions** ● I can explain what it means for a value or pair of values to be a solution to an equation. ● I can find solutions to equations by reasoning about a situation or by using algebra. **Lesson 5: Equations and Their Graphs (optional)** ● I can use graphing technology to graph linear equations and identify solutions to the equations. ● I can explain how the coordinates of the points on the graph of a linear equation are related to the equation. ● When given the graph of a linear equation, I can explain the meaning of the points on the graph in terms of the situation it represents. Checkpoint A Problem 2
Checkpoint A	*Responding to Student Thinking* More Chances: Students will have more opportunities to develop this understanding in later sections. There is no need to slow down or add additional work to review this concept at this time.	
Section B Manipulating Equations and Understanding Their Structure Lessons 6-11	**Learning Target #3** I can determine the slope and vertical intercept of the graphs of linear equations by making use of structure or by rearranging the equations. **Learning Target #4** I can rearrange multi-variable equations to highlight a particular quantity. **Learning Target #5** I can recognize that "equivalent equations" are equations that have exactly the same solutions, and that multiple equivalent equations can represent the same relationship.	**Lesson 6 Equivalent Equations** ● I can tell whether two expressions are equivalent and explain why or why not. Checkpoint B Problem 1 End of Unit Problem 1 *NOTES: End of Unit Problem 1* *Many students are unable to demonstrate that they understand legal moves because of the complexity of fractions.* *Idea: Would prefer a similar question with different equations so students can show they know what equivalent equations mean. Compare with Checkpoint B problem 1.* ● I know and can identify the moves that can be made to transform an equation into an equivalent one. ● I can explain what it means for two equations to be equivalent, and how equivalent equations can be used to describe the same situation in different ways. **Lesson 7 Explaining Steps for Rewriting Equations** ● I can explain why some algebraic moves create equivalent equations but some do not. ● I know how equivalent equations are related to the steps of solving equations. ● I know what it means for an equation to have no solutions and can recognize such an equation. **Lesson 8 Which Variable to Solve for? (Part 1)** ● Given an equation, I can solve for a particular variable (like height, time, or length) when the equation would be more useful in that form.

		Checkpoint B Problem 2 End of Unit Problem 2 • I know the meaning of the phrase “to solve for a variable.” **Lesson 9 Which Variable to Solve for? (Part 2)** • I can write an equation to describe a situation that involves multiple quantities whose values are not known, and then solve the equation for a particular variable. Checkpoint B Problem 2 End of Unit Problem 2 • I know how solving for a variable can be used to quickly calculate the values of that variable. **Lesson 10 Connecting Equations to Graphs (Part 1)** • I can describe the connections between an equation of the form ax + by = c, the features of its graph, and the rate of change in the situation. Checkpoint B Problem 2 End of Unit Problem 3 *NOTES: End of Unit Problem 3* *For options ‘c’ and ‘d”* *This concept of “If we increase x by a then we must decrease y by b” does not correspond to any activity in the unit. The closest is lesson 10 activity 2 in which slope is discussed as the change in y when x changes by 1, but this is not the same.* *Idea: This could be resolved by inserting extra practice problems or an activity about the change in y value for changes in x value greater than 1 in Lesson 10.* • I can graph a linear equation of the form ax + by = c • I explain how rewriting the equation for a line in different forms can make it easier to find certain kinds of information about the relationship and about the graph. **Lesson 11 Connecting Equations to Graphs (Part 2)** • I can find the slope and vertical intercept of a line with equation ax + by = c Checkpoint B Problem C • I can take an equation of the form ax + by = c and rearrange it into the equivalent form y = mx + b • I can use a variety of strategies to find the slope and vertical intercept of the graph of a linear equation given in different forms.
Checkpoint B	*Responding to Student Thinking* • More Chances: Students will have more opportunities to develop this understanding in later sections. There is no need to slow down or add additional work to review this concept at this time.	
Section C Systems of Linear Equations in Two Variables Lessons 12-17	**Learning Target #6** I can determine whether a system of equations will have 0, 1, or infinitely many solutions by analyzing their structure or by graphing. **Learning Target #7** I can use elimination or substitution to create one or more equivalent systems to help solve the original system.	**Lesson 12 Writing and Graphing Systems of Linear Equations** • I can explain what we mean by “the solution to a system of linear equations” and can explain how the solution is represented graphically. • I can explain what we mean when we refer to two equations as a system of equations. • I can use tables and graphs to solve systems of equations. End of Unit Problem 5

NOTES: End of Unit Problem 5
The success criterion is recognizing that the solution is the intersection, but this question assumes fluency in graphing lines in multiple forms with mixed fractions, which is not possible to do on Edulastic/Pear Assessment.
Idea: (1) Allow graphing calculator on End of Unit (2) Change the equations so that the intercepts and the solution are all whole numbers. This would also make it graphable on Pear Assessment, allowing us to track student understanding year over year.
For example, this system has the same complexity and is graphable on edulastic.
$y=-12x+9$ $5x - 4y = 20$ Sol: (8, 2)

Lesson 13 Solving Systems by Substitution

- I can solve systems of equations by substituting a variable or an expression.
- I know more than one way to perform substitution and can decide which way or what to substitute based on how the given equations are written.

End of Unit Problem 6
NOTES: End of Unit Problem 6
A student who has mastered elimination and substitution but has not mastered rearranging an equation first will not be able to demonstrate their learning and would receive no credit.
Idea: (1) Separate into two questions, one where they need to rearrange (just rearrange, not solve) and then a second question where they are given one question in $y=mx+b$ form and one in standard form.

Lesson 14 Solving Systems by Elimination (Part 1)

- I can solve systems of equations by adding or subtracting them to eliminate a variable.
- I know that adding or subtracting equations in a system creates a new equation, where one of the solutions to this equation is the solution to the system.

End of Unit Problem 7
NOTES: End of Unit Problem 7
The language is not accessible for many students
Idea: Change the question so that students solve it first (this way they are demonstrating the ability to use both substitution and elimination on the test), keep part A, drop part B

Lesson 15 Solving Systems by Elimination (Part 2)

- I can explain why adding or subtracting two equations that share a solution results in a new equation that also shares the same solution.

End of Unit Problem 7

Lesson 16 Solving Systems by Elimination (Part 3)

- I can solve systems of equations by multiplying each side of one or both equations by a factor, then adding or subtracting the equations to eliminate a variable.

Checkpoint C Problem 1
End of Unit Problem 6

- I can explain why multiplying each side of an equation by a factor creates an equivalent equation whose

		graph and solutions are the same as that of the original equation. **Lesson 17 Systems of Linear Equations and Their Solutions** ● I can tell how many solutions a system has by graphing the equations or by analyzing the parts of the equations and considering how they affect the features of the graphs. Checkpoint C Problem 2 ● I know the possibilities for the number of solutions a system of equations could have.
Checkpoint C	*Responding to Student Thinking* ● Points to Emphasize: If most students struggle to identify the number of solutions for a system of equations, plan to use all or part of this optional lesson: Algebra 1, Unit 2, Lesson 18 Asking About Solving Systems	
Section D Let's Put it to Work Lessons 18-19 **SKIP**	**Learning Target #8** Analyze given information about a situation involving multiple linear equations, and determine what additional information is needed to solve problems. **Learning Target #9** Create a pattern using linear equations. **Learning Target #10** Solve, without graphing, systems of equations created by peers.	**Lesson 18 Asking About Solving Systems** ● I can get more information about a problem in order to write and solve a system of linear equations. ● I can solve linear equations algebraically. ● I can write linear equations to create a pattern. **Lesson 19 Linear Patterns** ● I can get more information about a problem in order to write and solve a system of linear equations. ● I can solve linear equations algebraically. ● I can write linear equations to create a pattern.
End of Unit Assessment		

Unit Title:

Unit 3: Linear Inequalities and Systems (iM U4)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	HSA-CED.A.3	Lesson 6	HSA-CED.A.3HSA-REI.D.12
Lesson 2	HSA-REI.B.3	Lesson 7	HSA-CED.A.3HSA-REI.D.12
Lesson 3	HSA-CED.A.1HSA-CED.A.3HSA-REI.B.3	Lesson 8	HSA-REI.D.12
Lesson 4	HSA-REI.D.12	Lesson 9	HSA-CED.A.3HSA-REI.D.12HSN-Q.A.2
Lesson 5	HSA-CED.A.3HSA-REI.D.10HSA-REI.D.12		

Essential Question(s):

- How can I create equations and inequalities to represent real-world situations?
- In what ways do the solutions of equations and inequalities help us understand and solve problems in context?
- What strategies can I use to solve linear equations and inequalities, including those with lettered coefficients, and how do I choose the best one?
- How do I find and represent a solution set?

Enduring Understanding(s):

- Equations and inequalities serve as powerful models that represent real-world situations by translating constraints and relationships into a mathematical language.
- Solving equations and inequalities in one variable means finding all values that satisfy the given condition, whether through methods like balancing, substitution, or graphing.
- Mathematical solutions must be interpreted in light of the original problem, ensuring that the answer is meaningful and accurately reflects the real-world scenario.
- Clear reasoning and communication in creating, solving, and interpreting equations and inequalities form the basis for effective problem solving and informed decision-making in real-world contexts.
- Inequalities can be defined by their boundary and the region (relative to the boundary) that contains the solution set. This extends both to solving and to graphing one- and two-variable inequalities.
- Solution set of systems of inequalities in two variables is composed of any pair of values that make both inequalities true.

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 3)
CFA 2: Checkpoint B (after Lesson 6)
Checkpoint C (after lesson 9): Opportunity for feedback
End of Unit Assessment A (after lesson 19)

Pacing for Unit

13 Days

Lesson to Review/Add:

- 7.6.13
- 7.6.15

Lesson Modifications:

- Lesson 9: Complete outside of class.

Family Overview

https://accessim.org/9-12-aga/algebra-1/unit-4?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

Solution set , Half-plane, Boundary line, Dashed line, Solid line , Shaded region, System of linear inequalities, Solution region, Constraint, Viable solution, Nonviable solution, Equivalent inequalities, Related equation

Aligned Unit Materials, Resources, and Technology

Digital Applets

- Alg1.4.2 Digital Activity: More or Less?

Provide access as needed throughout the unit:

- Colored pencils
- Graphing technology
- Math Community Chart
- Tools for creating a visual display (Any way for students to create work that can be easily displayed to the class. Examples: Chart paper and markers, whiteboard space and markers, shared online drawing tool, access to a document camera.)

Lessons	Materials to Gather	Materials to Copy

4	Colored pencils: Activity 1	
6	Graphing technology: Warm-up, Activity 1	Representations of Inequalities Cards (1 copy for every 2 students): Activity 2
7	Graphing technology: Warm-up, Activity 1, Activity 2	
8	Math Community Chart: Activity 2	Terms of A Team Cards (1 copy for every 2 students): Activity 2
9	Graphing technology: Activity 2 Tools for creating a visual display: Activity 2	

Opportunities for Interdisciplinary Connections:

Science (Physics)
- Students model linear motion by writing an equation for the distance traveled over time using real-world speed and time data.
- Apply Newton’s Second Law by setting up and solving equations to analyze force, mass, and acceleration in different scenarios.
- Phase diagrams in chemistry are systems of linear inequalities. (future grade levels)

Social Studies
- Students create a monthly budget by writing equations and inequalities for income, expenses, and savings.
- Analyze break-even points for small businesses using a system of equations to compare revenue and costs.
- Use supply and demand models to explore real-world pricing and economic decision-making.

Health & PE
- Students track their daily caloric intake and exercise expenditure by writing equations to model energy balance.
- Compare different diet plans and workout regimens using a system of equations to determine optimal nutrition.
- Create inequalities to determine if a person meets nutritional guidelines while staying within calorie limits.

Anticipated misconceptions:

- Many students believe the direction of the inequality sign (< or >) will always be the same after solving or rearranging the inequality.
- Students often misread word problems, overlook key constraints, or choose inappropriate variables, leading to incomplete or incorrect equations.
- Students may follow rote steps without understanding inverse operations, causing errors in maintaining equivalence.
- Students often expect a single point solution instead of a region (often on the intersection of the boundaries), mix up open/closed boundaries, or misinterpret “and” vs. “or,” leading to errors in graphing feasible regions.
- Some students believe that a number is not a solution to an inclusive inequality if the numbers are not equal.
- Many students interpret “at least” to mean “less than” and “at most” to mean “more than” when in fact it is the opposite.

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- Solve inequalities by reasoning about quantities
- Solve linear equations and systems of equations by writing equivalent equations.

Relevant Unit(s)/Lesson(s) to Review:
- Grade 7 Unit 6: Expressions, Equations, and Inequalities

Connections to Future Units:

Connection to Unit 3: Linear Inequalities and Systems
- Understanding constraints in data helps interpret inequality boundaries
- Analyzing scatter plots prepares students to visualize feasible regions
- Interpreting points above/below a line extends to understanding solution regions

Connection to Unit 4: Functions
- Correlation and causation discussions prepare for understanding functional relationships
- Analyzing relationships in data sets leads to formal function concepts
- Interpreting key features of scatter plots extends to analyzing function graphs

Connection to Unit 5: Exponential Functions
- Residual analysis helps distinguish linear from exponential patterns
- Understanding "goodness of fit" helps choose

appropriate models

- Data analysis skills extend to exploring exponential relationships

Connection to Unit 6: Quadratic Functions

- Pattern recognition in data prepares for identifying quadratic relationships
- Understanding that not all relationships are linear prepares for quadratic modeling
- Skill Transfer: extends to parabolic relationships

Differentiation through *Universal Design for Learning*

Engagement:

- Encourage peer interaction and provide sentence frames for constraint modeling
- (Lesson 7, Activity 1 Launch)

Representation:

- Use diagrams to visualize "at most" or "at least" constraints
- (Lesson 3, Activity 1 Student Task Statement)

Action & Expression:

- Invite students to plan strategies and choose appropriate tools before testing solutions
- (Lesson 8, Activity 1 Launch)

Supporting Multilingual Learners

Math Language Routines

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MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR2: Collect and Display (Lesson 1)
- MLR4: Information Gap (Lesson 8)
- MLR5: Co-Craft Questions (Lessons 2, 3)
- MLR6: Three Reads (Lessons 1, 5, 7, 9)
- MLR7: Compare and Connect (Lessons 3, 6, 9)
- MLR8: Discussion Supports (Lessons 2, 4, 7, 8)

Sentence Frames and Stems

Section A

- The related equation _____ helped me see that _____ is/is not a solution to the inequality _____ because ...
- The value _____ is/is not a solution to the inequality _____ because ...
- The inequality _____ represents this situation because ...
- To solve the inequality for all possible values of _____, first I _____, then I ...

Section B

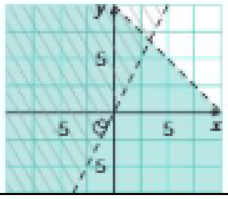
- The inequality _____ represents this situation because ...
- The point _____ is/is not a solution to the inequality because ...
- To graph the solution to the inequality ____, first I _____, then I ...

Section C

- The pair of values _____ is a solution to the system of inequalities _____ because ...
- I noticed that ... This means that the system of inequalities _____ has _____ solution(s).
- The system of inequalities _____ represents this situation because ...

Unit Outline

In this unit, students examine solving and graphing linear inequalities and systems of linear inequalities.



The unit builds on concepts from middle school when students write and solve inequalities by reasoning about quantities. It further builds on concepts from an earlier unit in which students solve linear equations and systems of equations by writing equivalent equations.

To start, students solve linear inequalities in one variable and graph the solutions on a number line by writing equivalent inequalities. In the second section, they solve linear inequalities with two variables by looking at the related equation, graphing it on a coordinate plane, and testing points on either side of the line to determine the solution region. The third section is about solving systems of linear inequalities considering multiple linear inequalities as conditions for situations and finding a solution region that satisfies all of the inequalities.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A: Linear Inequalities in One Variable Lessons 1-3	**Learning Target #1** Use a related equation to solve an inequality in one variable. **Learning Target #2** Write and solve inequalities in one variable to represent the constraints in situations and to solve problems.	**Lesson 1 Representing Situations with Inequalities** • I can write inequalities that represent the constraints in a situation. **Lesson 2 Solutions to Inequalities in One Variable** • I can graph the solution to an inequality in one variable. • I can solve one-variable inequalities and interpret the solutions in terms of the situation. • I understand that the solution to an inequality is a range of values (such as $x>7$) that makes the inequality true. **Lesson 3 Writing and Solving Inequalities in One Variable** • I can analyze the structure of an inequality in one variable to help determine if the solution is greater or less than the solution to the related equation. • I can write and solve inequalities to answer questions about a situation.
Checkpoint A	*Responding to Student Thinking* Points to Emphasize: If students struggle to solve and graph an inequality in 1 variable, provide additional practice throughout the unit. For example, use the practice problems referred to here to discuss solutions. Algebra 1, Unit 4, Lesson 4, Practice Problem 10 Algebra 1, Unit 4, Lesson 5, Practice Problem 7 More Chances: Students will have more opportunities to develop this understanding in later sections. There is no need to slow down or add additional work to review this concept at this time.	
Section B: Linear Inequalities in Two Variables Lessons 4-6	**Learning Target #3** Understand that a constraint on two variables can be represented by an inequality, a graph (a half-plane), and a verbal description. **Learning Target #4** Write inequalities in two variables to represent the constraints in a situation, and use technology to graph the solution set to answer questions about the situation.	**Lesson 4 Graphing Linear Inequalities in Two Variables (Part 1)** • Given a two-variable inequality and the graph of the related equation, I can determine on which side of the line the solutions to the inequality will fall. • I can describe the graph that represents the solutions to a linear inequality in two variables. **Lesson 5 Graphing Linear Inequalities in Two Variables (Part 2)** • Given a two-variable inequality that represents a situation, I can interpret points in the coordinate plane and decide if they are solutions to the inequality. • I can find the solutions to a two-variable inequality by using the graph of a related two-variable equation. • I can write inequalities to describe the constraints in a situation. **Lesson 6 Solving Problems with Inequalities in Two Variables** • I can use graphing technology to find the solution to a two-variable inequality. • When given inequalities, graphs, and descriptions that represent the constraints in a situation, I can connect the different representations and interpret them in terms of the situation..
Checkpoint B	*Responding to Student Thinking* *More Chances: Students will have more opportunities to develop this understanding in later sections. There is no need to slow down or add additional work to review this concept at this time.*	
Section C: Systems of Linear Inequalities in Two Variables Lessons 7-9	**Learning Target #5** Given a system of inequalities and their graphs, explain how to tell if a pair of values is a solution to the system.	**Lesson 7 Solutions to Linear Systems of Inequalities in Two Variables** • I can write a system of inequalities to describe a situation, find the solution by graphing, and interpret points in the solution.

	Learning Target #6 Understand that the solution set of a system of inequalities in two variables is composed of any pair of values that make both inequalities true, and that it is represented graphically by the region where the graphs overlap.	● I know what is meant by "the solutions to a system of inequalities" and can describe the graphs that represent the solutions. ● When given descriptions and graphs that represent two different constraints, I can find values that satisfy each constraint individually, and values that satisfy both constraints at once. **Lesson 8 Solving Problems with Systems of Linear Inequalities in Two Variables** ● I can explain how to tell if a point on the boundary of the graph of the solutions to a system of inequalities is a solution or not. **Lesson 9 Modeling with Systems of Inequalities in Two Variables** ● I can interpret inequalities and graphs in a mathematical model. ● I know how to choose variables, specify the constraints, and write inequalities to create a mathematical model.
Checkpoint C	*Responding to Student Thinking* Points to Emphasize: If students struggle to write a system of inequalities to represent the situation, consider using modeling prompts to help students identify variables and write relationships. For example, in the referred-to modeling prompt, students might use inequalities to write a system involving a worker's annual salary (Algebra 1, Modeling prompt: Giving Bonuses)	
End of Unit Assessment		

Unit Title:

Unit 4: Functions (iM U5)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	HSF-IF.A.1, HSF-IF.B.4	Lesson 10	HSF-IF.B, HSF-IF.B.5
Lesson 2	HSF-IF.A.1, HSF-IF.A.2, HSF-IF.B.4	Lesson 11	HSF-IF.B.4, HSF-IF.B.5
Lesson 3	HSF-IF.A.2, HSF-IF.B.4	Lesson 12	HSF-IF.A.2, HSF-IF.B.5, HSF-IF.C, HSF-IF.C.7, HSF-IF.C.7.b
Lesson 4	HSF-BF.A.1.a, HSF-IF.A.1, HSF-IF.A.2, HSF-IF.B.4, HSF-IF.C	Lesson 13	HSA-CED.A.1, HSF-IF.C, HSF-IF.C.7.b
Lesson 5	HSA-REI.A.1, HSF-IF.A.2, HSF-IF.B.4	Lesson 14	HSF-BF.A.1, HSF-BF.A.1.a, HSF-BF.B.3, HSF-IF.C, HSF-IF.C.7.b
Lesson 6	HSF-IF.B.4	Lesson 15	HSF-BF.B.4
Lesson 7	HSF-IF.B.6	Lesson 16	HSA-CED.A.4, HSF-BF.B.4
Lesson 8	HSF-IF.B.4, HSF-IF.B.6	Lesson 17	HSF-BF.A.1, HSF-BF.B.4, HSF-BF.B.4.a, HSF-IF.A.2, HSF-IF.B.4, HSS-ID.B.6.a, HSS-ID.B.6.c
Lesson 9	HSA-REI.D.11, HSF-IF.B.4, HSF-IF.B.6	Lesson 18	HSF-BF.A.1, HSF-IF.B.6, HSS-ID.B.6.a, HSS-ID.B.6.c

Essential Question(s):

- How can we use function notation, graphs, and equations to describe relationships between quantities in the real world?
- What key features of a graph (like intercepts, maximums, minimums, and intervals of increase or decrease) help us understand the story a function tells?
- How do we calculate and interpret the average rate of change of a function, and what does it tell us about the relationship between two quantities?
- What makes a relationship a function, and how can we determine if a function has an inverse that is also a function?

Enduring Understanding(s):

- Function Notation, Graphs, and Equations: Function notation, graphs, and equations are powerful tools for describing relationships between quantities, allowing us to model real-world situations and interpret how changes in one quantity affect another.
- Key Features of Graphs: The key features of a graph, such as intercepts, maximums, minimums, and intervals of increase or decrease, help us understand the behavior and story a function tells about a real-world situation, revealing how the relationship between variables changes over time or under different conditions.
- Average Rate of Change: The average rate of change of a function, represented by the slope over an interval, helps us quantify how one quantity changes in relation to another and provides insight into the strength and direction of their relationship over that interval.
- Function Definition and Inverses: A relationship is a function when each input corresponds to exactly one output. Understanding domain and range is essential for determining whether a function has an inverse, and whether that inverse is also a function, which allows us to solve for unknowns in different contexts.
- Non-Linear Functions: Not all situations are easily represented by linear equations. Piecewise functions, step functions, and absolute value functions can be useful to represent or model a wider range of situations.

Demonstration of Learning:

Checkpoint A (after Lesson 5): Opportunity for Feedback
CFA 1: Checkpoint B (after Lesson 9)
Mid-unit Assessment (after Lesson 9)
Checkpoint C (after Lesson 12): Opportunity for Feedback
CFA 2: Checkpoint D (after Lesson 16)
Checkpoint E (after lesson 19): Opportunity for Feedback
End-of-Unit Assessment (after Lesson 20)

Pacing for Unit

24 Days

Lessons to Add/Review:

- 8.5.2
- 8.5.3

Lesson Modifications:

- Combine Lessons 13 and 14, by completing Lesson 14 Activities 2 and 3 outside of class.
- Lesson 18: Complete outside of class.

Family Overview

https://accessim.org/9-12-aga/algebra-1/unit-5?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

Dependent variable, independent variable, function, function notation, linear function, maximum, minimum, horizontal intercept, vertical intercept, average rate of change, domain, range, piecewise function, absolute value, vertex, inverse function

Aligned Unit Materials, Resources, and Technology

Digital Applets
- Alg1.5.5 Digital Activity 2: Function Notation and Graphing Technology
- Alg1.5.8 Digital Activity: Flag Raising (Part 1): Are You Ready for More?
- Alg1.5.14 Digital Activity 2: Moving Graphs Around

Provide access as needed throughout the unit:
- Blank paper
- Glue or glue sticks
- Graphing technology
- Math Community Chart
- Scientific calculators

Lessons	Materials to Gather	Materials to Copy
6	Graphing technology: Activity 2	
10		Possible or Impossible Cards (1 copy for every 2 students): Activity 1
12	• Blank paper: Activity 3 • Glue or glue sticks: Activity 3	Piecing It Together Cards (1 copy for every 2 students): Activity 3
13		How Good Are Your Guesses Handout (1 copy for every 1 student): Activity 1
14	Graphing technology: Activity 3	
15	Scientific calculators: Lesson	
17	Scientific calculators: Lesson	Caesar Says, "Shift" Cutouts (1 copy for every 2 students): Activity 2
18	Math Community Chart: Activity 2	Custom Mugs Cards (1 copy for every 2 students): Activity 2
19	• Scientific calculators: Activity 1 • Graphing technology: Activity 3	

Opportunities for Interdisciplinary Connections:

Science (Physical Science, Earth Science)
- In physical science, students learn about speed, velocity, and acceleration—concepts that can be modeled with linear functions.
- In physical science, students learn about using Kelvin to measure temperature and in math they learn how to use functions and their inverse to convert back and forth from kelvin and celsius.

Social Studies /Civics
- Functions apply to economic trends, such as tracking the relationship between minimum wage and employment rates or supply and demand.

Health & PE
- In PE, students could model heart rate during exercise, where different stages (rest, exercise, recovery) are modeled with a piecewise function.

Anticipated misconceptions:

- Understanding the dependent variable (output) if a function of the independent variable (input)
- Interpreting function notation in the context of a problem, especially when only the input or output is given (not both).
- Understanding that function notation “f(x)” is not multiplication of two variables
- Representing a word problems as a mathematical model, such as an equation in function notation
- Understanding what a function or its inverse gives you within a context
- Predicting future results based on the average rate of change, including understanding of it as a rate
- Rewriting a function as its inverse.
- Graphing a piecewise function that is not a step function

See teacher's guide for specific misconceptions aligned to each lesson.

Visual Arts and Music
- Transformations of graphs (shifts, reflections, stretches) tie directly to transformations in art (moving shapes on a canvas or stretching images).

Career and Technical Education
- In business, students can create profit functions that model how income changes based on sales.
- In construction or engineering, students can graph relationships like material costs vs. project size.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- Understand the meaning of function as a rule with exactly one output for each allowable input.
- Understand independent and dependent variables and how they relate to functions.

Relevant Unit(s)/Lesson(s) to Review:

Grade 7 Bridge
- Unit 9: Functions and Volume (G7 ACC U6)

Connections to Future Units:

Connection to Unit 4: Functions
- Understanding domain restrictions from inequalities connects to function domains
- Graphing regions above/below lines prepares for understanding piecewise functions
- Interpreting solution regions builds intuition for function behavior in different intervals

Connection to Unit 5: Exponential Functions
- Constraints from inequalities help define meaningful domains for exponential contexts
- Understanding bounded regions connects to asymptotic behavior
- Solving inequalities with variables extends to exponential inequalities

Connection to Unit 6: Quadratic Functions
- Linear inequality concepts extend to quadratic inequalities
- Understanding regions above/below lines prepares for regions above/below parabolas
- Systems thinking extends to systems with quadratic functions

Differentiation through *Universal Design for Learning*

Engagement:
- Support peer collaboration through sentence frames during function discussions (Lesson 3, Activity 1 Launch)

Representation:
- Use physical objects (like a 3D prop for a dog's leash) to model movement (Lesson 1, Activity 1 Launch)

Action & Expression:
- Provide a blank two-column table to organize information before modeling (Lesson 20, Activity 2 Student Task Statement)

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:
- MLR1: Stronger and Clearer Each Time (Lessons 7, 8, 12, 14, 15, 20)
- MLR2: Collect and Display (Lessons 2, 9, 11, 12, 13, 17)
- MLR3: Clarify, Critique, Correct (Lesson 2)
- MLR4: Information Gap (Lessons 14, 18)
- MLR5: Co-Craft Questions (Lessons 6, 9, 19)
- MLR6: Three Reads (Lessons 1, 13, 17)
- MLR7: Compare and Connect (Lessons 8, 13, 18, 20)
- MLR8: Discussion Supports (Lessons 1, 4, 5, 9, 10, 11, 12, 14, 18, 19)

Sentence Frames and Stems

Section A

- In the function _____, the independent variable is _____ because … and the dependent variable is _____ because …
- The function _____ represents this situation/graph because …
- The value of the output is _____ when the input is ____, and can be represented in function notation as _____.

Section B

- On the graph, the average rate of change of the function from _____ to _____ is _____.
- Between _____ and _____, the _____ is _____.
- The value(s) of the _____ (feature of the graph) is/are _____.
- For the function _____, the value of the output is _____ when the input is _____.
- To sketch a graph of _____, I thought about _____, which meant I should draw …

Section C

- In this situation, the rule is _____ which means the input is _____ to get the output.
- _____ is a/n possible/impossible input because …
- The domain of the function is _____ because …
- The range of the function is _____ because …

Section D

- The domain/range of the absolute value function _____ is _____ because …
- The function _____ represents this situation/graph because …
- For the function _____, the value of the output is _____ when the input is _____.
- The solution(s) to the equation _____ is/are _____.

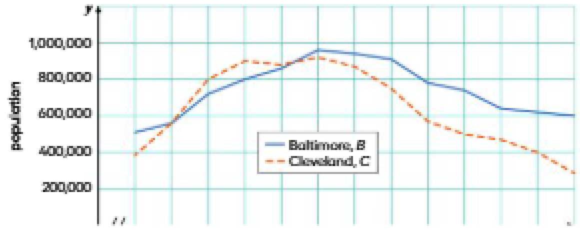
Section E

- The equation _____ represents the inverse function of the relationship between _____ and _____ because …
- The inverse function _____ is helpful in this situation because …
- To get the inverse function, first I _____, then I …

Section F

- I used the equation _____ to model the situation because …
- I changed my prediction from _____ to _____ because …
- The average rate of change between _____ and _____ is _____ which means …

Unit Outline



In this unit, students expand and deepen their understanding of functions. They begin with a reminder of the definition of a function (a rule that assigns exactly one output to each input) that they previously saw in grade 8, then get familiar with function notation and use it to compare and analyze functions, write rules for functions, and solve for inputs or outputs.

Then, students explore graphs of functions to describe features such as “maximum,” “minimum,” “intercepts,” “increasing,” “decreasing,” and “average rate of change” and make connections between the graphs and real-life situations. They use situations to discuss the domain and range of a function and make sense of piecewise-defined functions. In particular, students examine the absolute value function and some basic transformations of it. Later, students explore inverses of linear functions as a way to find corresponding input values when output values are known. Throughout the unit, students have chances to mathematically model real-world situations.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A: Functions and Their Representations Lessons 1-5	**Learning Target #1** Sketch a graph of a function given statements in function notation. **Learning Target #2** Understand that a relationship between two quantities is a function if there is only one possible output for each input. **Learning Target #3** Write equations that represent rules using function notation.	**Lesson 1 Describing and Graphing Situations** • I can explain when a relationship between two quantities i function. Checkpoint A Problem 1 *NOTES: Checkpoint A Problem 1* *Consider changing the scenarios to more student friendly relationship* • I can identify independent and dependent variables in a function and use words and graphs to represent the functi • I can make sense of descriptions and graphs of functions a explain what they tell us about situations. **Lesson 2 Function Notation** • I can use function notation to express functions that have specific inputs and outputs.

		• I understand what function notation is and why it exists. • When given a statement written in function notation, I can explain what it means in terms of a situation. Middle of Unit Problem 1 Middle of Unit Problem 4 **Lesson 3 Interpreting and Using Function Notation** • I can describe the connections between a statement in function notation and the graph of the function. Middle of Unit Problem 2 Middle of Unit Problem 5 Checkpoint B Problem 1 • I can use function notation to efficiently represent a relationship between two quantities in a situation. Checkpoint B Problem 2 *NOTE: Checkpoint B Problem 2* *Add a table/graph with values for students to calculate average rate of change, not just write an expression.* • I can use statements in function notation to sketch a grap a function. **Lesson 4 Using Function Notation to Describe Rules (Part 1)** • I can make sense of rules of functions when they are writte in function notation, and create tables and graphs to represent the functions. Middle of Unit Problem 6 • I can write equations that represent the rules of functions. Checkpoint A Problem 2 Middle of Unit Problem 4 Middle of Unit Problem 6 NOTES: Middle of Unit Problem 6 Students need more exposure to situations like this example with rice. **Lesson 5 Using Function Notation to Describe Rules (Part 2)** • I can use technology to graph a function given in function notation and use the graph to find the values of the functi • I know different ways to find the value of a function and to solve equations written in function notation. • I know what makes a function a linear function.
Checkpoint A	*Responding to Student Thinking* • **Question 1:** Points to Emphasize If students struggle to determine if the relationships are functions, reinforce the idea throughout the unit. For example, as students work with functions in the lesson referred to here, ask students why the relationships are functions and to provide a similar relationship that is not a function. Algebra 1, Unit 5, Lesson 6 Features of Graphs • **Question 2:** More Chances Students will have more opportunities to develop this understanding in late sections. There is no need to slow down or add additional work to review this concept at this time.	
Section B: Analyzing and Creating Graphs of Functions Lessons 6-9	**Learning Target #4** Given a graph of a function, estimate or calculate the average rate of change over a specified interval. **Learning Target #5** Interpret key features of a graph—the intercepts, maximums, minimums, and intervals when the function is increasing or decreasing—in terms of a situation.	**Lesson 6 Features of Graphs** • I can identify important features of graphs of functions an explain what they mean in the situations represented. Middle of Unit Problem 3 • I understand and can use the terms “horizontal intercept,” “vertical intercept,” “maximum,” and “minimum” when talk about functions and their graphs. Checkpoint B Problem 1 Middle of Unit Problem 3 **Lesson 7 Using Graphs to Find Average Rate of Change** • I understand the meaning of the term “average rate of change.” Middle of Unit Problem 7

	Learning Target #6 Interpret statements about two or more functions written in function notation.	*NOTE: Middle of Unit Problem 7* *Make Part b. one year and not an interval of years.* - When given a graph of a function, I can estimate or calcula the average rate of change between two points. Middle of Unit Problem 7 **Lesson 8 Interpreting and Creating Graphs** - I can explain the average rate of change of a function in terms of a situation. Middle of Unit Problem 7 - I can make sense of important features of a graph and explain what they mean in a situation. - When given a description or a visual representation of a situation, I can sketch a graph that shows important featur of the situation. **Lesson 9 Comparing Graphs** - I can compare the features of graphs of functions and exp what they mean in the situations represented. - I can make sense of an equation of the form - in terms of a situation and a graph, and know how to find t solutions. - I can make sense of statements about two or more functio when they are written in function notation.
Checkpoint B	*Responding to Student Thinking* - **Problem 1:** Points to Emphasize: If students struggle to identify important features of a graph, revisit th ideas whenever graphs are used throughout the rest of the unit. For example, in the activity referred to here, ask students about maxima, minima, and intercepts. Algebra 1, Unit 5, Lesson 11, Activity 2 Back to the Bouncing Ball - **Problem 2:** Points to Emphasize: If students struggle to write an expression for average rate of change, revisit the idea by asking students to compute the average rate of change for particular intervals of functions. For example, in the Warm-up of the activity referred to here, ask about the average rates of change from 0 to 8 ounces, 8 to 12 ounces, and 0 to 12 ounces, and note the difference in the context o piecewise functions. Algebra 1, Unit 5, Lesson 12, Warm-up Frozen Yogurt	
Section C: A Closer Look at Inputs and Outputs Lessons 10-14	**Learning Target #7** Interpret an absolute value function described in words or in function notation, and create a table of values and a graph to represent the function. **Learning Target #8** Interpret the graph of a piecewise function or its rules given in function notation, and explain the rules (orally and in writing) in terms of a situation. **Learning Target #9** Understand that the domain of a function is the set of all possible inputs and the range is the set of all possible outputs.	**Lesson 10 Domain and Range (Part 1)** - I know what is meant by the “domain” and “range” of a function. Checkpoint C Problem 1 *NOTE: Checkpoint C Problem 1:* *At a minimum (SG), change order of questions to c, a ,b. Students do not describe domain and range of functions in the lesson, they also do not graph an absolute value function by hand without a table.* Checkpoint C Problem 2 *NOTE: Checkpoint C Problem 2* *Same issue as Problem 1. Students have not determined domain and range from a piecewise function.* End of Unit Problem 1 - When given a description of a function in a situation, I can determine a reasonable domain and range for the function Checkpoint C Problem 1 Checkpoint C Problem 2 End of Unit Problem 1 *NOTE: End of Unit Problem 1:* *The graph is misleading to determine the range.* **Lesson 11 Domain and Range (Part21)** - When given a description of a function in a situation, I can determine a reasonable domain and range for the function Checkpoint C Problem 1

		Checkpoint C Problem 2 **Lesson 12 Piecewise Functions** ● I can make sense of a graph of a piecewise function in ter of a situation and sketch a graph of the function when the rules are given. End of Unit Problem 5 End of Unit Problem 7 NOTE: End of Unit Problem 7 Change y-axis label to Total Cost instead of Cost ● I can make sense of the rules of a piecewise function whe they are written in function notation and explain what they mean in the situation represented. Checkpoint C Problem 2 End of Unit Problem 5 ● I understand what makes a function a piecewise function. **Lesson 13 Absolute Value Functions (Part 1)** ● Given a set of numerical guesses and a target number, I ca calculate absolute errors and create a scatter plot of the d End of Unit Problem 2 ● I can analyze and describe features of a scatter plot that shows absolute error data. ● I can describe the general relationship between guesses a absolute errors using words or equations. End of Unit Problem 2 **Lesson 14 Absolute Value Functions (Part 2)** ● I can describe the effects of adding a number to the expression that defines an absolute value function. Checkpoint C Problem 1 End of Unit Problem 3 ● I can explain the meaning of absolute value function in ter of distance. ● When given an absolute value function in words or in funct notation, I can make sense of it and create a table of value and a graph to represent it.
Checkpoint C	*Responding to Student Thinking* ● Points to Emphasize: If students struggle to describe the domain and range of the function,revisit this i using the functions throughout the rest of the unit. For example, in the activity referred to here, ask students what a reasonable domain and range might be for temperatures in the area in the two measurement systems. Algebra 1, Unit 5, Lesson 18, Activity 1 From Celsius to Fahrenheit	
Mid-Unit Assessment		

Section D: Inverse Functions Lessons 15 - 19	**Learning Target #10** Find the inverse of a linear function by solving an equation for the input variable. **Learning Target #11** Write a linear function and an inverse function to model data and solve problems.	**Lesson 15 Solving Equations with Absolute Values** ● I understand the meaning of "inverse function" and how it could be found. Checkpoint D Problem 1 End of Unit Problem 4 ● When given a linear function that represents a situation, I c use words and equations to describe the inverse function. Checkpoint C Problem 1 **Lesson 16 Solving Inequalities with Absolute Values** ● I can explain the meaning of an inverse function in terms o situation. End of Unit Problem 6 ● When I have an equation that defines a linear function, I kn how to find its inverse. Checkpoint C Problem 1 End of Unit Problem 4 **Lesson 17 Inverse Functions** ● I can write a linear function to model given data and find th inverse of the function. ● When given a linear function defined using function notati I know how to find its inverse. End of Unit Problem 6 **Lesson 18 Finding and Interpreting Inverse Functions** ● I can use functions to model data and make predictions. **Lesson 19 Writing Inverse Functions to Solve Problems** ● I can write a linear function to model given data and find th inverse of the function. ● When given a linear function defined using function notati I know how to find its inverse.
Checkpoint D	*Responding to Student Thinking* ● **Problem 1:** Press Pause: If students struggle to graph the absolute value function, make time to revisit how to transform a graph by looking at the function. For example, use the practice problems referred to here to provide additional practice. Algebra 1, Unit 5, Lesson 14, Practice Problem 2 Algebra 1, Unit 5, Lesson 14, Practice Problem 4 ● **Problem 2:** Press Pause: If students struggle to solve absolute value equations and inequalities, and it i important standard for the course, make time to revisit the different methods for solving. For example, the practice problems referred to here to provide additional practice. Algebra 1, Unit 5, Lesson 16, Practice Problem 2 Algebra 1, Unit 5, Lesson 15, Practice Problem 5	
Section E: Let's Put It to Work Lesson 20	**Learning Target #12** Use functions to model real-life situations and make predictions.	**Lesson 20: Using Functions to Model Battery Power** ● Let's use functions to model data and make predictions.
End of Unit Assessment		

Unit Title:

Unit 5: Exponents and Scientific Notation (G8 U7)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	None Listed	Lesson 9	8.EE.A.3
Lesson 2	8.EE.A.1	Lesson 10	8.EE.A.3,8.EE.A.4
Lesson 3	8.EE.A.1	Lesson 11	8.EE.A.1, 8.EE.A.3, 8.EE.A.4
Lesson 4	8.EE.A.1	Lesson 12	8.EE.A.3, 8.EE.A.4
Lesson 5	8.EE.A.1	Lesson 13	8.EE.A.4
Lesson 6	8.EE.A.1	Lesson 14	8.EE.A.1, 8.EE.A.3, 8.EE.A.4
Lesson 7	8.EE.A.1	Lesson 15	8.EE.A.4
Lesson 8	8.EE.A.1	Lesson 16	8.EE.A.3, 8.EE.A.4

Essential Question(s):

- How can we use exponents to describe repeated multiplication more efficiently?
- What does the exponent tell us, and what does the base tell us?
- Why does a number raised to the power of 0 equal 1?
- When we multiply powers with the same base, what happens to the exponents, and why?
- How are the rules for multiplying and dividing powers related?
- What does it mean to raise a power to another power?
- How do exponent rules help us rewrite expressions in simpler or more useful forms?
- What does a negative exponent actually mean, and how is it different from a negative number?
- How can we use powers of 10 to represent very large and very small numbers?
- How can a number line help us understand the relationships between powers of 10?
- What is scientific notation, and why is it a useful way to represent numbers?
- How can we use scientific notation and estimation to compare or analyze real-world quantities?

Enduring Understanding(s):

- Exponents provide an efficient notation for repeated multiplication, where the base represents the factor being multiplied and the exponent represents how many times it is multiplied.
- The rules for operating with exponents (product rule, quotient rule, power of a power) are not arbitrary shortcuts—they emerge logically from the fundamental properties of multiplication and can be verified by expanding expressions.
- A negative exponent indicates division (or taking a reciprocal), not a negative quantity. The expression a^{-n} means $\frac{1}{a^n}$, and this definition extends the exponent rules consistently.
- Any large or small number can be expressed as a multiple of a power of 10. This equivalence allows us to move fluidly between standard form, exponential expressions, and scientific notation, and helps us compare and estimate quantities of different magnitudes.
- Scientific notation (writing a number as $ax10^n$ where $1 \leq a < 10$ is a universal standard that allows us to represent, compare, and compute with very large and very small numbers efficiently. It makes the magnitude of numbers transparent and computation manageable.

Demonstration of Learning:

Checkpoint A (after lesson 5): Opportunity for Feedback
CFA 1: Checkpoint B (after lesson 8)
Checkpoint C (after lesson 12): Opportunity for Feedback
CFA 2: Checkpoint D (after lesson 15)
EoU: Assessment A (after lesson 16)

Pacing for Unit

20 Days

Lessons to Add/Review:

- None

Lesson Modifications:

- Move to outside of class 8.7.16: culminating lesson incorporating work from the unit

Family Overview

https://accessim.org/6-8/grade-8/unit-7?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

Base (of an exponent), exponent, reciprocal, scientific notation

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.7.1 Activity 2: Doubling Coins
- 8.7.2 Activity 2 Applet: Zoom
- 8.7.10 Activity 1 & 2 Applets: Comparing Large Numbers with a Number Line, The Speeds of Light

Provide access as needed throughout the unit:

- Blank paper
- Math Community Chart
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
8	Tools for creating a visual display: Activity 2	
9		Using Powers of 10 to Describe Cards (1 copy for every 6 students): Activity 2
12	Math Community Chart: Activity 1	
13	Blank paper	Scientific Notation Matching Cards (1 copy for every 4 students): Activity 2
14		Distances in the Solar System Cards (1 copy for every 4 students): Activity 2
16		Old Hardware New Hardware Handout (1 copy for every 2 students): Activity 1

Opportunities for Interdisciplinary Connections:

Chemistry & Atomic Structure

- Lesson connection: Lessons 5 and 11 focus on negative exponents and very small numbers, providing foundational understanding for chemistry contexts.

Earth Science

- Lesson connection: Lessons 12-15 apply scientific notation to real-world measurement and comparison situations.

Reading Scientific Texts

- Orders of magnitude reasoning: Articles often describe quantities as "thousands," "millions," or "billions." Students connect these verbal descriptions to scientific notation and understand relative sizes.
- Lesson connection: Lesson 14 on estimating with scientific notation prepares students to read and understand these texts critically.

Measurement and Estimation in Medical and Health Contexts

Dosing & Pharmacology

- Medication dosages: Some medications are dosed in micrograms (grams) or nanograms (grams) per kilogram of body weight. Students use negative exponents and scientific notation to calculate appropriate doses.
- Lesson connection: Lessons 11-15 support calculations with very small quantities expressed in scientific notation.

Anticipated misconceptions:

- Students may confuse different exponent rules (mixing up the product rule and power of a power rule)
- Overgeneralization from procedures they've learned (if multiplication is involved, multiply all numbers)
- The same rule applies whether you're multiplying or raising to a power
- Confusion about parentheses and what they mean
- Since division is the opposite of multiplication, maybe division of exponents is the opposite operation (divide instead of add)
- Overgeneralization: "divide the numbers" without thinking about what exponents represent
- The negative sign in the exponent makes the result negative
- 10^{-3} is the "opposite" of 10^{3}, meaning it's negative
- Confusion between 10^{-3} and -10^{3}
- Exponent of 0 means "nothing," so the answer is 0
- Any way of writing a number as a power of 10 is acceptable
- They may not understand that scientific notation has a specific, standardized form
- Not recognizing that addition requires like terms
- Confusion about how negative exponents relate to decimal place movement
- Incorrect direction of decimal movement (moving right instead of left, or vice versa) or amount of movement
- The base determines the size, not the exponent
- A large exponent doesn't matter if the base is small

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Expressions that have positive whole-number exponents and whole-number, fraction, or variable bases

Connections to Future Units:

Algebra Unit 6- Introduction to Exponential Functions.

Relevant Unit(s)/Lesson(s) to Review:
- Grade 6 Unit 6: Expressions and Exponents

Differentiation through *Universal Design for Learning*

Representation:
- Access for Perception by reading problems aloud to partners for extra processing time (Lesson 16, Activity 2 Launch)

Action & Expression:
- Chunk tasks and support use of structure when deciding which power of 10 to use (Lesson 11, Activity 2 Launch)

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:
- MLR1: Stronger and Clearer Each Time (Lesson 8)
- MLR2: Collect and Display (Lessons 2, 3, 6, 9)
- MLR3: Clarify, Critique, Correct (Lesson 4)
- MLR4: Information Gap (Lesson 14)
- MLR5: Co-Craft Questions (Lesson 10)
- MLR6: Three Reads (Lesson 1)
- MLR7: Compare and Connect (Lessons 1, 4, 16)
- MLR8: Discussion Supports (Lessons 5, 6, 11, 12, 13, 15, 16)

Sentence Frames and Stems

Section A
- The expression _____ is equivalent to _____ because …
- Using the rule for _____ powers, I know that _____ is equal to _____.
- The rule for _____ powers makes sense because …

Section B
- The expression _____ is equivalent to _____ because …
- Using the rule for _____ powers, I know that _____ is equal to _____.
- To simplify the expression with powers _____, first I _____, then I …

Section C
- Using scientific notation, the value _____ can be represented as _____.
- It’s helpful to be able to write values like _____ as _____ using scientific notation because …
- Using a number line to plot the value _____ given in scientific notation, I must first _____, then I …
- I used the expression _____ to represent this scenario and found the value of _____ to be _____.

Section D
- I know the value _____ is/is not written in scientific notation because …
- I used the expression _____ to represent this scenario and found the value of _____ to be _____.

Section E
- I know _____ can store _____ times as much as Apollo because …
- The _____ processor is _____ times as fast as the Apollo.
- _____ has _____ times the memory of the Apollo.

Unit Outline

In this unit, students deepen their understanding of exponents, powers of 10, and place value before being introduced to scientific notation. They build on work done in a previous course where students focused on whole-number exponents with whole-number, fraction, decimal, or variable bases, but did not formulate rules regarding the use of exponents.

$a^n \cdot a^m = a^{n+m}$	$(a^n)^m = a^{n \cdot m}$
$\frac{a^n}{a^m} = a^{n-m}$	$a^0 = 1$
$a^{-n} = \frac{1}{a^n}$	$a^n \cdot a^m = (a \cdot b)^n$

Students begin this unit by identifying patterns that emerge when multiplying and dividing powers of 10, and when raising powers of 10 to another power. Students generalize these patterns to develop exponent rules. They extend these rules to see why 10^0 must be equal to 1 and to understand what negative exponents mean.

Next, students determine that the rules developed for powers of 10 also work with other bases, as long as the bases in both expressions are the same. They observe a new rule that applies when multiplying bases that are different if the exponents are the same.

In the next section, students return to working with powers of 10 as they use multiples of powers of 10 to describe magnitudes of very large and very small quantities, such as the distance from Earth to the sun in kilometers or the mass of a proton in grams. Students plot these large and small values on number lines labeled using exponents and see how these numbers can be expressed in different ways — for example as $75 \cdot 10^5$ or $7.5 \cdot 10^6$.

After building a foundation connecting powers of 10 with place value, students are finally introduced to scientific notation as a specific and useful way of writing numbers as a power of 10. They compute sums, differences, products, and quotients of numbers written in scientific notation to make additive and multiplicative comparisons, estimate quantities, and make measurement conversions.

Lesson Sequence	**Learning Target(s)**	**Success Criteria/Assessment**
Section A Exponent Rules (Lessons 1-5)	**Learning Target #1** Use exponent rules to generate equivalent numerical expressions for powers of 10.	**Lesson 1 Exponent Review** • I can use exponents to describe repeated multiplication. • I understand the meaning of a term with an expone **Lesson 2 Multiplying Powers of 10** • I can explain and use a rule for multiplying powers of 10. **Lesson 3 Powers of Powers of 10** • I can explain and use a rule for raising a power of 10 to a power. **Lesson 4 Dividing Powers of 10** • I can evaluate 100 and explain why it makes sense. • I can explain and use a rule for dividing powers of 10. **Lesson 5 Negative Exponents with Powers of 10** • I can use the exponent rules with negative exponents. • I know what it means if 10 is raised to a negative power.
Checkpoint A	*Responding to Student Thinking* More Chances: Students will have more opportunities to develop this understanding in later lessons. There is need to slow down or add additional work to review this concept at this time.	
Section B More Exponents Rules (Lessons 6-8)	**Learning Target #2** Use exponent rules to generate equivalent numerical expressions for expressions with different bases and bases other than 10.	**Lesson 6 What About Other Bases** • I can use the exponent rules for bases other than 10. **Lesson 7 Practice with Rational Bases** • I can change an expression with a negative exponent into an equivalent expression with a positive exponent. • I can choose an appropriate exponent rule to rewrite an expressio to have a single exponent. **Lesson 8 Combining Bases** • I can use and explain a rule for multiplying terms that have differe bases but the same exponent.
Checkpoint B	*Responding to Student Thinking* • **Problem 1:** Points to Emphasize: If most students struggle with identifying equivalent exponential expressions, revisit the exponent rules in this practice problem: • **Problem 2:** Points to Emphasize: If most students struggle with multiplying expressions with different bases, revisit this concept in this practice problem: Grade 8, Unit 7, Lesson 10, Practice Problem 6 • **Problem 3:** Points to Emphasize: If most students struggle with explaining why expressions with differe bases can not be multiplied if they do not have the same exponent, revisit this concept in this practice problem: Grade 8, Unit 7, Lesson 14, Practice Problem 5	
Section C Large and Small Numbers	**Learning Target #3** Compare very large or very small quantities expressed as a multiple of a power of 10. **Learning Target #4** Use exponent rules and powers of 10 to solve problems in context..	**Lesson 9 Describing Large and Small Numbers Using Powers of** • Given a very large or very small number, I can write an expression equal to it using a power of 10. **Lesson 10 Representing Large Numbers on the Number Line** • I can plot a multiple of a power of 10 on such a number line. • I can subdivide and label a number line between 0 and a power of with a positive exponent into 10 equal intervals. • I can write a large number as a multiple of a power of 10. **Lesson 11 Representing Small Numbers on the Number Line** • I can plot a multiple of a power of 10 on such a number line. • I can subdivide and label a number line between 0 and a power of with a negative exponent into 10 equal intervals.

		● I can write a small number as a multiple of a power of 10. **Lesson 12 Applications of Arithmetic with Powers of 10** ● I can apply what I learned about powers of 10 to answer question about real-world situations.
Checkpoint C	*Responding to Student Thinking* ● **Problem 1:** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time. ● **Problem 2:** More Chances	
Section D Scientific Notation (Lessons 13-15)	**Learning Target #5** Calculate with numbers in scientific notation and interpret them in context.. **Learning Target #10** Identify numbers written in scientific notation, including scientific notation that has been generated by technology.	**Lesson 13 Definition of Scientific Notation** ● I can tell whether or not a number is written in scientific notation. **Lesson 14 Estimating with Scientific Notation** ● I can multiply and divide numbers given in scientific notation. ● I can use scientific notation and estimation to compare very larg very small numbers. **Lesson 15 Adding and Subtracting with Scientific Notation** ● I can add and subtract numbers given in scientific notation.
Checkpoint D	*Responding to Student Thinking* ● **Problem 1:** Press Pause: If most students struggle with identifying numbers written in scientific notatio make time to revisit related work in the lesson referred to here. See the Course Guide for ideas to help students re-engage with earlier work Grade 8, Unit 7, Lesson 13 Definition of Scientific Notation ● **Problem 2:** Press Pause: If most students struggle with arithmetic with numbers written in scientific notation, make time to revisit related work in the lesson referred to here. See the Course Guide for idea help students re-engage with earlier work. Grade 8, Unit 7, Lesson 15 Adding and Subtracting with Scientific Notation	
Section E Let's Put it to Work (Lessons 16)	**Learning Target #11** Use scientific notation to compare quantities in context, and describe (orally) how using scientific notation helps with making comparisons between very large and very small quantities.	**Lesson 16 Is a Smartphone Enough to Go to the Moon?** ● I can use scientific notation to compare different amounts and answer questions about real-world situations
End of Unit Assessment		

Unit Title:

Unit 6: Introduction to Exponential Functions (iM U6)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	HSF-IF.B.4, HSF-LE.A.3	Lesson 13	HSF-IF.B.6
Lesson 2	HSF-BF.A.1.a, HSF-IF.B.4, HSF-IF.C.9	Lesson 14	HSF-BF.A.1, HSF-IF.A.2, HSF-IF.B.4, HSF-IF.B.5, HSF-LE.A.1, HSF-LE.A.1.c, HSF-LE.A.2, HSF-LE.B.5, HSN-Q.A.1, HSN-Q.A.3, HSS-ID.B.6.a
Lesson 3	HSA-CED.A.2, HSF-BF.A.1.a, HSF-LE.B.5	Lesson 15	HSF-IF.B.4, HSF-IF.C.9, HSF-LE.B.5
Lesson 4	HSA-CED.A.2, HSF-IF.B.4, HSF-LE.B.5	Lesson 16	HSF-IF.B.4, HSF-LE.A.2, HSF-LE.B.5
Lesson 5	HSA-CED.A.2, HSA-SSE.A.1, HSF-BF.A.1.a, HSF-LE.B.5	Lesson 17	None listed
Lesson 6	HSA-CED.A.2, HSF-IF.B.4, HSF-IF.C.9	Lesson 18	HSF-BF.A.1, HSF-BF.A.1.a, HSF-IF.B.6, HSF-IF.C.7.e, HSF-LE.A.2
Lesson 7	HSA-CED.A.2, HSA-SSE.A.1, HSN-Q.A.1	Lesson 19	HSF-BF.A.1.a
Lesson 8	HSN-RN.A	Lesson 20	HSA-SSE.A, HSA-SSE.A.1, HSF-BF.A.1.a, HSF-IF.A.2, HSN-Q.A.2
Lesson 9	HSN-RN.A	Lesson 21	HSA-SSE.A.1.b, HSA-SSE.B.3.c, HSF-IF.A.2, HSF-IF.C.8, HSF-IF.C.8.b
Lesson 10	HSN-RN.A	Lesson 22	HSF-IF.A.2, HSF-IF.B.4, HSF-IF.B.5, HSF-LE.A. HSF-LE.A.2, HSF-LE.A.3
Lesson 11	HSF-IF.A.2, HSF-IF.B, HSF-IF.B.5, HSF-IF.C.7, HSF-LE.A.2, HSN-Q.A.1	Lesson 23	HSF-LE.A.1.a, HSF-LE.A.1.b, HSF-LE.A.2
Lesson 12	HSA-SSE.A, HSF-IF.A.2, HSF-IF.B.5, HSF-IF.C.7.e, HSF-LE.A.2	Lesson 24	HSF-LE.A.1, HSF-LE.A.1.b, HSF-LE.A.1.c, HSF-LE.A.2, HSN-Q.A.3, HSS-ID.B.6.a

Essential Question(s):

- How can mathematical expressions, equations, and inequalities be used to model and solve real-world problems?
- What patterns and relationships exist in different types of functions (linear and exponential), and how do their graphs represent these relationships?
- How do the key features of functions (such as intercepts, domain, range, increasing/decreasing behavior) help us analyze and compare different types of functions?
- How can properties of exponents be used to simplify expressions, solve equations, and model exponential growth and decay?
- How can we distinguish between situations modeled by linear and exponential functions, and what real-world problems are best represented by each?

Enduring Understanding(s):

- Functions describe relationships between variables and can be represented algebraically, graphically, numerically, and verbally.
- Exponential functions model situations in which a number repeatedly multiplies or divides (or increases or decreases by a set percentage of the total).
- The characteristics of functions, such as intercepts and growth factors, help us analyze and compare different types of functions and their real-world applications.
- Patterns in different types of functions help us determine how quantities change over time and predict future values.
- The structure of algebraic expressions can be analyzed and rewritten to reveal important information about functions and their graphs.
- Exponential functions model real-world situations such as population growth, radioactive decay, and financial investments, and their properties can be understood through transformations and logarithmic relationships.

Demonstration of Learning:

Checkpoint A (after Lesson 2): Opportunity for Feedback
Checkpoint B (after Lesson 6): Opportunity for Feedback
CFA 1: Checkpoint C (after Lesson 10)
Checkpoint D (after Lesson 16): Opportunity for Feedback
Mid-Unit Assessment (after Lesson 16)
CFA 2: Checkpoint Section E (after Lesson 21)
Checkpoint F (after Lesson 23 : Opportunity for Feedback
Checkpoint G (after Lesson 24): Opportunity for Feedback
End-of-Unit Assessment (after Lesson 24)

Pacing for Unit

25 Days

Lessons to Review/Add:

- 8.7 Lessons 2–4: Emphasize Lesson 2 Activity 2, Lesson 3 Activity 1, and Lesson 4 Activity 1. Students can complete practice problems or other activities outside of class. Note that Algebra 1 Lesson 3 provides additional opportunities to review these concepts.
- 8.7 Lessons 5–6: Emphasize the meaning of negative exponents, and the idea that exponent laws for 10 apply to all numbers. Assign practice problems for outside of class work.

Lesson Modifications:

- Lessons 8, 9, 10, 16, 17 are optional
- Omit Lesson 20. This lesson explores how exponential functions grow over equal intervals. It is not essential for the successful completion of this course and will be addressed in more detail in Algebra 2.
- Omit Lesson 21. In this lesson students apply their learning from the unit to model different populations with linear and exponential functions. While it provides an opportunity to consolidate learning from the unit, it does not introduce new topics.

Family Overview

https://accessim.org/9-12-aga/algebra-1/unit-6?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)

Unit-specific Vocabulary:

dependent variable, function, independent variable, function notation, linear function, decreasing (function), horizontal intercept, increasing (function), maximum (of a function), minimum (of a function), vertical intercept, average rate of change, domain, range (of a function), piecewise function, absolute value, vertex (of a graph), inverse (function)

Aligned Unit Materials, Resources, and Technology

Provide access as needed throughout the unit:

- A collection of balls that bounce
- Blank paper
- Graphing technology
- Math Community Chart
- Measuring tapes
- Scientific calculators
- Spreadsheet technology
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
1	• Scientific calculators: Activity 1 • Spreadsheet technology: Activity 1	
2	Spreadsheet technology: Activity 1	
6		Matching Descriptions to Graphs Cards (1 copy for every 2 students): Activity 2
7	Graphing technology: Activity 2	
11	Graphing technology: Activity 1, Activity 3	
12	• Blank paper: Activity 2 • Graphing technology: Activity 2	Smartphone Sales Cards (1 copy for every 2 students): Activity 2
4	• A collection of balls that bounce: Activity 2 • Measuring tapes: Activity 2	
15	Graphing technology: Activity 1, Activity 2	
16	Graphing technology: Activity 1, Activity 2	
18	Graphing technology: Activity 2	
20	Math Community Chart: Activity 1	
22	Graphing technology: Activity 1, Activity 2	

Opportunities for Interdisciplinary Connections:

Science

Anticipated misconceptions:

- Many students interpret the exponent as multiplication

- Functions describe real-world scientific phenomena such as population growth, radioactive decay, and projectile motion. Exponential functions model bacteria growth and decay, while quadratic functions describe the trajectory of objects in physics and engineering.

Social Studies

- Exponential functions model financial growth, such as compound interest, and demographic trends, such as population growth or decline.

Health & Physical Education

- Functions model heart rate recovery after exercise, which follows an exponential decay pattern, helping students understand cardiovascular health. Distance-time graphs in sports measure speed and endurance, connecting math to athletic performance and health science.

Personal Finance

- Many activities refer to investments and debt, both of which grow exponentially.

- Students may conflate an increase of n% with a growth factor of n.
- Students often confuse x^2 and 2^x.
- Students often use the decay rather than 1-decay as the growth factor for exponential decay.
- Students often assume that all functions grow at a constant rate, leading them to misinterpret exponential growth as linear growth or vice versa.
- Students may confuse t = 0 and t = 1.
- Students may believe that any growth factor that is a fraction represents exponential decay because they assume all fractions are less than one.
- Students may conflate 1.05 and 1.5 or think that 1.5 is ⅕ or 1 ⅕

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Percent change
- Exponents

Relevant Unit(s)/Lesson(s) to Review:

- Grade 8 Unit 7: Exponents and Scientific Notation
- Grade 7 Unit 4: Proportional Relationships and Percentages

Connections to Future Units:

Connection to Unit 6: Quadratic Functions

- Understanding of non-linear growth patterns extends to quadratic growth
- Work with exponents transfers to squared terms in quadratic expressions
- Experience with curved graphs prepares for parabolas
- Comparing rates of change at different points prepares for varying rates in quadratics
- Understanding y-intercept as initial value continues with quadratic contexts
- Experience with multiple representations (graphs, tables, equations) transfers to quadratics
- Analyzing key features of graphs (intercepts, increasing/decreasing) extends to parabolas
- Interpreting parameters in context continues with quadratic models
- Using technology to explore graphs carries forward

Differentiation through *Universal Design for Learning*

Engagement:

- Chunk tasks by inviting students to choose one specific graph to analyze first (Lesson 7, Activity 2 Launch)

Representation:

- Provide a timeline to connect positive and negative exponents to specific years (Lesson 7, Activity 1 Launch)

Action & Expression:

- Provide tools like a blank table or graphing software to calculate total balances (Lesson 20, Activity 2 Launch)

Supporting Multilingual Learners

Math Language Routines

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MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 1, 7, 10, 20)
- MLR2: Collect and Display (Lessons 3, 5, 6, 11, 15, 21)
- MLR3: Clarify, Critique, Correct (Lesson 23)

- MLR4: Information Gap (Lesson 14)
- MLR5: Co-Craft Questions (Lessons 14, 16, 20)
- MLR6: Three Reads (Lessons 1, 18, 22)
- MLR7: Compare and Connect (Lessons 22, 24)
- MLR8: Discussion Supports (Lessons 2, 3, 4, 6, 11, 15, 17, 21)

Sentence Frames and Stems

Section A

- I used the _____ (representation/tool) to determine this is a/an _____ relationship.
- In the _____ function, the constant difference/factor is _____ because ...
- The equation _____ represents this situation because ...
- The _____ is _____ by _____ each _____, so the relationship is _____.

Section B

- The equation _____ represents this situation because ...
- I can connect the equation to the graph by ...
- In this situation, there is a starting value of _____ with a growth factor of _____.
- On the graph of the exponential equation _____, the a value is _____ and can be found _____. The b value is _____ and can be found _____.
- This situation represents exponential growth/decay because the growth factor is _____ which means ...

Section C

- In this situation, the exponent _____ in the equation _____ means ...
- The value of the exponential expression _____ when the exponent is _____ is _____.
- The simplified value of the algebraic expression is _____ because ...

Section D

- The function _____ represents this situation because ...
- The graph of the situation should be discrete/continuous because ...
- For the function _____, the value of the output is _____ when the input is _____.

Section E

- The function _____ represents a _____ percent increase applied _____ times.
- The amount of _____ after _____ year(s) will be _____ because ...
- Since the interest is compounded _____ (time interval) at _____ percent, we can _____ to find _____.

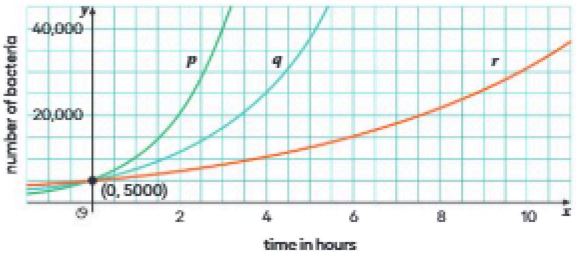
Section F

- For the function _____, the rate of change from _____ to _____ is _____.
- The function _____ is _____ because ...

Unit Outline

In this unit, students build on their understanding of linear functions, properties of exponents, and percent change to explore exponential relationships. Students learn that exponential relationships are characterized by a constant quotient over equal intervals, and compare it to linear relationships, which are characterized by a constant difference over equal intervals. They encounter contexts that change exponentially. These contexts are presented verbally and with tables and graphs. They construct equations and use them to model situations and solve problems. At first, students investigate these exponential relationships without using function notation and language so that they can focus on gaining an appreciation for critical properties and characteristics of exponential relationships.

Later, students view these relationships as functions and employ the notation and terminology of functions. They study graphs of exponential functions both in terms of contexts that they represent and abstract functions that don't represent a particular context, observing the effect of different values of a and b on the graph of the function f represented by $f(x)=ab^x$.



The contexts used early in this unit lead to functions where the domain is the integers. In some situations, students will interpret exponential expressions with fractional values in the exponent using graphing, but the connection to roots or logarithms is left for a later course.

Note on materials: Throughout this unit, students should have access to a calculator with an exponent button. Access to graphing technology is necessary for some activities and encouraged throughout the unit. Examples of graphing technology include a handheld graphing calculator, a computer with a graphing calculator application installed, or an internet-enabled device with access to a site like desmos.com/calculator or geogebra.org/graphing. Interactive applets are embedded throughout, and a graphing calculator tool is accessible in the Math Tools in the digital version.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment

Section A Looking at Growth Lessons 1-2	**Learning Target #1** Compare linear and exponential relationships by performing calculations. **Learning Target #2** Describe patterns in tables that represent linear and exponential relationships.	**Lesson 1 Growing and Growing** ● I can compare growth patterns using calculations and grap **Lesson 2 Patterns of Growth** ● I can use words and expressions to describe patterns in tables of values. ● When I have descriptions of linear and exponential relationships, I can write expressions and create tables of values to represent them. Checkpoint A problem 1 Checkpoint A problem 2
Checkpoint A	*Responding to Student Thinking* Points to Emphasize: If students struggle to determine the growth patterns, revisit the idea throughout the u For example, in the optional activity referred to here, ask students to describe the pattern and then to determ whether it changes by a factor or a difference.	
Section B A New Kind of Relationship Lessons 3-6	**Learning Target #3** Write and graph an equation that represents exponential decay to solve problems. **Learning Target #4** Write an equation of the form $y = a \bullet b^x$ to represent a quantity a that changes by a growth factor b.	**Lesson 3 Representing Exponential Growth** ● I can explain the connections between an equation and a graph that represents exponential growth. ● I can write and interpret an equation that represents exponential growth. Middle of Unit problem 1 *NOTE: Middle of Unit Problem 1* *Notes say no calculator for the test. None of the high school standards involve computation so calculators should be allowed.* Middle of Unit Problem 4 End of Unit Problem 1 ● I can graph equations that represent quantities that chang by a growth factor that is greater than 1. Middle of Unit Problem 6 **Lesson 4 Representing Exponential Decay** ● I can explain the meanings of a and b in an equation that represents exponential decay and is written as $y = a \bullet b^x$. Checkpoint B Problem 1 ● I can find a growth factor from a graph and write an equati to represent exponential decay. ● I can graph equations that represent quantities that chang by a growth factor that is between 0 and 1. Checkpoint B problem 3 **Lesson 5 Understanding Decay** ● I can use only multiplication to represent "decreasing a quantity by a fraction of itself." ● I can write an expression or equation to represent a quanti that decays exponentially. Checkpoint B Problem 1 ● I can interpret an equation that represents exponential de Middle of Unit Problem 7 ● I know the meanings of “exponential growth” and “exponential decay.” **Lesson 6 Analyzing Graphs** ● I can use graphs to compare and contrast situations that involve exponential decay. ● I can use information from a graph to write an equation tha represents exponential decay.
Checkpoint B	*Responding to Student Thinking* More Chances: Students will have more opportunities to develop this understanding in later sections. There i no need to slow down or add additional work to review this concept at this time.	

Section C Negative and Fractional Exponents Lessons 7-10	**Learning Target #5** Interpret a negative exponent in equations that represent exponential growth or decay. **Learning Target #6** Use roots and fractional exponents to represent the same value in different ways.	**Lesson 7 Using Negative Exponents** ● I can describe the meaning of a negative exponent in equations that represent exponential decay. Checkpoint B problem 2 Middle of Unit Problem 5 Part 2 ● I can write and graph an equation that represents exponen decay to solve problems. Middle of Unit Problem 7 **Lesson 8 Exponential Rules (Optional)** ● I can use the idea that $\sqrt[n]{a}^{\ n} = a$ to compute values. ● I can write exponent rules for $a^b \cdot a^c, \frac{a^b}{a^c}, (a^b)^c$ **Lesson 9 Unit Fractional Exponents (Optional)** ● I can rewrite roots in a form with a fractional exponent. **Lesson 10 Other Fractional Exponents (Optional)** ● I can rewrite roots raised to a power as values with a fractional exponent.
Checkpoint C	*Responding to Student Thinking* ● **Problem 1:** Points to Emphasize: If students struggle to interpret a negative exponent in a situation, emphasize the concept throughout the unit. For example, in the activity referred to here, emphasize wh an input of -1 could mean or what the model predicts for the year 1976. ● **Problem 2:** Press Pause: If students struggle to use fractional exponents and roots to write expression that have the same value, make time to revisit the idea. For example, use the practice problems referre here to provide additional practice. Algebra 1, Unit 6, Lesson 10, Practice Problem 4 Algebra 1, Unit 6, Lesson 10, Practice Problem 2	
Mid-Unit Assessment		
Section D Exponential Functions Lessons 11-16	**Learning Target #7** Describe the effect of changing a and b on a graph that represents $y = a \bullet b^x$. **Learning Target #8** Use function notation to write equations that represent exponential relationships.	**Lesson 11 Exponential Situations as Functions** ● I can use function notation to write equations that represe exponential relationships. End of Unit Problem 1 ● When I see relationships in descriptions, tables, equations graphs, I can determine whether the relationships are functions. Checkpoint C Problem 1.1 **Lesson 12 Interpreting Exponential Functions** ● I can analyze a situation and determine whether it makes sense to connect the points on the graph that represents t situation. ● When I see a graph of an exponential function, I can make sense of and describe the relationship using function notation. Middle of Unit Problem 5 **Lesson 13 Looking at Rates of Change** ● I can calculate the average rate of change of a function ove specified period of time. ● I know how the average rate of change of an exponential function differs from that of a linear function. **Lesson 14 Modeling Exponential Behavior** ● I can use exponential functions to model situations that involve exponential growth or decay. Checkpoint C problem 1.2 ● When given data, I can determine an appropriate model fo the situation described by the data. Middle of Unit Problem 3 **Lesson 15 Reasoning about Exponential Graphs (Part 1)**

		- I can describe the effect of changing - $a$and b on a graph that represents $f(x) = a \cdot b^{x}$. Checkpoint C Problem 2 Middle of Unit Problem 2 - I can use equations and graphs to compare exponential functions. **Lesson 16 Reasoning about Exponential Graphs (Part 2) (Option** - I can explain the meaning of the intersection of the graphs two functions in terms of the situations they represent. - When I know two points on a graph of an exponential function, I can write an equation for the function. End of Unit Problem 6 *NOTE: End of Unit Problem 6* *Problem 6 is more difficult to interpret than it is to answer. If the idea is that the output is 2^3 times larger after x increases by 3, it should be worded that way.*
Checkpoint D	*Responding to Student Thinking* - **Problem 1:** More Chances: Students will have more opportunities to develop this understanding in later sections. There is no need to slow down or add additional work to review this concept at this time. - **Problem 2:** Points to Emphasize: If students struggle to match the graphs to the exponential functions, revisit the idea throughout the next sections. For example, after completing the activity referred to here ask students to look back on this Checkpoint question to interpret the functions in terms of percentage to make a connection to the amount of growth happening in each graph. Algebra 1, Unit 6, Lesson 18, Activity 2 Comparing Loans	
Section E Percent Growth and Decay Lessons 17-21	**Learning Target #9** Calculate the result of repeated percent increase for the same initial balance and interest rate, but compounded at different intervals. **Learning Target #10** I can justify why applying a percent increase p, n times, is not equivalent to applying the percent np.	**Lesson 17 Recalling Percent Change (Optional)** - I can find the result of applying a percent increase or decrease on a quantity. - I can write different expressions to represent a starting po and a percent increase or decrease. Checkpoint D Problem 1 End of Unit Problem 3 **Lesson 18 Functions Involving Percent Change** - I can use graphs to illustrate and compare different percen increases. - I can write a numerical expression or an algebraic expressi to represent the result of applying a percent increase repeatedly. End of Unit Problem 5 **Lesson 19 Compounding Interest** - I can explain why applying a percent increase, p, n times is or unlike applying the percent increase np. Checkpoint D Problem 1 **Lesson 20 Different Compounding Intervals** - I can calculate interest when I know the starting balance, interest rate, and compounding intervals. End of Unit problem 2 End of Unit problem 4 - When given interest rates and compounding intervals, I ca choose the better investment option. Checkpoint D Problem 2 **Lesson 21 Expressed in Different Ways** - I can solve problems using exponential expressions writte different ways. End of Unit Problem 2 - I can write equivalent expressions to represent situations that involve repeated percent increase or decrease.

		End of Unit Problem 3
Checkpoint E	*Responding to Student Thinking* • **Problem 1:** Press Pause If students struggle to show that the ratio between f(x+1) and f(x) is a const make time to revisit the idea. For example, use the lesson referred to here to connect growth factors this idea. In the activity referred to here, note the connection between the term "doubling" and the exponential form of the function. Algebra 1, Unit 6, Lesson 2 Patterns of Growth Algebra 1, Unit 6, Lesson 3, Activity 3 Multiplying Microbes • **Problem 2:** Press Pause If students struggle to show their understanding that exponential growth i eventually faster than linear growth, make time to revisit the idea. For example, use the activities referred to here to examine graphs of linear and exponential functions to show that exponential functions are eventually greater than linear functions. Algebra 1, Unit 6, Lesson 2, Activity 2 Growing Stores Algebra 1, Unit 6, Lesson 19, Activity 3 Reaching 2,000	
Section F Comparing Linear and Exponential Functions Lesson 22-23	**Learning Target #11** Use rates of change, and show that, for any equal intervals of the independent variable, an exponential function always increases or decreases by an equal factor. **Learning Target #12** Use tables, calculations, and graphs to compare growth rates of linear and exponential functions.	**Lesson 22 Which One Changes Faster?** • I can use tables, calculations, and graphs to compare grow rates of linear and exponential functions and to predict ho the quantities change eventually. Checkpoint E Problem 2 End of Unit Problem 7 **Lesson 23 Changes over Equal Intervals** • I can calculate rates of change of functions given graphs, equations, or tables. • I can use rates of change to describe how a linear function and an exponential function change over equal intervals. Checkpoint E problem 1 End of Unit problem 6
Checkpoint F	*Responding to Student Thinking* • **Problem 1:** Press Pause If students struggle to show that the ratio between f(x+1) and f(x) is a const make time to revisit the idea. For example, use the lesson referred to here to connect growth factors this idea. In the activity referred to here, note the connection between the term "doubling" and the exponential form of the function. Algebra 1, Unit 6, Lesson 2 Patterns of Growth Algebra 1, Unit 6, Lesson 3, Activity 3 Multiplying Microbes • **Problem 2:** Press Pause If students struggle to show their understanding that exponential growth i eventually faster than linear growth, make time to revisit the idea. For example, use the activities referred to here to examine graphs of linear and exponential functions to show that exponential functions are eventually greater than linear functions. Algebra 1, Unit 6, Lesson 2, Activity 2 Growing Stores Algebra 1, Unit 6, Lesson 19, Activity 3 Reaching 2,000	
Section G Let's Put It to Work Lesson 24	**No new learning targets**	**Lesson 24 Predicting Populations** • I can determine how well a chosen model fits the given information. • I can determine whether to use a linear function or an exponential function to model real-world data.
End of Unit Assessment		

Unit Title:

Unit 7: Topics in Grade 8 (BPS)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
U5 Lesson 13/14	8.G.C.9, 8.G.C	U8 Lesson 3	8.EE.A.2, 8.NS.A, 8.NS.A.1, 8.NS.A.2
U5 Lesson 15/16	8.G.C.9, 8.G.C	U8 Lesson 4	8.EE.A.2, 8.NS.A, 8.NS.A.1, 8.NS.A.2
U5 Lesson 20	8.G.C.9, 8.G.C	U8 Lesson 6	8.EE.A.2, 8.NS.A, 8.NS.A.1, 8.NS.A.2
U5 Lesson 21	8.G.C.9, 8.G.C	U8 Lesson 9	8.G.B.7
		U8 Lesson 10	8.G.B.7
		U8 Lesson 11	8.G.B.7
		U8 Lesson 13	8.G.B.8
		U8 Lesson 15	8.EE.A.2, 8.NS.A.2

Essential Question(s):

- How do we measure what we cannot see directly?
- Why do some numbers resist being written as simple fractions?
- How do we represent and solve equations we cannot solve with whole numbers or fractions alone?
- How is the Pythagorean Theorem a bridge between algebra, geometry, and proof?
- How do we find what we're looking for when direct measurement isn't possible?

Enduring Understanding(s):

- Equations like $x^2=n$ require us to extend beyond rational numbers and use radical notation. Square roots and cube roots provide notation and meaning for solutions that often fall between integers. Representing these solutions on the number line connects symbolic notation to geometric understanding.
- The Pythagorean Theorem is both a geometric relationship and an algebraic tool. Understanding the area-based proof reveals why the relationship $a^2 + b^2= c^2$ works and connects areas to squares of side lengths. This theorem enables us to find unknown distances, verify right angles, and solve real-world problems—demonstrating how abstract mathematical relationships have concrete applications.
- Mathematical tools—formulas, theorems, and reasoning—allow us to determine distances and dimensions that we cannot physically measure. The coordinate plane, the Pythagorean Theorem, and radical notation work together to solve problems in abstract and real-world contexts. This reflects the power of mathematics to extend beyond what we can directly observe.

Demonstration of Learning:

CFA 1: Checkpoint D & E (after G8 U5 Lesson 21)
CFA 2: Checkpoint A (after G8 U8 Lesson 6)
CFA 3: Checkpoint B #1 & 2 only (after G8 U8 Lesson 15)
EOU Assessment

Pacing for Unit

16 Days
Lesson Modifications:
G8 Unit 5 Section D & E

- Start with Lesson 13/14
- Combine Lesson 15/16
- Skip Lessons 17-19
- Checkpoint D and E together on the same day

G8 Unit 8 Section A, B & C

- Skip Lessons 1-2, 5, 7, 8, 12, 14

Family Overview

https://accessim.org/6-8/grade-8/unit-5?a=family
https://accessim.org/6-8/grade-8/unit-8?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

Radius, volume, cylinder, cone, sphere, square root, rational number, irrational number, hypotenuse, Legs, Pythagorean Theorem, cube root, repeating decimal

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.5.11 Digital Applet: Height and Volume
- 8.8.1 Digital Applet: Making Squares
- 8.8.2 Digital Applet: The Sides and Areas of Tilted Squares

- 8.8.8 Digital Applet: A Transformational Proof

Provide access as needed throughout the unit:

- Colored pencils
- Graduated cylinders
- Math Community Chart
- Spherical objects
- Straightedges
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
	UNIT 5	
11	Graduated cylinders: Activity 1	
13	Colored pencils: Activity 2	
19	Spherical objects: Activity 2	
21	Tools for creating a visual display: Lesson Math Community Chart: Activity 2	Unknown Dimensions Cards (1 copy for every 4 students): Activity 2
	UNIT 8	
1		Making Squares Cutouts (1 copy for every 2 students): Activity 2
2	• Geometry toolkits: Activity 1, Activity 2 • Tracing paper: Activity 1, Activity 2	
3	• Geometry toolkits: Activity 1, Activity 3 • Tracing paper: Activity 1 • Four-function calculators: Activity 2	
4	• Geometry toolkits: Activity 2 • Tracing paper: Activity 2 • Four-function calculators: Activity 4	
5	• Compasses: Activity 2 • Geometry toolkits: Activity 2 • Four-function calculators: Activity 3	
8	• Blank paper: Lesson • Scissors: Activity 3	A Transformational Proof Cutouts (1 copy for every 2 students): Activity 3
9	Blank paper: Lesson	
12	Math Community Chart: Activity 2	Pythagorean Theorem Cards (1 copy for every 2 students): Activity 2
14	Math Community Chart: Activity 3	Rooted in the Number Line Cards (1 copy for every 2 students): Activity 3

17		Some Numbers Are Rational Cards (1 copy for every 2 students): Activity 2
18	Scientific calculators: Activity 2, Activity 3	

Opportunities for Interdisciplinary Connections:

Earth Science
- Model atmospheric pressure using sphere volume; explore planetary volumes to compare sizes

Astronomy
- Calculate distances between stars or planets using coordinates; explore the concept of irrational numbers in orbital mechanics

Sports
- Calculate distances in sports (baseball diamond, soccer field diagonals, skateboarding ramps)

Music:
- Irrational numbers appear in frequency ratios and musical intervals
- Understand how irrational numbers relate to string lengths and acoustic resonance

Art & Design:
- Golden Ratio — Connect irrational numbers (phi) to aesthetics and composition in visual art
- Architecture — Explore how irrational numbers appear in building design and proportions
- Sculpture — Design cylindrical, conical, and spherical forms; understand volume relationships in 3D art

Anticipated misconceptions:

Solving for Unknown Dimensions
- When solving volume equations for a missing di
- mension, students may not isolate the variable correctly
- Trouble handling the $\frac{1}{3}$ in cone equations — forgetting to multiply by 3 when solving

Context & Real-World Applications
- Looking at pictures that aren't to scale and assuming they represent the actual volumes
- Not considering that changing dimensions affects how much something holds
- In the popcorn container problem: overestimating cone volume because it "looks bigger" visually

Understanding Square Roots:
- Not recognizing that $\sqrt{9}$ =3, not 9 ÷2

Perfect Squares
- Not memorizing/recognizing perfect squares: 1,4,9,16,25,36,49,64,81,100,121,144
- Thinking $\sqrt{2}$ is a whole number

Irrational Numbers
- Thinking all irrational numbers are square roots (forgetting π)
- Believing irrational numbers are "made up" or not real
- Confusing irrational with non-integer (integers and fractions are rational)
- Not understanding that irrational numbers can't be written as a ratio of two integers
- Thinking $\sqrt{2}$=1.1421356... has a pattern or repeats
- Assuming all non-terminating decimals are irrational

Pythagorean Theorem
- Thinking the Pythagorean Theorem applies to all triangles (only right triangles
- Not identifying which side is the hypotenuse in a right triangle
- Confusing legs and hypotenuse: thinking the shortest side is always the hypotenuse
- Not understanding you need to solve backwards when finding a leg

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- Volume of a rectangular prism
- Exponents
- Area of a circle (radius vs diameter)
- Solving Equations
- Right angle

Relevant Unit(s)/Lesson(s) to Review:
- Grade 6 Unit 6 Expressions and Equations
- Grade 7 Unit 3 Measuring Circles
- Grade 7 Unit 7 Angles and Triangles
- Grade 8 Unit 4 Linear Equations and Linear Systems

Connections to Future Units:

This unit contains content that is necessary for success on the Smarter Balanced Assessment. Volume and the Pythagorean Theorem connect to High School Geometry. Rational and irrational numbers will support the quadratics unit when solving equations and finding *x*-intercepts.

Differentiation through *Universal Design for Learning*

Engagement:

- Chunk task and assess comprehension after every two rows of missing cone dimensions (G8 Unit 5, Lesson 16 Activity 2 Launch)

Representation:

- Use a kinesthetic representation of the number line (e.g., a clothesline) (G8 Unit 8, Lesson 15 Activity 2 Synthesis)

Action & Expression:

- Provide access to digital applets for measuring height and volume (G8 Unit 5, Lesson 11 Activity 1 Launch)

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (G8 Unit 5, Lessons 11, 14, 17, 22; G8 Unit 8, Lessons 5, 6, 13)
- MLR2: Collect and Display (G8 Unit 5, Lessons 7, 11; G8 Unit 8, Lesson 7)
- MLR3: Clarify, Critique, Correct (G8 Unit 5, Lesson 15; G8 Unit 8, Lesson 9)
- MLR4: Information Gap (G8 Unit 8, Lessons 12, 21)
- MLR5: Co-Craft Questions (G8 Unit 8, Lesson 8)
- MLR6: Three Reads (G8 Unit 5, Lesson 3; G8 Unit 8, Lessons 11, 18)
- MLR8: Discussion Supports (G8 Unit 5, Lessons 11, 14, 16, 21 G8 Unit 8, Lessons 6, 11, 15)

Sentence Frames and Stems

Section A(Gr 8 Unit 8 Rational/Irrational Numbers)

- _____ is an irrational number because ...
- The square root of _____ must be _____ because ...
- The solution to the equation _____ is _____ because ...
- To place the square root of _____ on a number line, first I _____, then I ...

Section B (Gr 8 Unit 8 Rational/Irrational Numbers)

- The distance between point _____ and point _____ is _____ because ...
- If the leg lengths of the right triangle are _____ and _____, then the hypotenuse must be _____ because ...
- The side lengths _____, _____, and _____ make a right triangle because ...
- I used the equation _____ to find the missing side length of the right triangle. The missing side length is _____.

Section C (Gr 8 Rational/Irrational Numbers)

- If the volume of a cube is _____, the edge length must be _____ because ...
- The cube root of _____ must be _____ because ...
- To place the cube root of _____ on a number line, first I _____, then I ...
- The solution to the equation _____ is _____ because ...

Section D (Gr 8 Unit 5 Volume)

- I know the volume of the cylinder/cone is _____, and the radius of the base is _____, so the height must be _____ because ...
- The volume of the cylinder is _____ because ...
- The volume of the cone is _____ because ...
- As the radius of the base increases by _____, the volume of the cylinder/cone increases by _____ because ...

Section E (Gr 8 Unit 5 Volume)

- When the radius of the _____ is changed by _____, the volume ...
- The volume of the hemisphere is _____ because ...
- The volume of the sphere is _____ because ...

Unit Outline

Unit 5

In the remaining three sections of the unit, students build on their knowledge of the formula for the volume of a right rectangular prism from grade 7, learning formulas for volumes of cylinders, cones, and spheres. Students express functional relationships described by these formulas as equations, focusing on situations involving proportional relationships. They use these relationships to reason about how the volume of a figure changes as one of its dimensions changes, transforming algebraic expressions to get the information they need. In future courses, students will continue this thinking as they study nonlinear relationships and question how, for example, the volume of a sphere changes as the radius increases.

Unit 8

In the first section, students extend work from grade 6, composing and decomposing shapes to find the areas of tilted squares. They see “square root of n” and $\sqrt{n}$ to mean the side length of a square with area n square units, and understand that finding the solution to equations of the form $x^2=n$ means determining which values of x make the equation true. Students learn and use definitions for “rational number” and “irrational number,” learn (without proof) that $\sqrt{2}$ is irrational, and plot square roots on the number line.

In the second section, students continue using tilted squares as they investigate relationships between side lengths of right and non-right triangles. Students are encouraged to notice patterns among the triangles before being shown geometric and algebraic proofs of the Pythagorean Theorem. They use the Pythagorean Theorem and its converse to solve problems in two and three dimensions, for example, to determine lengths of diagonals of rectangles and right rectangular prisms, and to estimate distances between points in the coordinate plane.

In the third section, students see that “cube root of n" and $\sqrt[3]{n}$ mean the side length of a cube with volume n cubic units. They also represent a cube root as a decimal approximation and as a point on the number line.

In the fourth section, students consider the decimal expansions of rational and irrational numbers. They learn how to rewrite fractions as a repeating decimal, how to rewrite a repeating decimal as a fraction, and reinforce their understanding that irrational numbers have a place on the number line even if they cannot be written as a fraction of integers.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Grade 8 Unit 5 **Section D** Volume (Lessons 11-16) **Section E** Dimensions and Spheres (Lessons 17-21)	**Learning Target #1** Calculate the value of one dimension of a cylinder or cone, and explain the reasoning. **Learning Target #2** Calculate the volume of a cylinder or cone.	**Lesson 13 The Volume of a Cylinder** ● I can find the volume of a cylinder in mathematical and real-world situations. ● I know the formula for the volume of a cylinder. **Lesson 14 Finding Cylinder Dimensions** ● I can find missing information about a cylinder if I know its volume and some other information. **Lesson 15 The Volume of a Cone** ● I can find the volume of a cone in mathematical and real-world situations. ● I know the formula for the volume of a cone. **Lesson 16 Finding the Cone Dimensions** ● I can find missing information about a cone if I know its volume ar some other information. **Lesson 20 The Volume of a Sphere** ● I can find the volume of a sphere when I know the radius. **Lesson 21 Cylinders, Cones, and Spheres** ● I can find the radius of a sphere if I know its volume. ● I can solve mathematical and real-world problems about the volu of cylinders, cones, and spheres.
Grade 8 Unit 5 Checkpoint D & E	*Responding to Student Thinking* Checkpoint D Points to Emphasize: If most students struggle with using the formula for volume of a cylinder, revisit this skil throughout the next section. For example, during the Activity Synthesis of the activity referred to here, invite 1–3 students to share how they calculated the volume of the cylinder. Grade 8, Unit 5, Lesson 19, Activity 3 Estimating Hemispheres Checkpoint E Press Pause: If most students struggle with using the formula for volume, make time to do some or all of this optional lesson: Grade 8, Unit 5, Lesson 22 Volume as a Function of . . .	
Grade 8 Unit 8 **Section A** Side Lengths and Areas of Squares (Lessons 1-6)	**Learning Target #3** Comprehend the term “irrational number” to mean a number that is not rational and that $\sqrt{2}$ is an example of an irrational number. **Learning Target #4** Comprehend the term “square root of n” and the notation $\sqrt{n}$ to	**Lesson 3 Square Roots** ● I can find a decimal approximation for square roots. **Lesson 4 Rational and Irrational Numbers** ● I know what an irrational number is and can give an example. ● I know what a rational number is and can give an example. **Lesson 6 Reasoning About Square Roots** ● I can find a decimal approximation for square roots. ● I can plot square roots on the number line. ● When I have a square root, I can reason about which two whole numbers it is between.

	mean the side length of a square whose area is n square units. **Learning Target #5** Use the square root symbol to represent solutions to equations of the form x^2=n and represent the square root as a point on the number line.	
Grade 8 Unit 8 Checkpoint A	*Responding to Student Thinking* More Chances: Students will have more opportunities to understand the mathematical ideas addressed here There is no need to slow down or add additional work to the next lessons.	
Grade 8 Unit 8 **Section B** The Pythagorean Theorem (Lessons 7-13)	**Learning Target #6** Calculate the distance between two points in the coordinate plane by using the Pythagorean Theorem. **Learning Target #7** Explain an area-based algebraic proof of the Pythagorean Theorem. **Learning Target #8** Use the Pythagorean Theorem to calculate unknown side lengths of right triangles and to solve problems within a context. **Learning Target #9** Coordinate representations of a cube root, including cube root notation, decimal representation, the edge length of a cube of given volume, and a point on the number line.	**Lesson 9 Finding Unknown Side Lengths** • If I know the lengths of two sides, I can find the length of the thir side in a right triangle • When I have a right triangle, I can identify which side is the hypotenuse and which sides are the legs. **Lesson 10 The Converse** • I can explain why it is true that if the side lengths of a triangle sat the equation $a^2+ b^2 =c^2$ then it must be a right triangle. • If I know the side lengths of a triangle, I can determine if it is a rig triangle or not. **Lesson 11 Applications of the Pythagorean Theorem** • I can use the Pythagorean Theorem to solve problems. **Lesson 13 Finding Distances in a Coordinate Plane** • I can find the distance between two points in the coordinate plan • I can find the length of a diagonal line segment in the coordinate plane. **Lesson 15 Cube Roots** • When I have a cube root, I can reason about which two whole numbers it is between.
Grade 8 Unit 8 Checkpoint B Problems 1 &2 only	*Responding to Student Thinking* • **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery with using the Pythagorean Theorem. If most students struggle, revisit related work. For example, in the practice prob referred to here, review how to use the Pythagorean Theorem when finding a leg versus when finding t hypotenuse. • **Problem 2:** Points to Emphasize: If most students struggle with finding the distance between two point revisit how constructing a right triangle allows for the use of the Pythagorean Theorem. For example, in the practice problem referred to here, ask students to sketch a graph of the pairs of points when finding the distance between them.	
End of Unit Assessment		

Unit Title:

Unit 8: Introduction to Quadratic Functions (iM U7)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	HSF-BF.A.1.a	Lesson 10	HSA-SSE.B.3
Lesson 2	HSA-SSE.A.1, HSA-SSE.B.3, HSF-BF.A.1.a, HSF-IF.A.3	Lesson 11	HSA-SSE.A, HSF-IF.C.7.a
Lesson 3	HSA-SSE.A.1, HSF-BF.A.1.a, HSF-IF.A.2	Lesson 12	HSF-BF.B.3HSF-IF.C, HSF-IF.C.7, HSF-LE.A.2
Lesson 4	HSF-BF.A.1.a, HSF-IF.C, HSF-LE.A.3	Lesson 13	HSA-SSE.B.3, HSF-BF.B.3, HSF-IF.C.7, HSF-IF.C.7.a
Lesson 5	HSF-BF.A.1.a, HSF-IF.A.2	Lesson 14	HSF-IF.A.2, HSF-IF.B.4, HSF-IF.C.7.a, HSF-IF.C.8, HSF-IF.C.9
Lesson 6	HSF-BF.A.1, HSF-BF.A.1.a, HSF-IF.B.5, HSF-IF.C, HSF-IF.C.7.a	Lesson 15	HSF-BF.B.3, HSF-IF.C, HSF-IF.C.7.a
Lesson 7	HSF-BF.A.1.a, HSF-IF.B.5, HSF-IF.C.7.a	Lesson 16	HSF-IF.C, HSF-IF.C.7.a
Lesson 8	HSA-APR.A, HSA-SSE.A, HSA-SSE.A.2, HSA-SSE.B.3	Lesson 17	HSF-BF.B.3, HSF-IF.C, HSF-IF.C.7.a
Lesson 9	HSA-APR.A, HSA-SSE.A.2, HSA-SSE.B.3		

Essential Question(s):

- How do different forms of a function's equation help us understand its key features and behavior?
- What do the key features of a function—such as intercepts, maximums, minimums, and end behavior—reveal about its graph and real-world meaning?
- How do transformations, such as shifts, reflections, and stretches, affect the graph and equation of a function?
- How do we determine whether a function best models a real-world situation as linear, quadratic, or exponential?
- What are the different kinds of growth and how do they compare?
- How can we analyze and compare functions that are represented in different ways, such as equations, graphs, tables, and verbal descriptions?
- How can expressing the same equation in different forms reveal different properties of a quadratic function?

Enduring Understanding(s):

- Functions can be represented in multiple ways—algebraically, graphically, numerically, and verbally—and each representation provides different insights into the function's behavior.
- Rewriting expressions through factoring, expanding, and completing the square reveals important characteristics of functions, such as zeros, intercepts, and vertex points.
- Transformations, including shifts, reflections, stretches, and compressions, help us understand how function graphs change and how different functions relate to one another.
- The structure of an algebraic expression can be analyzed and rewritten to make solving equations easier and to reveal key features of the function it represents.
- Exponential, linear, and quadratic functions model different types of real-world relationships, and understanding their differences allows us to choose the best function for a given situation.
- Comparing functions in different forms—such as equations, tables, graphs, and descriptions—helps us analyze relationships and make predictions.
- Projectile motion can be represented using a quadratic function.

Demonstration of Learning:

Checkpoint A: Opportunity for Feedback (after Lesson 2)
CFA 1: Checkpoint B(after Lesson 7)
Checkpoint C: Opportunity for Feedback (after Lesson 10)
Mid-Unit Assessment (after Lesson 10)
CFA 2: Checkpoint D (after Lesson 17)
End-of-Unit Assessment (after Lesson 17)

Pacing for Unit

23 Days

Lessons to Add/Review:

- If students need additional support with combining like terms or applying the distributive property, Grade 7 Unit 6 Lessons 18–22 address these topics.
- The Algebra 1 Extra Supports materials, particularly Lessons 1 and 3, provide additional material for students who may need resources to support their understanding of area and perimeter.

Lesson Modifications:

- Combine Lessons 1 and 2. Emphasize Activities 2.2 and 2.3.
- Combine Lessons 3 and 4. Emphasize Activity 4.2 and the idea that exponential functions always eventually grow more quickly than quadratic functions.

- Remove Lesson 7. This focuses on quadratic functions in the context of price versus revenue.
- Remove Lesson 13. This focuses on the effect of the linear term in quadratic functions and is beyond the scope of Algebra 1 standards.
- Remove Lessons 15–17. These lessons introduce vertex form. While vertex form is important, the lessons in the first sections of Unit 7 are higher priority for Algebra 1 students.

Family Overview

https://accessim.org/9-12-aga/algebra-1/unit-7?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

Quadratic expression, quadratic function, vertex, zero, factored form, standard form, vertex form

Aligned Unit Materials, Resources, and Technology

Digital Applets

- Alg1.7.11 Digital Activity 2: What Do We Need to Sketch a Graph?
- Alg1.7.12 Digital Activity 1: Quadratic Graphs Galore
- Alg1.7.17 Digital Activity 2: A Peanut Jumping over a Wall

Provide access as needed throughout the unit:

- Colored pencils
- Graphing technology
- Graph paper
- Math Community Chart

Lesson	Materials to Gather	Materials to Copy
1	Graph paper: Activity 1	
4	Graphing technology: Activity 1, Activity 2	
6	Graphing technology: Activity 1, Activity 2	
11	• Colored pencils: Activity 1 • Graphing technology: Activity 2	
12	Graphing technology: Activity 1, Activity 2	Representations of Quadratic Functions Cards (1 copy for every 2 students): Activity 3
13	Graphing technology: Activity 1, Activity 2	
14	Graphing technology: Warm-up, Activity 1	Rocket Math Cards (1 copy for every 2 students): Activity 3
15	Graphing technology: Activity 2	
16		Matching Equations with Graphs Cards (1 copy for every 2 students): Activity 2
17	• Graphing technology: Activity 1, Activity 2, Activity 3 • Math Community Chart: Activity 2	

Opportunities for Interdisciplinary Connections:

Anticipated misconceptions:

Science
- Quadratic functions describe projectile motion and acceleration in physics, helping students understand real-world applications of parabolic paths.
- Transformations of functions relate to wave motion, sound frequencies, and light reflection in physics.

Economics & Business
- Linear and quadratic models help analyze profit, revenue, and cost trends in business scenarios.
- Understanding function transformations allows for predicting market growth and stock trends over time.

Computer Science & Engineering
- Quadratic and exponential functions play a role in algorithm efficiency and machine learning models in computer science.
- Graph transformations and function comparisons help analyze digital image processing, scaling, and animation effects in game development.

- Many students misunderstand that transformations (shifts, reflections, stretches) apply to all points on a function, not just specific ones like the vertex.
- Some students assume that exponential and quadratic functions both grow at a constant rate instead of recognizing that exponentials grow by multiplication while quadratics do not.
- Students may incorrectly believe that the x-intercepts (solutions) are always the maximum or minimum of the function, rather than understanding how the vertex relates to symmetry and extrema.
- Some students struggle to compare functions across different representations (graph, table, equation, verbal) and focus only on algebraic form.

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- Write equivalent expressions by combining like terms and applying the distributive property.

Relevant Unit(s)/Lesson(s) to Review:
- Grade 7, Unit 6: Expressions, Equations, and Inequalities

Connections to Future Units:

Connections to Units in Future Courses

Transformations of Functions
- Understanding shifts, reflections, stretches, and compressions of functions lays the foundation for geometric transformations in Geometry and function transformations in Algebra 2, including rational, logarithmic, and trigonometric functions.

Circles, Higher-Degree Polynomials, and Rational Expressions
- Skills like factoring and completing the square extend to deriving the equation of a circle in Geometry and factoring and solving higher-degree polynomials in Algebra 2.

Logarithms and Advanced Growth Models
- Working with exponential growth and decay prepares students for logarithmic functions and solving logarithmic equations in Algebra 2, which are used to model real-world scenarios like sound intensity and pH levels.

Inverse Functions
- The concept of inverse functions expands into logarithmic inverses of exponentials and inverse trigonometric functions in Algebra 2.

Differentiation through *Universal Design for Learning*

Engagement:
- Leverage choice by inviting students to select specific graphs to match with their equations (Lesson 13, Activity 2 Launch)

Representation:
- Provide a graphic organizer for individual sketches and observations of parameter changes (Lesson 12, Activity 1 Launch)

Action & Expression:
- Chunk graphing tasks into parts and encourage pattern sharing with partners (Lesson 11, Activity 1 Launch)

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text

MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 9, 16)
- MLR2: Collect and Display (Lessons 3, 5, 11, 12, 14)
- MLR6: Three Reads (Lesson 17)
- MLR7: Compare and Connect (Lesson 8)
- MLR8: Discussion Supports (Lessons 1, 2, 12, 13, 15)

Sentence Frames and Stems

Section A

- This pattern represents a _____ relationship because ...
- Using the _____ I see that the pattern is growing by ...
- The expression _____ represents this situation because ...

Section B

- The expression _____ represents this situation because ...
- When the input is _____, the output for the function _____ is greater/less than the output for the function _____ because ...
- The height of the _____ after _____ is _____ because ...
- The function _____ represents this situation because ...

Section C

- If the factored form of a quadratic expression is _____, then the standard form is _____ because ...
- In this situation, the _____ (feature of the graph) represent(s) _____ because ...
- The equation _____ defines the function of the graph shown because ...

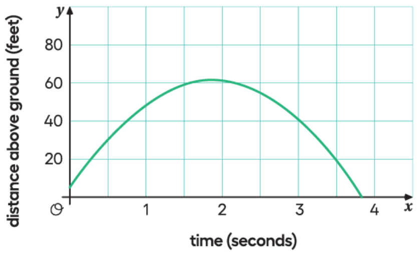
Section D

- When the equation is written in _____ form, I can easily identify the _____ (feature of the graph) which is _____ because ...
- In the equation _____, if the value _____ is changed to _____, the graph changes by ...
- To graph the function _____, first I _____, then I ...
- In this situation, the _____ (feature of the graph) represent(s) _____ because ...

Unit Outline

Prior to this unit, students have studied what it means for a relationship to be a function, used function notation, and investigated linear and exponential functions. In this unit, they look at some patterns that grow quadratically and contrast this growth with linear and exponential growth. They further observe that eventually these quadratic patterns grow more quickly than do linear patterns but more slowly than exponential patterns grow.

Students examine the important example of free-falling objects whose height over time can be modeled with quadratic functions. They use tables, graphs, and equations to describe the movement of these objects, eventually looking at the situation in which a projectile is launched upward. They interpret the meaning of each term in this context and work toward understanding how the coefficients influence the shape of the graph. Additional situations, such as revenue and area, are also introduced.



Next, students examine standard, factored, and vertex forms of quadratic functions. They recognize what information about the graph is easily obtained from each form and how the different values in each form influence the graph. In particular, they begin to generalize ideas of how horizontal and vertical translation, as well as vertical and horizontal stretching of graphs, relate to modifying the equation of a function.

Note on materials: Access to graphing technology is necessary for many activities. Examples of graphing technology are: a handheld graphing calculator, a computer with a graphing calculator application installed, and an internet-enabled device with access to a site like desmos.com/calculator or geogebra.org/graphing. For students using the digital version of these materials, a separate graphing calculator tool isn't necessary. Interactive applets are embedded throughout, and a graphing calculator tool is accessible in the student math tools.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A: A Different Kind of Change Lessons 1-2	**Learning Target #1** I can comprehend that a "quadratic relationship" can be expressed with a squared term. **Learning Target #2** I can determine and explain whether a visual pattern	**Lesson 1 A Different Kind of Change** • I can create drawings, tables, and graphs that represent the area of a garden. • I can recognize a situation represented by a graph that increases and then decreases. **Lesson 2 How Does It Change?** • I can describe how a pattern is growing. Checkpoint B Problem 1

	represents a linear, exponential, or quadratic relationship.	Middle of Unit Problem 1 ● I can tell whether a pattern is growing linearly, exponentially, or quadratically. Checkpoint A Middle of Unit Problem 1 ● I know a quadratic expression has a squared term. Checkpoint A
Checkpoint A	*Responding to Student Thinking* More Chances: Students will have more opportunities to develop this understanding in later sections. There is no need to slow down or add additional work to review this concept at this time.	
Section B: Quadratic Functions Lessons 3-7	**Learning Target #3** I can interpret quadratic functions that represent a physical phenomenon, given expressions and graphs. **Learning Target #4** I can use graphs, tables, and calculations to show that exponential functions eventually overtake quadratic functions.	**Lesson 3 Building Quadratic Functions from Geometric Patterns** ● I can explain using graphs, tables, or calculations that exponential functions eventually grow faster than quadratic functions. Middle of Unit Problem 5 ● I can recognize quadratic functions written in different ways. ● I can use information from a pattern of shapes to write a quadratic function. Middle of Unit Problem 1 **Lesson 4 Comparing Quadratic and Exponential Functions** ● I can explain using graphs, tables, or calculations that exponential functions eventually grow faster than quadratic functions. Middle of Unit Problem 5 **Lesson 5 Building Quadratic Functions to Describe Situations (Part 1)** ● I can explain the meaning of the terms in a quadratic expression that represents the height of a falling object. Checkpoint B Problem 2 Middle of Unit Problem 2 ● I can use tables, graphs, and equations to represent the height of a falling object. **Lesson 6 Building Quadratic Functions to Describe Situations (Part 2**) ● I can create quadratic functions and graphs that represent a situation. ● I can relate the vertex of a graph and the zeros of a function to a situation. ● I know that the domain of a function can depend on the situation it represents. Middle of Unit Problem 2 **Lesson 7 Building Quadratic Functions to Describe Situations (Part 3**) ● I can choose a domain that makes sense in a revenue situation. Middle of Unit Problem 7 ● I can model revenue with quadratic functions and graphs. Middle of Unit Problem 4 *NOTE: Middle of Unit Problem 4* *Test question context is area but the Lesson is based on revenue, may want to preview revenue.* Middle of Unit Problem 7

		• I can relate the vertex of a graph and the zeros of a function to a revenue situation.
Checkpoint B	*Responding to Student Thinking* • **Problem 1:** Points to Emphasize: If students struggle to describe why exponential growth is eventually faster than quadratic growth, plan to revisit the idea throughout the rest of the unit. For example, as students explore graphs of quadratic functions in the lesson referred to here, use different functions of the form $y=ab^x$ to show that the exponential functions eventually grow faster. Algebra 1, Unit 7, Lesson 10 Graphs ofFunctions in Standard and Factored Forms • **Problem 2:** More Chances: Students will have more opportunities to develop this understanding in later sections. There is no need to slow down or add additional work to review this concept at this time.	
Section C: Working with Quadratic Expressions Lessons 8-10	**Learning Target #5** I can coordinate a quadratic expression given in factored form and the intercepts of its graph. **Learning Target #6** I can use the distributive property to write equivalent quadratic expressions from factored into standard form.	**Lesson 8 Equivalent Quadratic Expressions** • I can rewrite quadratic expressions in different forms by using an area diagram or the distributive property. Checkpoint C Middle of Unit Problem 3 Middle of Unit Problem 6 **Lesson 9 Standard Form and Factored Form** • I can rewrite quadratic expressions given in factored form, in standard form, using either the distributive property or a diagram. Middle of Unit Problem 3 Middle of Unit Problem 6 • I know the difference between "factored form" and "standard form." Checkpoint C **Lesson 10 Graphs of Functions in Standard and Factored Forms** • I can explain the meaning of the intercepts on a graph of a quadratic function in terms of the situation it represents. Middle of Unit Problem 7 End of Unit Problem 5 *NOTE: End of Unit Problem 5* *Clare's function in factored form should be looked at. Question b. Give a different time value so that someone's height is higher and they are NOT the same. Difficult to understand why a student made an error.* End of Unit Problem 7 • I know how the numbers in the factored form of a quadratic expression relate to the intercepts of its graph. Middle of Unit Problem 7 End of Unit Problem 5 End of Unit Problem 7
MOU (after lesson 10)		
Checkpoint C	*Responding to Student Thinking* • More Chances: Students will have more opportunities to develop this understanding in later sections. There is no need to slow down or add additional work to review this concept at this time.	
Section D: Features of Graphs of Quadratic Functions Lessons 11-17	**Learning Target #7** I can explain how a graph is affected by changing parameters in quadratic expressions written in standard, factored, and vertex forms. **Learning Target #8**	**Lesson 11 Graphing from the Factored Form** • I can graph a quadratic function given in factored form. End of Unit Problem 4 • I know how to find the vertex and y-intercept of the graph of a quadratic function in factored form without graphing it first.

	I can use an equation in vertex form to identify the maximum or minimum of a quadratic function.	End of Unit Problem 4 End of Unit Problem 5 **Lesson 12 Graphing the Standard Form (Part 1)** ● I can explain how the a and c in $y = ax^2 + bx + c$ affect the graph of the equation. Checkpoint D Problem 1 End of Unit Problem 3 ● I understand how graphs, tables, and equations that represent the same quadratic function are related. **Lesson 13 Graphing the Standard Form (Part 2) (Optional)** ● I can explain how the b in $y = ax^2 + bx + c$ affects the graph of the equation. ● I can match equations given in standard and factored form with their graph. End of Unit Problem 1 End of Unit Problem 2 **Lesson 14 Graphs That Represent Situations (Optional)** ● I can explain how a quadratic equation and its graph relate to a situation. End of Unit Problem 5 **Lesson 15 Vertex Form** ● I can recognize the "vertex form" of a quadratic equation. ● I can relate the numbers in the vertex form of a quadratic equation to its graph. End of Unit Problem 2 End of Unit Problem 6 **Lesson 16 Graphing from the Vertex Form (Optional)** ● I can graph a quadratic function given in vertex form, showing a maximum or minimum and the y-intercept. ● I know how to find a maximum or a minimum of a quadratic function given in vertex form without first graphing it. Checkpoint D Problem 2 End of Unit Problem 6 **Lesson 17 Changing the Vertex** ● I can describe how changing a number in the vertex form of a quadratic function affects its graph. End of Unit Problem 6
Checkpoint D	*Responding to Student Thinking* ● **Problem 1:** Press Pause: If students struggle to describe how graphs of quadratic functions differ based on the functions, make time to explore the idea further. For example, revisit the digital form of the activity referred to here to explore how changing the parameters influence the graph. Algebra 1, Unit 7, Lesson 11, ● **Problem 2:** Press Pause: If students struggle to identify the maximum or minimum of a quadratic function in vertex form, plan to make time to revisit the idea. For example, use the optional lesson referred to here to practice connecting the equation of the quadratic function with the graph that represents it.	
End of Unit Assessment		

Course Title	**Content Area**	**Grade Level**	**Credit (if applicable)**
Grade 7 Math	**Mathematics**	**Grade 7**	**N/A**

Course Description

IM Grade 7 begins with students studying scale drawings, an engaging geometric topic that sets the stage for the subsequent work on proportional relationships in the following three units. Students also have opportunities to build fluency with IM Grade 6 arithmetic. They work with proportional relationships represented by tables, equations, and graphs. Geometry and proportional relationships are interwoven in the third unit, when the important proportional relationship between a circle's circumference and its diameter is studied. Then students work with percent increase and percent decrease.

By the fifth unit, on operations with rational numbers, students have had time to brush up on and solidify their understanding of, and skill in, IM Grade 6 arithmetic. At this point, the emphasis becomes the role of the properties of operations in determining the rules for operating with negative numbers. This is a natural lead-in to the work on solving equations and simplifying expressions in the next unit. Students then put their arithmetical and algebraic skills to work in the last two units: on angles, triangles, and prisms, and on probability and sampling.

Aligned Core Resources

CT Core Standards
(aligned to National Common Core Standards)

Imagine Learning iM Resources (Imagine 6-8)
BPS teacher login through ClassLink required

https://accessim.org/6-8/grade-7/course-guide/further-reading?a=teacher

- Empowering All Storytellers: Tips for Engaging Special Populations Using IM® v.360 for Grade 6–12
- Tackling Wordy Problems: How the Three Reads Math Language Routine Supports Access for All Learners
- Think Pair Share
- Math Language Routines: Discourse with a Purpose
- Unlocking Learners' Thinking Using the Mathematical Language Routines

Connection to the BPS Vision of the Graduate

Common Core State Standards: Math Practice (MP) Standards
MP 1: Make sense of problems and persevere in solving them.
MP 2: Reason abstractly and quantitatively.
MP 3: Construct viable arguments and critique the reasoning of others.
MP 4: Model with mathematics.
MP 5: Use appropriate tools strategically.
MP 6: Attend to precision.
MP 7: Look for and make use of structure.
MP 8: Look for and express regularity in repeated reasoning.

	Lessons that Showcase Math Practice Standards							
	Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	**Unit 7**	**Unit 8**
MP 1	1, 8, 13	7, 9, 15	4, 5, 10, 11	2, 3, 6, 7, 10, 12, 14, 15	1, 4, 10, 12	1, 4, 5, 9, 11, 12, 17	2, 4, 6, 11	8, 14, 19, 20
MP 2	7, 8	3–6, 10–12	4, 5, 9, 10	2, 4, 5, 8, 11, 16	1, 2, 4, 6–9, 12, 14–16	4, 5, 11, 14, 22	15	2, 3, 9, 15
MP 3	1, 3, 4, 12	7, 10, 14	2, 5, 8, 10	1, 3, 5, 7, 11, 12, 14, 16	1, 5, 7, 13, 15, 16	2, 3, 6, 7, 10, 12, 13, 16, 19–21	1, 2, 4, 5, 8, 11, 12, 15	2, 5, 7, 11, 12, 14, 16, 18, 20
MP 4	13	1, 11, 14, 15	1, 6, 11	13	17	2, 17, 22	16	6, 7
MP 5	2, 3, 5, 7	-	2, 7	-	-	-	3	7, 10
MP 6	1, 4, 11, 12	1, 4, 5, 8, 9, 11, 13	2, 4, 7, 9, 10	5–10, 12, 15	2, 7, 10, 11, 14	3, 6, 8, 9, 13, 15, 17, 18, 20–22	3, 4, 9, 10	4, 6, 10, 16, 18, 19
MP 7	2–6, 9–12	2, 3, 6, 8, 10, 12, 13	3, 6, 8, 9	2–6, 8–10, 14	3, 5, 10, 11, 13, 15	2, 4–7, 10, 14, 16, 18–21	1, 4, 5, 7, 9, 13, 14	2, 8, 13, 15, 17
MP 8	2, 5, 6, 10	4–6, 12	1, 3, 5, 7, 8	1, 4, 8–10, 13	2, 3, 5, 6, 8, 9, 16	1, 15	2, 3	2-,5, 17

Bristol Public Schools Vision of the Graduate

Problem Solving
- iM's focus on real-world modeling and problem-solving strategies
- Multiple solution pathways are encouraged and explored
- Students develop perseverance through challenging tasks

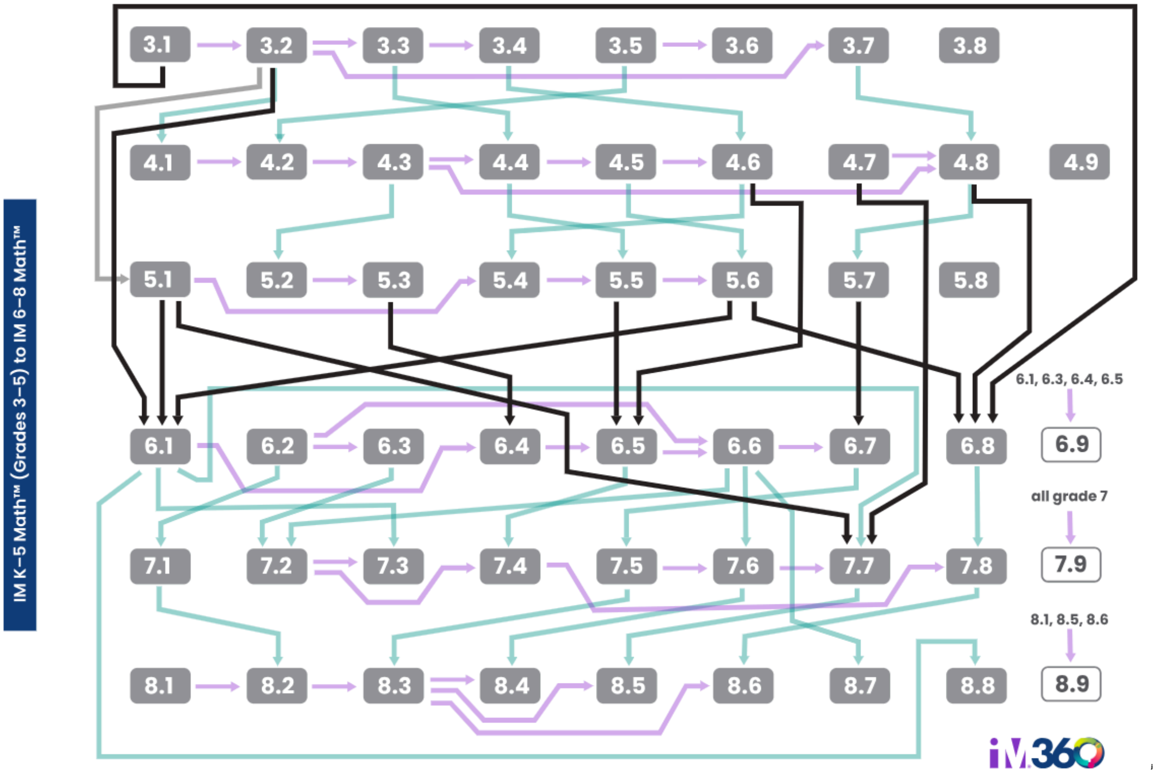
Critical Thinking
- Students analyze mathematical relationships and justify their reasoning
- Regular opportunities to critique others' reasoning
- Emphasis on understanding "why" not just "how"

Communication and Collaboration
- Structured mathematical discourse is built into lessons
- Students explain their thinking both verbally and in writing
- Many activities involve partner and group work

Link to Equity Audit Equity Curriculum Review Audit (Gr. 8 Alg+)

Additional Course Information:

Knowledge/Skill Dependent courses/prerequisites



Standard Matrix

Standard	Lesson(s)				
7.EE.A	Unit 7, Lesson 3				
7.EE.A.1	Unit 6, Lesson 18	Unit 6, Lesson 19	Unit 6, Lesson 20	Unit 6, Lesson 21	Unit 9, Lesson 6
7.EE.A.2	Unit 4, Lesson 4	Unit 4, Lesson 8	Unit 4, Lesson 10	Unit 6, Lesson 12	Unit 9, Lesson 6
7.EE.B	Unit 9, Lesson 7				
7.EE.B.3	Unit 3, Lesson 11 Unit 5, Lesson 12 Unit 5, Lesson 15	Unit 5, Lesson 17 Unit 6, Lesson 2	Unit 6, Lesson 3 Unit 6, Lesson 4	Unit 6, Lesson 5 Unit 6, Lesson 6	Unit 6, Lesson 11 Unit 6, Lesson 12
7.EE.B.4	Unit 5, Lesson 15 Unit 5, Lesson 16	Unit 6, Lesson 5 Unit 6, Lesson 9 Unit 6, Lesson 11	Unit 6, Lesson 12 Unit 6, Lesson 13 Unit 6, Lesson 15	Unit 7, Lesson 5	Unit 9, Lesson 2
7.EE.B.4.a	Unit 6, Lesson 4 Unit 6, Lesson 5	Unit 6, Lesson 7 Unit 6, Lesson 8	Unit 6, Lesson 9 Unit 6, Lesson 10	Unit 6, Lesson 11 Unit 6, Lesson 12	Unit 9, Lesson 6
7.EE.B.4.b	Unit 6, Lesson 14	Unit 6, Lesson 16	Unit 6, Lesson 17		
7.G.A	Unit 3, Lesson 2	Unit 3, Lesson 7	Unit 7, Lesson 1	Unit 7, Lesson 4	Unit 7, Lesson 9
7.G.A.1	Unit 1, Lesson 1 Unit 1, Lesson 2 Unit 1, Lesson 3 Unit 1, Lesson 4	Unit 1, Lesson 5 Unit 1, Lesson 6 Unit 1, Lesson 7 Unit 1, Lesson 8	Unit 1, Lesson 9 Unit 1, Lesson 10 Unit 1, Lesson 11 Unit 1, Lesson 12	Unit 1, Lesson 13 Unit 2, Lesson 1 Unit 3, Lesson 6 Unit 3, Lesson 11	Unit 9, Lesson 3 Unit 9, Lesson 8 Unit 9, Lesson 12
7.G.A.2	Unit 3, Lesson 2 Unit 7, Lesson 6	Unit 7, Lesson 7 Unit 7, Lesson 8	Unit 7, Lesson 9	Unit 7, Lesson 10	Unit 7, Lesson 17
7.G.A.3	Unit 7, Lesson 11	Unit 7, Lesson 13			
7.G.B	Unit 3, Lesson 6 Unit 3, Lesson 7	Unit 7, Lesson 1 Unit 7, Lesson 2	Unit 7, Lesson 4 Unit 7, Lesson 15	Unit 7, Lesson 16	Unit 9, Lesson 5
7.G.B.4	Unit 3, Lesson 3 Unit 3, Lesson 4	Unit 3, Lesson 5 Unit 3, Lesson 7	Unit 3, Lesson 8 Unit 3, Lesson 9	Unit 3, Lesson 10 Unit 3, Lesson 11	Unit 9, Lesson 3 Unit 9, Lesson 10 Unit 9, Lesson 11
7.G.B.5	Unit 7, Lesson 2	Unit 7, Lesson 3	Unit 7, Lesson 4	Unit 7, Lesson 5	
7.G.B.6	Unit 1, Lesson 6	Unit 7, Lesson 13	Unit 7, Lesson 16	Unit 9, Lesson 3	Unit 9, Lesson 7

	Unit 3, Lesson 6 Unit 7, Lesson 12	Unit 7, Lesson 14 Unit 7, Lesson 15	Unit 7, Lesson 17	Unit 9, Lesson 4	Unit 9, Lesson 8
7.NS.A	Unit 5, Lesson 13	Unit 5, Lesson 15			
7.NS.A.1	Unit 5, Lesson 1	Unit 5, Lesson 4	Unit 5, Lesson 7	Unit 6, Lesson 18	
7.NS.A.1.a	Unit 5, Lesson 2	Unit 5, Lesson 3	Unit 5, Lesson 4		
7.NS.A.1.b	Unit 5, Lesson 2	Unit 5, Lesson 3			
7.NS.A.1.c	Unit 5, Lesson 5	Unit 5, Lesson 6	Unit 5, Lesson 7	Unit 6, Lesson 18	
7.NS.A.1.d	Unit 5, Lesson 3	Unit 5, Lesson 6	Unit 5, Lesson 13		
7.NS.A.2.a	Unit 5, Lesson 8	Unit 5, Lesson 9			
7.NS.A.2.b	Unit 5, Lesson 11				
7.NS.A.2.c	Unit 5, Lesson 9	Unit 5, Lesson 10	Unit 5, Lesson 13		
7.NS.A.2.d	Unit 4, Lesson 5	Unit 8, Lesson 16	Unit 9, Lesson 3		
7.NS.A.3	Unit 5, Lesson 7	Unit 5, Lesson 10 Unit 5, Lesson 12	Unit 5, Lesson 14 Unit 5, Lesson 15	Unit 5, Lesson 16 Unit 5, Lesson 17	Unit 9, Lesson 2 Unit 9, Lesson 5
7.RP.A	Unit 2, Lesson 5 Unit 2, Lesson 9 Unit 2, Lesson 11 Unit 2, Lesson 14	Unit 5, Lesson 8 Unit 5, Lesson 12 Unit 7, Lesson 16 Unit 8, Lesson 4	Unit 8, Lesson 7 Unit 8, Lesson 16 Unit 8, Lesson 20	Unit 9, Lesson 5 Unit 9, Lesson 9	Unit 9, Lesson 10 Unit 9, Lesson 11 Unit 9, Lesson 12
7.RP.A.1	Unit 2, Lesson 8	Unit 4, Lesson 2	Unit 4, Lesson 3	Unit 9, Lesson 4	
7.RP.A.2	Unit 2, Lesson 2 Unit 2, Lesson 4 Unit 2, Lesson 5 Unit 2, Lesson 6	Unit 2, Lesson 7 Unit 2, Lesson 8 Unit 2, Lesson 9 Unit 2, Lesson 10	Unit 2, Lesson 12 Unit 2, Lesson 13 Unit 2, Lesson 14 Unit 2, Lesson 15	Unit 3, Lesson 3	Unit 4, Lesson 3 Unit 4, Lesson 4 Unit 4, Lesson 5 Unit 9, Lesson 2 Unit 9, Lesson 4
7.RP.A.2.a	Unit 2, Lesson 3 Unit 2, Lesson 7	Unit 2, Lesson 8 Unit 2, Lesson 10	Unit 3, Lesson 1 Unit 3, Lesson 3	Unit 3, Lesson 5 Unit 3, Lesson 7	
7.RP.A.2.b	Unit 2, Lesson 2	Unit 2, Lesson 3	Unit 2, Lesson 5	Unit 2, Lesson 11	Unit 2, Lesson 13
7.RP.A.2.c	Unit 2, Lesson 4 Unit 2, Lesson 5	Unit 2, Lesson 6 Unit 2, Lesson 7	Unit 2, Lesson 8	Unit 2, Lesson 13	Unit 3, Lesson 5
7.RP.A.2.d	Unit 2, Lesson 11	Unit 2, Lesson 13			
7.RP.A.3	Unit 3, Lesson 5 Unit 4, Lesson 6 Unit 4, Lesson 7 Unit 4, Lesson 8	Unit 4, Lesson 9 Unit 4, Lesson 10 Unit 4, Lesson 11	Unit 4, Lesson 12 Unit 4, Lesson 13 Unit 4, Lesson 14 Unit 4, Lesson 15	Unit 4, Lesson 16 Unit 5, Lesson 17 Unit 9, Lesson 1 Unit 9, Lesson 2	Unit 9, Lesson 3 Unit 9, Lesson 5 Unit 9, Lesson 7 Unit 9, Lesson 12
7.SP.A	Unit 8, Lesson 13	Unit 8, Lesson 16	Unit 8, Lesson 17	Unit 8, Lesson 20	
7.SP.A.1	Unit 8, Lesson 12	Unit 8, Lesson 13	Unit 8, Lesson 14	Unit 8, Lesson 15	Unit 8, Lesson 20
7.SP.A.2	Unit 8, Lesson 13 Unit 8, Lesson 14	Unit 8, Lesson 15	Unit 8, Lesson 16	Unit 8, Lesson 17	Unit 8, Lesson 20
7.SP.B	Unit 8, Lesson 11	Unit 8, Lesson 12			
7.SP.B.3	Unit 8, Lesson 11	Unit 8, Lesson 18			
7.SP.B.4	Unit 8, Lesson 15 Unit 8, Lesson 16	Unit 8, Lesson 18	Unit 8, Lesson 19	Unit 8, Lesson 20	Unit 9, Lesson 2
7.SP.C	Unit 8, Lesson 6				
7.SP.C.5	Unit 8, Lesson 2	Unit 8, Lesson 3	Unit 8, Lesson 4	Unit 8, Lesson 5	Unit 8, Lesson 6
7.SP.C.6	Unit 8, Lesson 1	Unit 8, Lesson 3	Unit 8, Lesson 4	Unit 8, Lesson 5	Unit 8, Lesson 6
7.SP.C.7	Unit 8, Lesson 3	Unit 8, Lesson 4	Unit 8, Lesson 5	Unit 8, Lesson 14	
7.SP.C.7.a	Unit 8, Lesson 3	Unit 8, Lesson 20			
7.SP.C.7.b	Unit 8, Lesson 4	Unit 8, Lesson 5	Unit 8, Lesson 6		
7.SP.C.8.a	Unit 8, Lesson 9				
7.SP.C.8.b	Unit 8, Lesson 8	Unit 8, Lesson 9			
7.SP.C.8.c	Unit 8, Lesson 6	Unit 8, Lesson 7	Unit 8, Lesson 10		

Unit Links

Grade 7 Math	Use of Instructional Time (181 School Days) ➔ 162 iM Content and Assessment Days

Unit 1: Scale Drawings Unit 2: Introducing Proportional Relationships Unit 3: Measuring Circles Unit 4: Proportional Relationships and Percentages Unit 5: Rational Number Arithmetic Unit 6: Expressions, Equations, and Inequalities Unit 7: Angles, Triangles, and Prisms Unit 8: Probability and Sampling Course Assessment Map	➔ 6 Climate and Culture Days: 2 days at start of year, 2 shortened days before breaks, and 2 days at end of year ➔ 9 IAB Days: 1 day Strategic Review and 2 day IAB in fall, winter, and spring ➔ 4 SBA Days: 1 day Strategic Review and 3 day SBA

Unit Title:

Unit 1: Scale Drawings

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.G.A.1	Lesson 8	7.G.A.1
Lesson 2	7.G.A.1	Lesson 9	7.G.A.1
Lesson 3	7.G.A.1	Lesson 10	7.G.A.1
Lesson 4	7.G.A.1	Lesson 11	7.G.A.1
Lesson 5	7.G.A.1	Lesson 12	7.G.A.1
Lesson 6	7.G.A.1, 7.G.B.6	Lesson 13	7.G.A.1
Lesson 7	7.G.A.1		

Essential Question(s):

- How can I identify if a copy is "to scale" compared to an original?
- What is the relationship between the scale factor and the resulting size of a figure?
- How do scale drawings represent real-world objects and locations?

Enduring Understanding(s):

- A scaled copy is a two-dimensional image created by multiplying all original lengths by a consistent scale factor while keeping the corresponding angle measures the same.
- When a scale factor is greater than 1, the copy will be larger than the original; when it is less than 1, the copy will be smaller.
- A scale drawing uses a specific scale to relate drawn measurements to actual measurements, allowing for the calculation of real-world distances and areas.

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 6)
CFA 2: Checkpoint B (after Lesson 12)
Unit 1 End of Unit Assessment

Pacing for Unit

14 Days

Lessons to Add/Remove:

- If prior knowledge needs to be reviewed, add the following lessons from Grade 6:
  - 6.2.5. 6.2.8, 6.2.11, 6.2.14
  - Combine 6.1.5 and 6.1.6 - focus on finding area of polygons.
- If you need to condense the unit:
  - Combine lessons 7.1.4 and 7.1.5 skipping optional activities.
  - Remove 7.1.6 - optional activity calculating and comparing areas of multiple scaled copies of the same shape.
  - Remove 7.1.8 - optional lesson using a scale drawing to estimate the distance an object traveled
  - Remove 7.1.11 - activity can be moved to at home if additional time is needed
  - Remove 7.8.13 - lesson can be removed as it is additional practice with creating scale drawings

BPS Lesson Modifications:

- Lesson 6 - skip activity, supplement to do more with area on a grid then using the blocks (aligns to EOU #3)
- Lesson 7 (Section B) - more examples/hands on of items that are scaled (minibrands, expandable water toys that "grow, lego sets)
- Lesson 8 - skip? (could use for CCR in Unit 2)
- Lesson 11-13 - optional, could make a BPS lesson/project based on scaling a real object by hand

Family Overview

https://accessim.org/6-8/grade-7/unit-1?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
7.1.1	scaled copy original polygon	
7.1.2	corresponding scale factor figure segment	
7.1.4	quadrilateral measurement distance	corresponding scale factor original
7.1.5	reciprocal	
7.1.6	area one-dimensional two-dimensional	squared
7.1.7	scale drawing scale represent actual three-dimensional	scaled copy
7.1.8	estimate travel constant speed	scale
7.1.9	floor plan	
7.1.10	appropriate dimension	actual represent
7.1.11	scale without units ___ to ___	scale drawing
7.1.12	equivalent scales	___ to ___
7.1.1	scaled copy original polygon	

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 1.1 Printing, Portraits, Scaling F, Pairs of Scaled Polygons
- 1.2 Corresponding Parts
- 1.3 Drawing Scaled Copies
- 1.4 Comparing Pairs of Birds
- 1.6 Scaling a Pattern Block, Scaling More Pattern Blocks
- 1.8 Driving on I-90
- 1.9 Bedroom Floor Plan

For whole course: https://accessim.org/6-8/grade-7/course-guide/required-materials?a=teacher

Provide access as needed throughout the unit:

- Blank paper
- Chart paper
- Geometry toolkits
- Tracing paper, graph paper, colored pencils, scissors, and an index card to use as a straightedge or to mark right angles, ruler and a protractor. Clear protractors with no holes and with radial lines printed on them are recommended.
  Notes: (1) "Tracing paper" is easiest to use when it's a smaller size. Commercially available "patty paper" is 5 inches by 5 inches and ideal for this. If using larger sheets of tracing paper, consider cutting them down for student use. (2) When compasses are required in grades 6–8, they are listed as separate Required Material.
- Graph paper
- Math Community Chart
- Measuring tools
- Metric and customary unit conversion charts
- Pattern blocks
- Sticky notes

Lesson	Materials to Gather	Materials to Copy
1	• Chart paper: Warm-up • Sticky notes: Activity 1	• 6–12 Blank Math Community Chart (1 copy for every 30 students): Warm-up • Pairs of Scaled Polygons Cards (1 copy for every 2 students): Activity 2
2	Geometry toolkits: Activity 1	
3	• Math Community Chart: Warm-up • Sticky notes: Warm-up • Geometry toolkits: Activity 1	
4	Geometry toolkits: Activity 2, Activity 3	
5	Geometry toolkits: Activity 2, Activity 3	• Scaled Copies Cards (1 copy for every 3 students): Activity 1 • Scaling A Puzzle Cutouts (1 copy for

		every 3 students): Activity 2
6	• Pattern blocks: Warm-up, Activity 1 • Geometry toolkits: Activity 2	• Scaled Copies Cards (1 copy for every 3 students): Activity 1 • Scaling A Puzzle Cutouts (1 copy for every 3 students): Activity 2
7	• Math Community Chart: Warm-up • Geometry toolkits: Activity 1, Activity 2	
8	• Geometry toolkits: Activity 2	
9	• Geometry toolkits: Activity 2	
10	• Math Community Chart: Lesson • Math Community Chart: Warm-up • Geometry toolkits: Activity 2	Same Plot, Different Drawings Cards (1 copy for every 24 students): Activity 1
11	• Geometry toolkits: Activity 1, Activity 2	
12	• Metric and customary unit conversion charts: Activity 2 • Geometry toolkits: Activity 3	• Scales Cards (1 copy for every 4 students): Activity 1 • Units of Length Reference Sheet (1 copy for every 2 students): Activity 1 and 2
13	• Blank paper: Activity 1 • Measuring tools: Activity 1 • Graph paper: Activity 2	

Opportunities for Interdisciplinary Connections:

- **Geography:** Students use scale drawings and maps to calculate actual real-world distances
- **Art and Design:** Students explore scaling in the context of printing portraits and analyzing the proportions of various artistic figures
- **Biology:** Scaling is explored through the lens of "Movie Monsters," examining how size changes affect physical properties

Anticipated misconceptions:

- **Grid Dependency:** Students may believe that vertices in a scaled copy must land exactly on the intersections of grid line
- **Additive Scaling:** A common error is thinking that adding a fixed amount to all side lengths, rather than multiplying by a scale factor, creates a scaled copy
- **Area vs. Length:** Students often mistakenly assume that if the side lengths of a figure double, the area also doubles, rather than quadruples

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Find the area of polygons.
- Generate equivalent ratios and justify why they are equivalent

Relevant Unit(s)/Lesson(s) to Review:

- Grade 6 Unit 2: Introducing Ratios

Connections to Future Units:

This unit lays the foundation for work on proportional relationships later in Grade 7. It also prepares students for Grade 8 topics including dilations, similarity, translations, rotations, and reflections

Differentiation through *Universal Design for Learning*

Engagement:

- Display sentence frames during peer collaboration (Lesson 1, Activity 1 Synthesis)
  LT1: Determine whether a figure is a scaled copy of another figure, by examining corresponding side lengths and angle measures.
- Leverage choice around perceived challenge in drawing tasks (Lesson 3, Activity 1 Launch)
  LT2: Draw a scaled copy of a figure using a given scale factor.

Representation:

- Use multiple examples and non-examples of scaled copies (Lesson 1, Activity 2 Launch)
  LT1: Determine whether a figure is a scaled copy of another figure
- Maintain vocabulary displays for corresponding points, segments, and angles (Lesson 2, Activity 1 Launch)
  LT1: Determine whether a figure is a scaled copy of another figure
- Use color coding and annotations to highlight connections between representations (Lesson 4, Activity 1 Synthesis)
  LT1: Determine whether a figure is a scaled copy of another figure

Action & Expression:

- Support working memory with access to sticky notes or mini-whiteboards (Lesson 2, Warm-up Launch)
  LT1: Determine whether a figure is a scaled copy of another figure
- Chunk task of drawing classroom floor plan into manageable parts (Lesson 13, Activity 2 Launch)
  LT5: Generate an appropriate scale to represent an actual distance on a limited drawing size

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 4, 12)
- MLR2: Collect and Display (Lessons 2, 7, 10)
- MLR3: Critique, Correct, Clarify (Lessons 9, 12)
- MLR7: Compare and Connect (Lessons 6, 8, 9, 11, 13)
- MLR8: Discussion Supports (Lessons 1, 2, 3, 4, 5, 7, 11, 12, 13)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as comparing, explaining, and describing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Compare

- Compare, contrast, and critique (orally) scale drawings of the classroom. (Lesson 7 & 8)
- I can use corresponding distances and corresponding angles to tell whether one figure is a scaled copy of another. (Lesson 4)
- When I see a figure and its scaled copy, I can explain what is true about corresponding angles. (Lesson 4)
- When I see a figure and its scaled copy, I can explain what is true about corresponding distances. (Lesson 4)
- I can tell whether two scales are equivalent (Lesson 12).

Explain

- How to use scale drawings to find actual distances (Lessons 7 and 11).
- How to use scale drawings to find actual distances, speed, and elapsed time (Lesson 8).
- The meaning of scales expressed without units (Lesson 11)
- How to use scale drawings to find actual areas (Lesson 12).

Describe

- I can describe some characteristics of a scaled copy (Lesson 1).
- I can describe what the scale factor has to do with a figure and its scaled copy (Lesson 2).
- I can describe the effect on a scaled copy when I use a scale factor that is greater than 1, less than 1, or equal to 1 (Lesson 5).
- I can describe how the area of a scaled copy is related to the area of the original figure and the scale factor that was used (Lesson 6).

Sentence Frames and Stems

Section A

- I know _____ is/is not a scaled copy of _____ because ...
- Corresponding side lengths in scaled copies _____ . Angle measures in scaled copies _____.
- The scale factor between _____ and _____ is _____ because ...
- To create a scaled copy of the figure _____ , I multiplied each side length by the scale factor _____ to get side lengths ...
- If the scale factor is greater/less than one, the copy will be _____ because ...

Section B

- The scale shows that _____ on the drawing represents _____ on the actual object.
- Since the scale is _____ to _____ , then _____ on the drawing means _____ on the actual object.
- When a scale drawing has a scale of _____ to _____ with no units, it means ...
- The scale _____ to _____ and _____ to _____ are equivalent because ...
- If the scale of the drawing is _____, the area of the actual object would be _____ because...

Section C

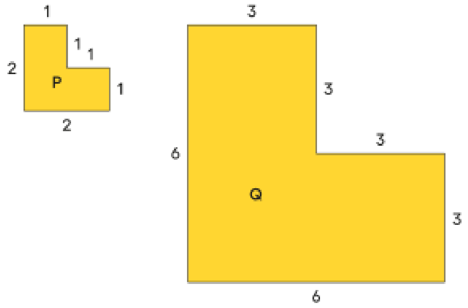
- I chose to use a scale of _____ to _____ because ...
- Since the length of _____ is _____ and I want to make a drawing with length of _____, my scale will be _____ to _____.
- To make a scale floor plan of _____, first I would ...

Unit Outline

In this unit, students study scaled copies of plane figures and scale drawings of real-world objects. Students learn that all lengths in a scaled copy are the result of multiplying the original lengths by a scale factor. Also, the angle measures in a scaled copy are the same as in the original figure.

This work builds on what students learned in previous grades about measuring lengths, areas, and angles. This unit provides a geometric context to preview the type of reasoning that students will use with proportional relationships later in grade 7. It also lays the foundation for grade 8 work on dilations and similarity.

Students begin the unit by looking at copies of a picture and describing what differentiates scaled and non-scaled copies. They calculate scale factors and draw scaled copies of figures. Note that the study of scaled copies is limited to pairs of figures that have the same orientation — in other words, they are not rotations or reflections of each other. In grade 8, students will extend their knowledge of scaled copies when they study translations, rotations, reflections, and dilations.



Next, students study scale drawings. They see that the principles and strategies that they used to reason about scaled copies of figures can also be used with scale drawings. They use scale drawings to calculate actual lengths and areas, and they create scale drawings.

A note about the geometry toolkit:
In the unit, several lesson plans suggest that each student have access to a geometry toolkit. Each toolkit contains tracing paper, graph paper, colored pencils, scissors, a centimeter ruler, a protractor (clear protractors with no holes that show radial lines are recommended), and an index card to use as a straightedge or to mark right angles. Providing students with these toolkits gives opportunities for students to develop abilities to select appropriate tools and use them strategically to solve problems (MP5). Note that even students in a digitally enhanced classroom should have access to such tools. Applets and simulations should be considered additions to their toolkits, not replacements for physical tools.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A: Scaled Copies (Lessons 1-6)	**Learning Target #1** Determine whether a figure is a scaled copy of another figure, by examining corresponding side lengths and angle measures. **Learning Target #2** Draw a scaled copy of a figure using a given scale factor.	**Lesson 1 What are Scaled Copies?** • I can describe some characteristics of a scaled copy. • I can tell whether or not a figure is a scaled copy of another figure. **Lesson 2 Corresponding Parts and Scale Factors** • I can describe what the scale factor has to do with a figure and its scaled copy. • In a pair of figures, I can identify corresponding points, corresponding segments, and corresponding angles. **Lesson 3 Making Scaled Copies** • I can draw a scaled copy of a figure using a given scale factor. • I know what operation to use on the side lengths of a figure to produce a scaled copy. **Lesson 4 Scaled Relationships** • I can use corresponding distances and corresponding angles to tell whether one figure is a scaled copy of another.

		● When I see a figure and its scaled copy, I can explain what is true about corresponding angles. ● When I see a figure and its scaled copy, I can explain what is true about corresponding distances. **Lesson 5 The Size of a Scale Factor** ● I can describe the effect on a scaled copy when I use a scale factor that is greater than 1, less than 1, or equal to 1. ● I can explain how the scale factor that takes Figure A to its copy Figure B is related to the scale factor that takes Figure B to Figure A **Lesson 6 Scaling and Area** ● I can describe how the area of a scaled copy is related to the area of the original figure and the scale factor that was used.
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons. ● **Problem 2:** Points to Emphasize: If most students struggle with creating a scaled copy of a figure, revisit the characteristics of scaled copies when opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about how to create a scale drawing in these activities ○ Grade 7, Unit 1, Lesson 9, Activity 3 Two Maps of Utah ○ Grade 7, Unit 1, Lesson 10, Activity 3 A New Drawing of the Playground	
Section B Scaled Drawings (Lessons 7-12)	**Learning Target #3** Create a scale drawing given the actual measurements of the object or given another scale drawing at a different scale. **Learning Target #4** Explain how to use scales and scale drawings to calculate actual distances and areas.	**Lesson 7 Scale Drawings** ● I can explain what a scale drawing is, and I can explain what its scale means. ● I can use actual distances and a scale to find scaled distances. ● I can use a scale drawing and its scale to find actual distances. **Lesson 8 Scale Drawings & Maps** ● I can use a map and its scale to solve problems about traveling. **Lesson 9 Creating Scale Drawings** ● I can determine the scale of a scale drawing when I know lengths on the drawing and corresponding actual lengths. ● I know how different scales affect the lengths in the scale drawing. ● When I know the actual measurements, I can create a scale drawing at a given scale. **Lesson 10 Changing Scales in Scale Drawings** ● Given a scale drawing, I can create another scale drawing that shows the same thing at a different scale. ● I can use a scale drawing to find actual areas. **Lesson 11 Scales without Units** ● I can explain the meaning of scales expressed without units. ● I can use scales without units to find scaled distances or actual distances. **Lesson 12 Units in Scale Drawings** ● I can tell whether two scales are equivalent. ● I can write scales with units as scales without units
Checkpoint B	***Responding to Student Thinking*** ● Press Pause By this point in the unit, there should be some student mastery of calculating actual lengths and areas from a scale drawing. If students struggle with this, make time to examine related work in the section referred to here. The Course Guide provides additional ideas for revisiting earlier work. (Grade 7, Unit 1, Section B Scale Drawings)	
Section C Draw it to Scale (Lessons 13 - optional)	**Learning Target #5** Generate an appropriate scale to represent an actual distance on a limited drawing size, and explain (orally) the reasoning.	**Lesson 13 Drawing it to Scale** ● I can create a scale drawing of my classroom. ● When given requirements on drawing size, I can choose an appropriate scale to represent an actual object.
End of Unit Assessment		

NOTES:

#7: scale without units, change to have units (if bedroom door is 6 ft tall, and scale is 1 ft = 0.5 cm, how tall is the door?), could look at released SBA questions

Unit Title:

Unit 2: Introducing Proportional Relationships

Relevant Standards: Bold indicates priority

Lesson	**Standards**	**Lesson**	**Standards**
Lesson 1	7.G.A.1	Lesson 9	7.RP.A, 7.RP.A.2
Lesson 2	7.RP.A.2, 7.RP.A.2.b	Lesson 10	7.RP.A.2, 7.RP.A.2.a
Lesson 3	7.RP.A.2.a, 7.RP.A.2.b	Lesson 11	7.RP.A, 7.RP.A.2.b, 7.RP.A.2.d
Lesson 4	7.RP.A.2, 7.RP.A.2.c	Lesson 12	7.RP.A.2
Lesson 5	7.RP.A7.RP.A.2, 7.RP.A.2.b, 7.RP.A.2.c	Lesson 13	7.RP.A.2, 7.RP.A.2.b, 7.RP.A.2.c, 7.RP.A.2.d
Lesson 6	7.RP.A.2, 7.RP.A.2.c	Lesson 14	7.RP.A. 7.RP.A.2
Lesson 7	7.RP.A.2, 7.RP.A.2.a, 7.RP.A.2.c	Lesson 15	7.RP.A.2
Lesson 8	7.RP.A.1, 7.RP.A.2, 7.RP.A.2.a, 7.RP.A.2.c		

Essential Question(s):

- What defines a proportional relationship between two quantities?
- How can a proportional relationship be identified across different representations?
- Why are there two different constants of proportionality for any proportional relationship?

Enduring Understanding(s):

- A proportional relationship exists when two quantities always share the same ratio, meaning one can be found by multiplying the other by a constant multiplier called the constant of proportionality.
- Proportional relationships appear as a set of equivalent ratios in a table, an equation in the form y=kx, and a straight line passing through the origin (0, 0) on a graph.
- Because a proportional relationship can be viewed from two perspectives (e.g., y proportional to x or x proportional to y), there are two constants of proportionality that are always reciprocals of each other.

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 3)
CFA 2: Checkpoint B (after Lesson 6)
CFA 3: Checkpoint C (after Lesson 9)
CFA 4: Checkpoint D (after Lesson 13)
Unit 2 End of Unit Assessment

Pacing for Unit

21 Days

Lessons to Add if prior knowledge needs to be reviewed:

- 6.3.5 - Prioritize activities 2 and 3
- 6.3.6
- 6.3.7 - Prioritize activities 2 and 3
- 6.6.15
- Combine 6.6.16 and 6.6.17

Lessons to condense if needed: :

- Remove 7.2.6 - additional practice that could be done outside of class
- Combine 7.2.7 and 7.2.8 - both lessons focus on comparing relationships (7.2.7 - activities 2 and 3, 7.2.8 - activities 2 and 3)
- Remove 7.2.15 - optional activity

BPS Modifications

- Deemphasize Lesson 5
- Can combine Lessons 14/15 (Lesson 14 is optional)

Family Overview

https://accessim.org/6-8/grade-7/unit-2?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
7.2.1	equivalent ratios	
7.2.2	constant of	equivalent ratios

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 2.1 Crescent Moons
- 2.10 Digital Applet: T-shirts for Sale
- 2.11 Digital Applet: Seagulls Eat What?
- 2.12 Race to the Bumper Cars, Space Rocks
- 2.13 Tables, Graphs, and Equations; Balloon Animal

	proportionality proportional relationship value	row column
7.2.3	___ is proportional to ___ relate constant	reciprocal per
7.2.4	equation quotient	___ is proportional to ___
7.2.5	steady situation	
7.2.6		equation quotient
7.2.7		constant of proportionality proportional relationship
7.2.8		constant
7.2.10	origin coordinate plane plot	
7.2.11	quantity axes coordinates	
7.2.13	x-coordinate y-coordinate	origin
7.2.14		axes
7.2.15	reasonable	

Contest

Provide access as needed throughout the unit:

- Chart paper
- Colored pencils
- Drink mix
- A powder that is mixed with water to create a fruit-flavored or chocolate-flavored drink. Using a sugar-free drink mix is recommended, but not a mix that calls for adding a separate sweetener when mixing up the drink.
- Four-function calculators
- Geometry toolkits (ongoing)
- Internet-enabled device
- Math Community Chart
- Measuring cup
- Measuring spoons
- Mixing containers
- Pre-printed slips, cut from copies of the blackline master
- Rulers
- Small disposable cups
- Snap cubes
- Tools for creating a visual display
  Any way for students to create work that can be easily displayed to the class. Examples: Chart paper and markers, whiteboard space and markers, shared online drawing tool, access to a document camera.
- Water

Lesson	Materials to Gather	Materials to Copy
1	• Math Community Chart: Activity 1 • Colored pencils: Activity 2 • Drink mix: Activity 2 • Measuring cup: Activity 2 • Measuring spoons: Activity 2 • Mixing containers: Activity 2 • Small disposable cups: Activity 2 • Water: Activity 2 • Geometry toolkits: Activity 3	
2	• Measuring cup: Activity 3 • Measuring spoons: Activity 3	
3	• Chart paper: Activity 1 • Math Community Chart: Activity 1	
6	Math Community Chart: Activity 1	
7	• Four-function calculators: Lesson • Math Community Chart: Activity 1	
8	Snap cubes: Activity 3	
9		Biking and Rain Cards (1 copy for every 4 students): Activity 2

10	- Rulers: Activity 2 - Math Community Chart: Activity 3 - Pre-printed slips, cut from copies of the blackline master: Activity 3	Matching Tables and Graphs Cards (1 copy for every 2 students): Activity 3
11	Rulers: Activity 3	
12	- Colored pencils: Activity 2 - Rulers: Activity 2	
13	Rulers: Activity 2	Tables, Graphs, and Equations Handout (1 copy for every 3 students): Activity 2
14	Tools for creating a visual display: Activity 2	Creating and Representing Situations Handout (1 copy for every 1 student): Activity 2
15	- Internet-enabled device: Activity 2 - Tools for creating a visual display: Activity 3	

Opportunities for Interdisciplinary Connections:

- **Culinary Arts:** Students apply proportional reasoning to scale food and drink recipes
- **Environmental Science:** The unit explores water usage efficiency in households and the economic value of recycling aluminum cans

Anticipated misconceptions:

- **Non-origin Graphs:** Students may assume any straight-line graph is proportional, neglecting the requirement that it must pass through the origin (0, 0)
- **Pace vs. Speed:** Students often confuse "moving faster" with having a steeper line on a graph, which may actually represent a slower pace if the axes are reversed

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- equivalent ratios
- derived units: miles per hour; meters per second; dollars per pound; or cents per minute

Relevant Unit(s)/Lesson(s) to Review:
- Grade 6 Unit 3 Unit Rates and Percentages
- Grade 6 Unit 6 Expressions and Equations

Connections to Future Units:

Builds toward the study of linear functions in Grade 8. Reasoning will be applied to multi-step problems and complex rates in later units.

Differentiation through *Universal Design for Learning*

Engagement:
- Recruit interest by inviting students to generate personal examples of proportional relationships (Lesson 14, Activity 1 Launch)
  LT7: Determine whether a given graph represents a proportional relationship
- Provide tools like calculators to facilitate information processing (Lesson 3, Activity 2 Launch)
  LT1: Determine the constant of proportionality for a proportional relationship represented in a table

Representation:
- Use physical cubes to connect symbols to concrete objects like "side length" (Lesson 8, Activity 2 Launch)
  LT5: Determine whether the values in a table could represent a proportional relationship

Action & Expression:
- Support executive function with checklists for using digital tools (Lesson 15, Activity 2 Synthesis)
  LT7: Determine whether a given graph represents a proportional relationship

Supporting Multilingual Learners

Math Language Routines The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts

MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 5, 8, 11, 15)
- MLR2: Collect and Display (Lessons 1, 3, 8, 10, 14)
- MLR3: Critique, Correct, Clarify (Lessons 4, 8, 9, 13)
- MLR4: Information Gap (Lesson 9)
- MLR5: Co-Craft Questions (Lessons 3, 5, 7, 10)
- MLR6: Three Reads (Lessons 2, 6, 9, 12, 15)
- MLR7: Compare and Connect (Lessons 4, 6, 8, 12, 13, 15)
- MLR8: Discussion Supports (Lessons 1, 2, 3, 4, 5, 7, 10, 11, 12, 13, 14, 15)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as comparing, interpreting, and generalizing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Compare

- Drink mixtures and figures (Lesson 1).
- Approaches to solving problems involving proportional relationships (Lesson 6).
- Proportional relationships with nonproportional relationships (Lesson 8).
- Tables, descriptions, and graphs representing the same situations (Lesson 10).
- Graphs of proportional relationships (Lesson 12).

Interpret

- Representations showing equivalent ratios (Lesson 1).
- Tables showing equivalent ratios (Lesson 2).
- Situations involving proportional relationships (Lesson 6 and 9).
- How a graph represents features of a situation (Lesson 11).

Generalize

- About proportional relationships (Lesson 4).
- About equations that represent proportional relationships (Lesson 5).
- About how a constant of proportionality is represented by graphs and tables (Lesson 13).

In addition, students are expected to describe proportional relationships and constants of proportionality, explain how to determine whether or not a relationship is proportional and how to compare and represent situations with different constants of proportionality, justify whether or not a relationship is proportional, and represent proportional and nonproportional relationships in multiple ways.

Sentence Frames and Stems

Section A

- I found the missing values in the table by …
- The constant of proportionality between _____ and _____ is _____ because …
- A second constant of proportionality between _____ and _____ is _____ because …
- The relationship between _____ and _____ is proportional because …

Section B

- The equation _____ represents this proportional relationship because …
- Two equations that represent the same proportional relationship are _____ and _____.
- I used _____ to represent the relationship and find the unknown values to be …
- I used the equation _____ to find the number of _____ when the number of _____ is _____.

Section C

- This situation is/is not a proportional relationship because …
- The values in this table do/do not represent a proportional relationship because …
- The equation _____ represents a proportional relationship because …

Section D

- The graph does/does not represent a proportional relationship because …
- Using the graph, I found the constant of proportionality to be _____ because …
- The constant of proportionality of this graph describes the relationship between _____ and _____.
- The coordinates _____ represent …
- The constant of proportionality of _____ is greater/less than the constant of proportionality of _____ because …
- The equation _____ represents the proportional relationship shown in the graph because …

Section E

- I created a proportional relationship between _____ and _____. The constant of proportionality is _____ and an equation to represent the relationship is _____.
- I am most comfortable representing a proportional relationship with _____ because ...

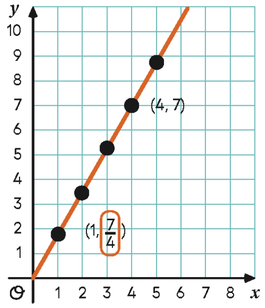
Unit Outline

In this unit, students develop the idea of a proportional relationship. They work with proportional relationships that are represented in tables, as equations, and on graphs. This builds on grade 6 work with equivalent ratios and helps prepare students for the study of linear functions in grade 8.

Students begin by looking at tables. In a table of equivalent ratios, a multiplicative relationship between a pair of rows is given by a scale factor, while the multiplicative relationship between the columns is given by a unit rate. Students learn that the relationship between pairs of values in the two columns is called a "proportional relationship," and the unit rate that describes this relationship is called a "constant of proportionality."

Next, students use equations of the form to represent proportional relationships and solve problems. They determine whether given tables and equations could represent a proportional relationship.

Then students investigate graphs of proportional relationships. They recognize that the graph of a proportional relationship is a straight line through . They interpret points on the graph, including the point . Here is an example of a graph, an equation, and a table that all represent the same proportional relationship.



$y = \boxed{\frac{7}{4}}x$

x	y
0	0
1	$\boxed{\frac{7}{4}}$
2	$\frac{7}{2}$
3	$\frac{21}{4}$
4	7

By the end of the unit, students should be comfortable working with common contexts associated with proportional relationships (such as constant speed, unit pricing, and measurement conversions) and be able to determine whether or not a relationship is proportional. In a later unit, students will apply proportional reasoning to solve multi-step problems and to calculate more complex rates.

A note on using the terms "ratio," "proportional relationship," and "unit rate":
In these materials, the term "ratio" is used to mean a type of association between two or more quantities. A quantity is a measurement that can be specified by a number and a unit, for example 4 oranges, 4 centimeters, or “my height in feet.” A *proportional relationship is a collection of equivalent ratios.*

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Representing Proportional Relationships with Tables (Lessons 1-3)	**Learning Target #1** Determine whether a figure is a scaled copy of another figure, by examining corresponding side lengths and angle measures. **Learning Target #2** Draw a scaled copy of a figure using a given scale factor.	**Lesson 1 One of These Things Is Not Like the Others** • I can use equivalent ratios to describe scaled copies of shapes. • I know that two recipes will taste the same if the ingredients are in equivalent ratios. **Lesson 2 Introducing Proportional Relationships with Tables** • I can use a table to reason about two quantities that are in a proportional relationship. • I understand the terms proportional relationship and constant of proportionality **Lesson 3 More about Constant of Proportionality** • I can find missing information in a proportional relationship using a table. • I can find the constant of proportionality from information given in a table.
Checkpoint A	***Responding to Student Thinking*** Press Pause: By this point in the unit, there should be some student mastery of working with a table that represents a proportional relationship and identifying the constant of proportionality. If students struggle with this, make time to examine related work in the lessons referred to here. The Course Guide provides additional ideas for revisiting earlier work. • Grade 7, Unit 2, Lesson 2 Introducing Proportional Relationships with Tables • Grade 7, Unit 2, Lesson 3 More about Constant of Proportionality	
Section B Representing Proportional Relationships with	**Learning Target #3** Use an equation to solve problems involving a proportional relationship.	**Lesson 4 Proportional Relationships and Equations** • I can write an equation of the form to represent a proportional relationship shown in a table or described in a story.

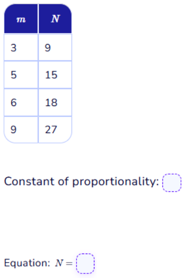
Equations (Lessons 4-6)	**Learning Target #4** Write an equation of the form y=kx to represent a proportional relationship, given a table or a description of the situation	● I can write the constant of proportionality as an entry in a table. **Lesson 5 Two Equations for Each Relationship** ● I can find two constants of proportionality for a proportional relationship. ● I can write two equations representing a proportional relationship described by a table or story **Lesson 6 Writing Equations to Represent Relationships** ● I can find missing information in a proportional relationship using the constant of proportionality. ● I can relate all parts of an equation to the situation it represents.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with writing an equation that represents a proportional relationship, as opportunities arise over the next several lessons, revisit the structure and meaning of an equation of the form y=kx. For example, in the activity referred to here, invite multiple students to share their thinking about the structure of the equations. ○ Grade 7, Unit 2, Lesson 8, Activity 3 Total Edge Length, Surface Area, and Volume ● **Problem 2:** Points to Emphasize: If most students struggle with using an equation to find unknown values, revisit this concept as opportunities arise over the next several lessons. For example, in the activity referred to here, invite multiple students to share their thinking about substituting values and evaluating expressions. ○ Grade 7, Unit 2, Lesson 8, Activity 2 More Conversions	
Section C Comparing Proportional and Nonproportional Relationships (Lessons 7-9)	**Learning Target #5** Determine whether the values in a table could represent a proportional relationship. **Learning Target #6** Use a table to determine whether an equation represents a proportional relationship	**Lesson 7 Comparing Relationships with Tables** ● I can decide if a relationship represented by a table could be proportional and when it is definitely not proportional. **Lesson 8 Comparing Relationships with Equations** ● I can decide if a relationship represented by an equation is proportional or not **Lesson 9 Solving Problems about Proportional Relationships** ● I can ask questions about a situation to determine whether two quantities are in a proportional relationship. ● I can solve all kinds of problems involving proportional relationships
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of determining whether or not a table could represent a proportional relationship. If students struggle with this, make time to examine related work in the section referred to here. The Course Guide provides additional ideas for revisiting earlier work. ○ Grade 7, Unit 2, Section C Comparing Proportional and Nonproportional Relationships ● **Problem 2:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section D Representing Proportional Relationships with Graphs (Lessons 10-13)	**Learning Target #7** Determine whether a given graph represents a proportional relationship. **Learning Target #8** Identify the constant of proportionality from the graph of a proportional relationship. **Learning Target #9** Interpret points on the graph of a proportional relationship.	**Lesson 10 Introducing Graphs of Proportional Relationships** ● I know that the graph of a proportional relationship lies on a line through (0, 0). **Lesson 11 Interpreting Graphs of Proportional Relationships** ● I can draw the graph of a proportional relationship given a single point on the graph (other than the origin). ● I can find the constant of proportionality from a graph. ● I understand the information given by graphs of proportional relationships that are made up of points or a line. **Lesson 12 Using Graphs to Compare Relationships** ● I can compare two, related proportional relationships based on their graphs. ● I know that the steeper graph of two proportional relationships has a larger constant of proportionality **Lesson 13 Two Graphs for Each Relationship**

<table>
<tr><td></td><td></td><td>● I can interpret a graph of a proportional relationship using the situation.
● I can write an equation representing a proportional relationship from a graph.
● I understand the relationship between a polyhedron and its net.</td></tr>
<tr><td>Checkpoint D</td><td colspan="2"><i>Responding to Student Thinking</i>
● Problem 1: Points to Emphasize: If most students struggle with determining whether or not a graph represents a proportional relationship, revisit this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about this using the graphs in the lessons referred to here.
○ Grade 7, Unit 3, Lesson 1 How Well Can You Measure?
○ Grade 7, Unit 3, Lesson 3 Exploring Circumference
● Problem 2: Press Pause: By this point in the unit, there should be some student mastery of interpreting points on the graph of a proportional relationship. If students struggle with this, make time to examine related work in the lessons referred to here. The Course Guide provides additional ideas for revisiting earlier work.
○ Grade 7, Unit 2, Lesson 11 Interpreting Graphs of Proportional Relationships
○ Grade 7, Unit 2, Lesson 13 Two Graphs for Each Relationship</td></tr>
<tr><td>Section E
Let's Put it To Work
(Lessons 14-15)</td><td>No new learning targets.</td><td>Lesson 14 Four Representations
● I can make connections between the graphs, tables, and equations of a proportional relationship.
● I can use units to help me understand information about proportional relationships
Lesson 15 Using Water Efficiently
● I can answer a question by representing a situation using proportional relationships</td></tr>
</table>

End of Unit Assessment

NOTES

Replace question 3 on EOU, completed table asking them to state the constant of proportionality



m	N
3	9
5	15
6	18
9	27

Constant of proportionality: ☐

Equation: $N =$ ☐

Reword question 7:

Original A recipe for salad dressing calls for 3 tablespoons of oil for every 2 tablespoons of vinegar

New A recipe for salad dressing calls for 2 tablespoons of vinegar for every 3 tablespoons of oil

Unit Title:

Unit 3: Measuring Circles

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.RP.A.2.a	Lesson 7	7.G.A, 7.G.B, 7.G.B.4, 7.RP.A.2.a
Lesson 2	7.G.A, 7.G.A.2	Lesson 8	7.G.B.4
Lesson 3	7.G.B.4, 7.RP.A.2, 7.RP.A.2.a	Lesson 9	7.G.B.4
Lesson 4	7.G.B.4	Lesson 10	7.G.B.4
Lesson 5	7.G.B.4, 7.RP.A.2.a, 7.RP.A.2.c, 7.RP.A.3	Lesson 11	7.EE.B.3, 7.G.A.1, 7.G.B.4
Lesson 6	7.G.A.1, 7.G.B, 7.G.B.6		

Essential Question(s):

- What is the relationship between a circle's diameter and its circumference?
- How can we determine the area of a circular region?
- How do I decide whether a situation involves circumference or area?

Enduring Understanding(s):

- The circumference of any circle is proportional to its diameter, and the exact value of this constant of proportionality is pi (π).
- The area of a circle can be calculated using the formula $A=\pi r^2$, which can be justified by decomposing and rearranging circular parts into shapes that approximate polygons like parallelograms.
- Circumference is a one-dimensional measure of the distance around a circle's boundary, while area is a two-dimensional measure of the surface space inside that boundary.

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 5)
CFA 2: Checkpoint B (after Lesson 9)
Checkpoint C (after Lesson 11) is an opportunity for feedback
Unit 3 End of Unit Assessment

Pacing for Unit

13 Days

Lesson to Review/Add:

- 6.1.6 - Focus on area of parallelograms
- 6.1.9 - Focus on area of triangles

Lesson Modifications to Condense the Unit:

- Deemphasize lesson 5 and 11
- 7.3.5 - lesson is optional
- 7.3.11 - lesson can be removed or moved to outside of class if time does not allow

Family Overview

https://accessim.org/6-8/grade-7/unit-3?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
7.3.1	relationship perimeter	
7.3.2	radius diameter circumference center (of a circle)	circle
7.3.3	pi (π)	
7.3.4	half-circle rotation approximation	
7.3.5		diameter circumference pi (π)

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 3.1 Perimeter of a Square
- 3.2 Drawing Circles
- 3.3 Measuring Circumference and Measuring Circumference Graph
- 3.4 Using pi
- 3.7 Estimating the Area of a Circle
- 3.8 Making Another Polygon out of a Circle

Provide access as needed throughout the unit:

- Blank paper
- Compasses
- Cylindrical household items
- Empty toilet paper roll
- Four-function calculators
- Geometry toolkits (ongoing)
- Glue or glue sticks

		travel
7.3.6		approximate estimate
7.3.7	area of a circle	
7.3.8	squared formula	radius area of a circle
7.3.9	in terms of π	
7.3.10		squared center (of a circle) formula
7.3.11	design	

- Markers
- Math Community Chart
- Measuring tapes
- Receipt tape
- Rulers
- Rulers marked with centimeters
- Scissors

Lesson	Materials to Gather	Materials to Copy
1	• Rulers marked with centimeters: Activity 1 • Four-function calculators: Activity 2	
2	• Compasses: Activity 3 • Rulers: Activity 3	Sorting Round Objects Cards (1 copy for every 2 students): Activity 1
3	• Empty toilet paper roll: Warm-up • Cylindrical household items: Activity 1 • Measuring tapes: Activity 1	
4	Four-function calculators: Activity 1	
5	• Blank paper: Activity 1 • Cylindrical household items: Activity 1 • Receipt tape: Activity 1 • Rulers: Activity 1	
6	• Geometry toolkits: Lesson • Geometry toolkits: Activity 1	
7	Geometry toolkits: Activity 1, Activity 2	Estimating Areas of Circles Handout (1 copy for every 12 students): Activity 1
8	• Blank paper: Activity 1 • Glue or glue sticks: Activity 1 • Markers: Activity 1 • Scissors: Activity 1	Making a Polygon out of a Circle Cutouts (1 copy for every 12 students): Activity 1
10	Math Community Chart: Activity 1	• Circle Problems Cards (1 copy for every 2 students gg): Activity 1 • Visual Display of Circle Problem Handout (1 copy for every 10 students): Activity 2 • Merry-go-round and Unicycle Cards (1 copy for every 4 students): Activity 4
11	• Blank paper: Activity 2 • Compasses: Activity 2 • Geometry toolkits: Activity 2	

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
- **History and Culture:** Students examine the geometry involved in Hopi Basket Weaving - **Art:** Students design stained-glass windows using circumference and area calculations - **Agriculture**: The unit uses the context of field irrigation to estimate circular areas	- **Measurement Error:** Students may discount mathematical patterns because their physical measurements of circumference and diameter are not perfectly proportional due to human error. - **Pi Placement:** When solving for diameter ($d=C/\pi$), students might multiply the circumference by π instead of dividing. - **Formula Confusion:** Students often apply the circumference formula ($2\pi r$) when the problem asks for area (πr^2), and vice versa See teacher's guide for additional misconceptions by lesson.
Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: - Find the perimeter of polygons. - Find the constant of proportionality. **Relevant Unit(s)/Lesson(s) to Review:** - Grade 6 Unit 1: Area and Surface Area	Serves as a bridge to advanced proportional applications and prepares students for Grade 8 work on the volume of spheres, cylinders, and cones.

Differentiation through *Universal Design for Learning*

Engagement:

- Develop effort and persistence by connecting new concepts like scaling circles to prior success with pattern blocks (Lesson 8, Activity 2 Launch)
  LT3: Justify that the area of a circle can be calculated with the formula

Representation:

- Provide reference sheets for polygon area formulas (Lesson 6, Activity 1 Launch)
  LT5: Solve problems involving the area of a circle
- Use digital applets to visualize cutting and "unrolling" circles (Lesson 8, Activity 2 Launch)
  LT3: Justify that the area of a circle can be calculated with the formula

Action & Expression:

- Support communication by providing sentence frames for critiquing claims (Lesson 10, Activity 3 Student Task)
  LT6: Critique claims about the radius, diameter, circumference, or area of a circle

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 1, 11)
- MLR2: Collect and Display (Lessons 2, 4, 7, 8, 10)
- MLR3: Critique, Correct, Clarify (Lessons 2, 8, 10, 11)
- MLR4: Information Gap (Lesson 10)
- MLR5: Co-Craft Questions (Lessons 4, 5, 11, 13)
- MLR6: Three Reads (Lessons 6, 8, 11, 14)
- MLR7: Compare and Connect (Lessons 4, 9, 10, 13)
- MLR8: Discussion Supports (Lessons 1, 2, 3, 5, 9, 10, 11)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as generalizing, justifying, and interpreting. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Generalize

- About categories for sorting circles (Lesson 2).

- About the relationship between circumference and diameter (Lesson 3).
- About circumference and rotation (Lesson 5).
- About the relationship between the radius and the area of a circle (Lesson 8).

Justify

- Reasoning about circumference and perimeter (Lesson 4).
- Estimates for the areas of circles (Lesson 7).
- Reasoning about areas of curved figures (Lesson 9).
- Reasoning about the cost of stained-glass windows (Lesson 11).

Interpret

- Situations involving circles (Lessons 5 and 8).
- Floor plans and maps (Lesson 6).
- Situations involving circumference and area (Lesson 10).

Sentence Frames and Stems

Section A

- The diameter of the circle is _____.
- I know the radius of the circle is _____ because the diameter is _____ and ...
- The equation _____ can be used to find the circumference of a circle with a diameter/radius of _____.
- The diameter of the circle is _____ with a circumference of _____. I know these values have a proportional relationship because ...
- If I know the _____ of a circle, I can find the _____ by ...
- The circumference of the circle is _____ because ...

Section B

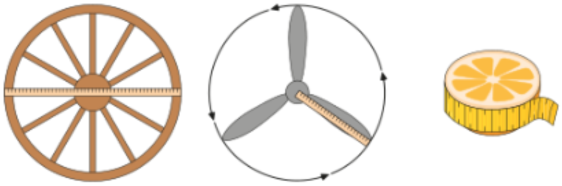
- The difference between circumference and area of a circle is ...
- I calculated the area of the circle by ...
- The area of the circle is _____ because ...
- The equation _____ can be used to find the area of a circle with a diameter/radius of _____.
- To find the area of a shaded region, first I _____, then I _____ ...

Section C

- For this question, I need to find the _____ of a circle because...
- I know the _____ of the circle, which I can use to find the _____. This will help me solve this problem because ...
- I used the equation _____ to solve this problem because ...

Unit Outline

In this unit, students apply their knowledge of proportional relationships to the context of measuring circles. They learn the relationships between radius, diameter, circumference, and area of circles and use these relationships to solve problems. This builds on students' work from previous grades with perimeter and area of polygons. Students will build on this work in grade 8 when they study the volume of spheres, cylinders, and cones.



The unit begins with activities designed to help build up students' vocabulary for describing circles more precisely. The terms "center," "radius," "diameter," and "circumference" are introduced. Then students investigate the relationship between circumference and diameter and see that it is a proportional relationship. They apply this relationship to solve problems.

Next, students explore the area of circular regions. They see an informal derivation that shows where the formula $A=\pi r2$ comes from and then use this formula to solve problems. Finally, students solve problems that require deciding whether the situation relates to the circumference or area of a circle.

The first section of this unit, in which students recognize and apply proportional relationships involving circumference, serves as a bridge between the foundational work with proportional relationships in the previous unit and the more advanced applications in the following unit. The remaining sections of this unit, which deal with the area of circles, are preparation for the continued geometry work students will do later in this course.

A note on using the term "circle":
Strictly speaking, a circle is one-dimensional. It is the boundary of a two-dimensional region, rather than the region itself. The circular region is called a "disk." Because students are not yet expected to make this distinction, these materials refer to both disks and the boundaries of disks as "circles," using illustrations to eliminate ambiguity.

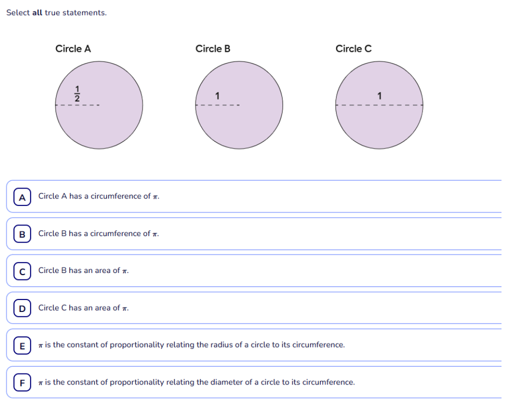
Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Circumference of a	**Learning Target #1**	**Lesson 1 How Well Can You Measure?**

Circle (Lessons 1-5)	Recognize that there are proportional relationships between the circumference, diameter, and radius of circles and express these relationships using equations. **Learning Target #2** Solve problems involving circumference.	● I can examine quotients and use a graph to decide whether two associated quantities are in a proportional relationship. ● I understand that it can be difficult to measure the quantities in a proportional relationship accurately. **Lesson 2 Exploring Circles** ● I can describe the characteristics that make a shape a circle. ● I can identify the diameter, center, radius, and circumference of a circle. **Lesson 3 Exploring Circumference** ● I can describe the relationship between circumference and diameter of any circle ● I can explain what pi means **Lesson 4 Applying Circumference** ● I can choose an approximation for pi based on the situation or problem. ● If I know the radius, diameter, or circumference of a circle, I can find the other two **Lesson 5 Circumference & Wheels** ● If I know the radius or diameter of a wheel, I can find the distance the wheel travels in some number of revolutions.
Checkpoint A	***Responding to Student Thinking*** More Chances Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons	
Section B Area of a Circle (Lessons 6-9)	**Learning Target #3** Justify that the area of a circle can be calculated with the formula. **Learning Target #4** Recognize that the area of a circle is not proportional to its diameter or radius. **Learning Target #5** Solve problems involving the area of a circle.	**Lesson 6 Estimating Areas** ● I can calculate the area of a complicated shape by breaking it into shapes whose area I know how to calculate. **Lesson 7 Exploring the Area of a Circle** ● If I know a circle's radius or diameter, I can find an approximation for its area. ● I know whether or not the relationship between the diameter and area of a circle is proportional and can explain how I know. **Lesson 8 Relating Area to Circumference** ● I can explain how the area of a circle and its circumference are related to each other ● I know the formula for the area of a circle. **Lesson 9 Applying Area of Circles** ● I can calculate the area of more complicated shapes that include fractions of circles ● I can write exact answers in terms of pi
Checkpoint B	***Responding to Student Thinking*** Points to Emphasize If most students struggle with finding the area of a circle and expressing it in terms of , revisit this concept when opportunities arise over the next several lessons.	
Section C Lets put it to work (Lessons 10-11)	**Learning Target #6** Critique (orally and in writing) claims about the radius, diameter, circumference, or area of a circle in a real-world situation. **Learning Target #7** Decide whether to calculate the circumference or area of a circle to solve a problem in a real-world situation, and justify (orally) the decision.. **Learning Target #8** Estimate measurements of a circle in a real-world situation, and explain (orally and in writing) the estimation strategy.	**Lesson 10 Distinguishing Circumference and Area** ● I can decide whether a situation about a circle has to do with area or circumference. ● I can use formulas for circumference and area of a circle to solve problems. **Lesson 11 Stained-Glass Windows** ● I can apply my understanding of area and circumference of circles to solve more complicated problems.

End of Unit Assessment

NOTES

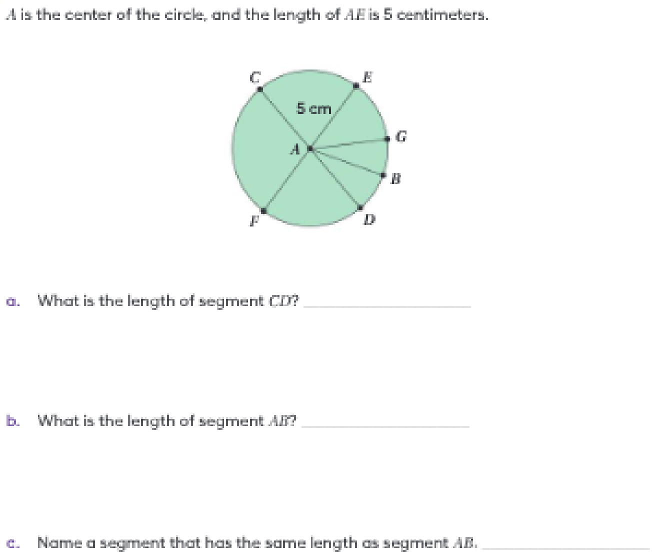
Replace question 3 on the EOU test version A with question 3 on the EOU test version B



Select **all** true statements.

- ☐ A Circle A has a circumference of π.
- ☐ B Circle B has a circumference of π.
- ☐ C Circle B has an area of π.
- ☐ D Circle C has an area of π.
- ☐ E π is the constant of proportionality relating the radius of a circle to its circumference.
- ☐ F π is the constant of proportionality relating the diameter of a circle to its circumference.

Possibility for a question like this added to the test? Name 2 radii and name 2 diameters?

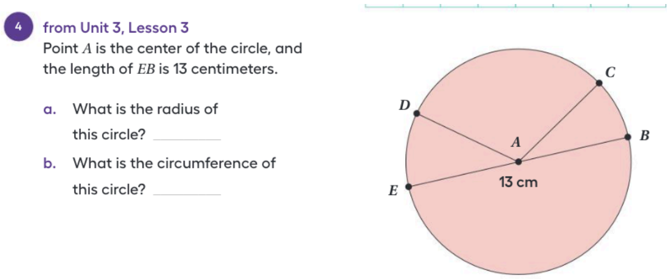


A is the center of the circle, and the length of AE is 5 centimeters.

a. What is the length of segment CD? ________________

b. What is the length of segment AB? ________________

c. Name a segment that has the same length as segment AB. ________________

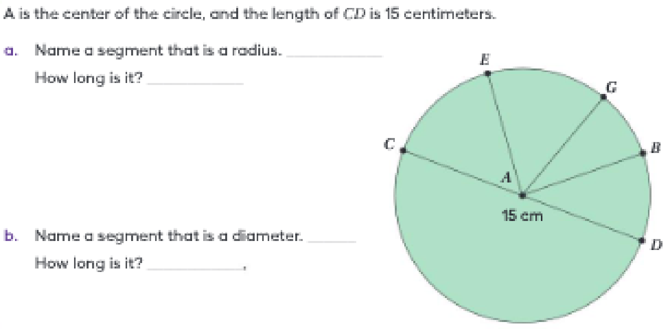


4 from Unit 3, Lesson 3

Point A is the center of the circle, and the length of EB is 13 centimeters.

a. What is the radius of this circle? ________

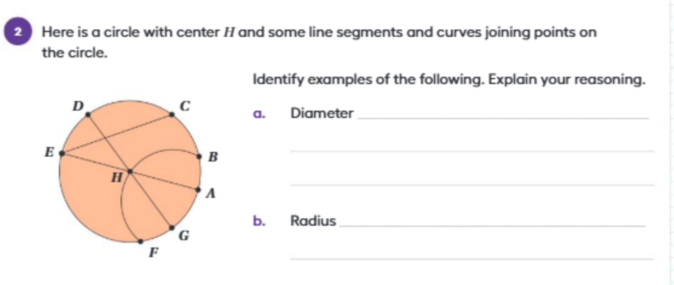
b. What is the circumference of this circle? ________



A is the center of the circle, and the length of CD is 15 centimeters.

a. Name a segment that is a radius. ________
How long is it? ________

b. Name a segment that is a diameter. ________
How long is it? ________.



2 Here is a circle with center H and some line segments and curves joining points on the circle.

Identify examples of the following. Explain your reasoning.

a. Diameter ________________

b. Radius ________________

Rewrite question 7:

Original: A store sells 50-pound bags of grass seed. One pound of grass seed covers about 400 square feet of field.

New: A store sells bags of grass seed. One bag of grass seed covers 20,000 sq feet.

Unit Title:

Unit 4: Proportional Relationships and Percentages

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1		Lesson 9	7.RP.A.3
Lesson 2	7.RP.A.1	Lesson 10	7.EE.A.2, 7.RP.A.3
Lesson 3	7.RP.A.1, 7.RP.A.2	Lesson 11	7.RP.A.3
Lesson 4	7.EE.A.2, 7.RP.A.2	Lesson 12	7.RP.A.3
Lesson 5	7.NS.A.2.d, 7.RP.A.2	Lesson 13	7.RP.A.3
Lesson 6	7.RP.A.1	Lesson 14	7.RP.A.3
Lesson 7	7.RP.A.3	Lesson 15	7.RP.A.3
Lesson 8	7.EE.A.2, 7.RP.A.3	Lesson 16	7.RP.A.3

Essential Question(s):

- How can I calculate a new amount after a percentage increase or decrease?
- What does the "original amount" represent in percentage problems?
- How are real-world costs like sales tax, tips, and discounts modeled?

Enduring Understanding(s):

- A percent change can be found by adding or subtracting a percentage of the original amount to/from the original, or by multiplying the original amount by a single scale factor like (1+0.25) for an increase.
- In situations involving percent increase or decrease, the initial or original value always corresponds to 100%.
- Taxes and tips are modeled as percent increases on a subtotal, while discounts and markdowns are modeled as percent decreases.

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 5)
CFA 2: Checkpoint B (after Lesson 9)
CFA 3: Checkpoint C (after Lesson 14)
Checkpoint D (after Lesson 16) is an opportunity for feedback)
Unit 4 End of Unit Assessment

Pacing for Unit

20 Days

Lessons to Add/Review:

- 6.3.14 - focus on strategies to solve problems involving percentages. Problem and Data Card discussion is highly suggested.
- 6.5.8 - focus on strategies for solving decimal multiplication problems.
- 6.5.11 - focus on strategies for solving decimal division problems.

Lesson Modifications to Condense Unit if Needed:

- Remove lessons 2 and 3 (Not relevant to overarching percent learning targets).
- Combine 7.4.8 and 7.4.9 - remove optional activities to help compact lessons. Optional lessons could be used as additional practice outside of class.
- Deempphasize 7.4.15 - an optional lesson finding and analyzing intervals of possible error based on maximum possible errors.
- Move 7.4.16 to outside of class - culminating lesson on percentages, students work at home to collect news clippings that mention percentages and sort them according to whether they are about percent increase or percent decrease, and formulate questions about them. Discussion could take place in class.
- Combine lesson 8 and 9 and remove optional activities if needed

Family Overview

https://accessim.org/9-12-aga/algebra-1/unit-5?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

Aligned Unit Materials, Resources, and Technology

Lesson	New Terminology receptive	 productive
4.1	percentage	
7.4.2		unit rate
7.4.4	(a fraction) more than (a fraction) less than initial / original amount final / new amount	tape diagram distributive property
7.4.5	repeating decimal long division decimal representation	
7.4.6	percent increase percent decrease	(a fraction) more than (a fraction) less than
7.4.7	discount	initial / original amount final / new amount
7.4.10	sales tax tax rate tip	percent increase
7.4.11	interest commission markup markdown	percent decrease
7.4.12		percentage discount
7.4.13	measurement error	
7.4.14	percent error	

Digital Applets

- 4.2 Scaling the Mona Lisa
- 4.9 Appetizers, entrees, and desserts

Provide access as needed throughout the unit:

- Four-function calculators
- Grocery store circulars
- Grocery store advertisements from the newspaper or that are picked up at the store. If students have internet access, an online version could be substituted.
- Math Community Chart
- Sticky notes
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
4		• Fractional Relationships Cards (1 copy for every 2 students): Activity 2
5		• More Representations Cards (1 copy for every 2 students): Activity 3
8	• Four-function calculators: Activity 1	
10	• Four-function calculators: Activity 1, Activity 2, Activity 3	
11	• Math Community Chart: Activity 1 • Four-function calculators: Activity 2	• Percentage Situations Cards (1 copy for every 2 students): Activity 1
12	• Four-function calculators: Activity 1	• Sporting Goods Cards (1 copy for every 2 students): Activity 1
13		• Measurement to the Nearest Cutouts (1 copy for every 2 students): Warm-up
14	• Four-function calculators: Activity 2	
15		
16	• Grocery store circulars: Warm-up, Activity 1 • Sticky notes: Activity 2 • Tools for creating a visual display: Activity 2	

Opportunities for Interdisciplinary Connections:

- **Social Studies:** Students investigate the history and specific dimensions required for the U.S. Flag
- **Economics:** Real-world financial applications include calculating sales tax, tips, and store discounts
- **Earth Science:** Percentages are used to analyze environmental changes, such as the drying of the Aral Sea

Anticipated misconceptions:

- **Long Division Setup:** Students may reverse the divisor and dividend when converting fractions to decimals
- **"Moving the Decimal":** Students may overgeneralize decimal rules, thinking 3.5% is 0.35 instead of 0.035
- **Percent Error Reference:** In percent error problems, students might divide the error by the measured value instead of the actual value

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: - Ratio, rates, and unit rates - Understanding of rates to include percentages as rates per 100 and reasoning about situations involving whole-number percentages **Relevant Unit(s)/Lesson(s) to Review:** - Grade 6 Unit 3: Unit Rates and Percentages - Grade 6 Unit 5: Arithmetic and Base Ten	Provides the groundwork for high school work with exponential functions and compounded percent changes.

Differentiation through *Universal Design for Learning*

Engagement:
- Leverage choice around perceived challenge in sorting or matching activities (Lesson 1, Activity 3 Synthesis)
  LT1: Create algebraic expressions that represent a situation involving adding or subtracting a fraction of the initial value

Representation:
- Activate background knowledge with documents containing mixed number arithmetic strategies (Lesson 1, Activity 1 Launch)
  LT1: Create algebraic expressions that represent a situation involving adding or subtracting a fraction of the initial value

Action & Expression:
- Internalize executive functions by inviting students to rephrase directions in their own words (Lesson 9, Activity 1 Launch)
  LT3: Create algebraic expressions or equations that represent a situation involving percent increase or decrease

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:
- MLR1: Stronger and Clearer Each Time (Lessons 3, 5, 8, 9, 15)
- MLR2: Collect and Display (Lessons 3, 4, 5, 8, 10, 13)
- MLR3: Critique, Correct, Clarify (Lessons 3, 5, 7, 12, 14)
- MLR4: Information Gap (Lessons 9, 12)
- MLR5: Co-Craft Questions (Lessons 2, 8, 10, 15, 16)
- MLR6: Three Reads (Lessons 2, 6, 7, 14, 15)
- MLR7: Compare and Connect (Lessons 1, 2, 4, 6, 10, 13, 16)
- MLR8: Discussion Supports (Lessons 1, 2, 4, 6, 10, 11, 14)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as interpreting, explaining, and representing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Interpret
- Situations involving constant speed (Lesson 2).
- Concrete problems involving percent increase and decrease (Lesson 7).
- Problems involving sales tax and tip (Lesson 10).
- Concrete situations involving percent error (Lesson 14).

Explain
- How to solve concrete and abstract problems involving an amount plus (or minus) a fraction of that amount (Lesson 4).
- How to solve percent change problems (Lesson 6).
- Strategies for solving percent problems with fractional percentages (Lesson 9).
- How to measure lengths and interpret measurement error (Lesson 13).
- Strategies for solving percent error problems (Lesson 14).

Represent

- Situations involving percent increase and decrease (Lessons 8 and 15).
- Situations from the news involving percent change (Lesson 16).

Sentence Frames and Stems

Section A

- I know _____ is/is not a scaled copy of _____ because ...
- The scale factor from _____ to _____ is _____ because ...
- The constant of proportionality is ____, and I can use it to help me find _____ because ...
- I can use the distributive property to represent _____ more than _____ with the equation _____.
- I used long division to generate the decimal _____ from the fraction _____.

Section B

- The amount increased/decreased by _____ which is _____ percent of the original amount _____.
- I used _____ to represent _____ percent increase/decrease because ...
- I found the new amount to be _____ after the original amount _____ increased/decreased by _____ percent.
- I wrote the equation_____ to model this situation because ...

Section C

- In this situation, the _____ can be represented with a percent increase/decrease and the equation _____.
- I used the decimal value _____ to represent the percent _____ in the expression _____ to find the _____.
- If the regular price is _____, a discount of _____ percent would make the sale price _____.
- The percent error in this situation is _____ because ...

Section D

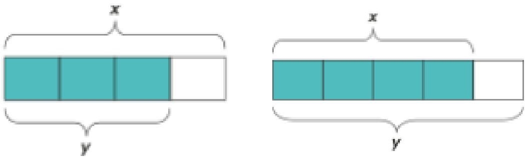
- There is a percent increase/decrease of _____ from _____ to _____.
- I know this situation is asking about a percent increase/decrease because ...
- I used _____ to model the situation because ...
- I used the equation _____ to solve this problem because ...

Unit Outline

In this unit, students deepen their understanding of proportional relationships and percentages. They solve multi-step problems and work with situations that involve fractional amounts. This builds on the work students did in grade 6 with ratios, rates, and percentages as well as previous units in grade 7 with proportional relationships. Students will build on this work in high school with exponential functions representing compounded percent increase and decrease.

Students begin the unit by revisiting constant rates, but this time the given values are fractional amounts. To determine the unit rate for the situation, students must compute the quotient of two fractions. Students also make sense of situations where an increase or decrease is expressed as a fraction of the initial amount. They create diagrams and apply the distributive property to generate expressions that represent these situations. They also use long division to write fractions as decimals, including their first introduction to repeating decimals.

Next, students make sense of situations where an increase or decrease is expressed as a percentage of the initial amount. They continue creating diagrams and writing equations to represent the situations. They solve for any one of the three quantities—the initial amount, the final amount, or the percentage of the change—given the other two quantities. They also reason about fractional percentages.



$y = x - \frac{1}{4}x$	$y = x + \frac{1}{4}x$
$y = \left(1 - \frac{1}{4}\right)x$	$y = \left(1 + \frac{1}{4}\right)x$
$y = \frac{3}{4}x$	$y = \frac{5}{4}x$
$y = (1 - 0.25)\,x$	$y = (1 + 0.25)\,x$
$y = 0.75x$	$y = 1.25x$
"a 25% decrease"	"a 25% increase"

Then students apply percent increase and decrease to solve problems in a variety of real-world situations, such as tax, tip, interest, markup, discount, depreciation, and commission. Lastly, students make sense of situations where the difference between a correct measurement and an incorrect measurement is expressed as a percentage of the correct amount.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Proportional Relationship with	**Learning Target #1** Create algebraic expressions that represent a situation involving	**Lesson 1 Lots of Flags** • I can find dimensions on scaled copies of a rectangle • I can remember how to compute percentages

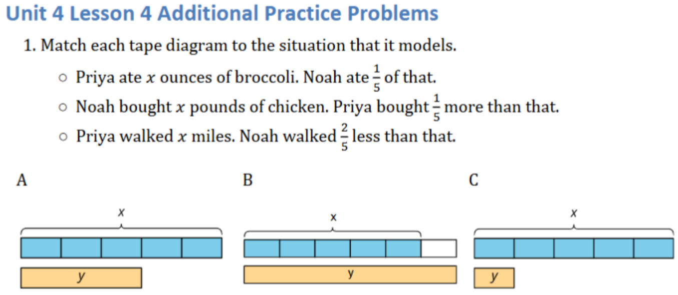
Fractions (Lessons 1-5)	adding or subtracting a fraction of the initial value. Solve problems about proportional relationships with fractional quantities. **Learning Target #2** Use long division to generate a decimal representation of a fraction.	**Lesson 2 Ratios and Rates with Fractions** ● I can solve problems about ratios of fractions and decimals **Lesson 3 Revisiting Proportional Relationships** ● I can use a table with 2 rows and 2 columns to find an unknown value in a proportional relationship ● When there is a constant rate, I can identify the two quantities that are in a proportional relationship **Lesson 4 More than That, Less than That** ● I can use the distributive property to rewrite an expression like x+1/2x as (1+½)x ● I understand that “half as much again” and “multiply by 3/2” mear the same thing **Lesson 5 Say it with Decimals** ● I can use the distributive property to rewrite an equation like x+0.5x=1.5x ● I can write fractions as decimals ● I understand that “half as much again” and “multiply by 1.5” mean the same thing
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time. ● **Problem 2:** By this point in the unit, there should be some student mastery of using the distributive property to generate expressions that represent a fractional increase. If students struggle, make time to revisit related work in the lesson referred to here. ● **Problem 3:** If students struggle with converting a fraction to a decimal, revisit this concept as opportunities arise over the next several lessons.	
Section B Percent Increase and Decrease (Lessons 6-9)	**Learning Target #3** Create algebraic expressions or equations that represent a situation involving percent increase or decrease. **Learning Target #4** Use diagrams to solve problems involving percent increase or decrease.	**Lesson 6 Increasing and Decreasing** ● I can draw a tape diagram that represents a percent increase or decrease. ● When I know a starting amount and the percent increase or decrease, I can find the new amount. **Lesson 7 One Hundred Percent** ● I can use a double number line diagram to help me solve percent increase and decrease problems. ● I understand that if I know how much a quantity has grown, then the original amount represents 100%. ● When I know the new amount and the percentage of increase or decrease, I can find the original amount. **Lesson 8 Percent Increase and Decrease with Equations** ● I can solve percent increase and decrease problems by writing ar equation to represent the situation and solving it. **Lesson 9 Part of a Percent** ● I can find fractional percentages (like 12.5% or 0.4%) of quantities. ● I understand that to find 0.1% of a quantity, I have to multiply by 0.001.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** If students struggle with finding the percentage of an increase or decrease, revisit this concept as opportunities arise over the next several lessons. ● **Problem 2:** By this point in the unit, there should be some student mastery of representing situations involving percent increase or decrease. If students struggle, make time to revisit related work in the activities referred to here.	
Section C Applying Percentages (Lessons 10-14)	**Learning Target #5** Calculate measurement error, and express it as a percentage of the actual value. **Learning Target #6** Solve problems involving tax, tip, simple interest, markup, markdown, or commission.	**Lesson 10 Tax and Tip** ● I understand and can solve problems about sales tax and tip **Lesson 11 Percent Contexts** ● I understand and can solve problems about commission, interest, markups and discounts **Lesson 12 Solving Multi-step Percentage Problems** ● I can solve problems that involve multiple percentages **Lesson 13 Measurement error** ● I can represent measurement error as a percentage of the correct measurement ● I understand that all measurements include some error

		Lesson 14 Percent Error ● I can solve problems that involve percent error
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Press Pause By this point in the unit, there should be some student mastery of finding the value after tax, tip, markup, or interest is added. If students struggle, make time to revisit related work in this section. ● **Problem 2:** More Chances Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time.	
Section D Let's put it to work. (Lessons 15-16)	**No new learning targets**	**Lesson 15 Changes on Earth** ● I can use percentages to describe changes in real-world situations. **Lesson 16 Posing Percentage Problems** ● I can write and solve problems about real-world situations that involve percent increase and decrease.

End of Unit Assessment

NOTES

Replace question 1 with a possible tape diagram problem from additional practice problems.



Unit 4 Lesson 4 Additional Practice Problems

1. Match each tape diagram to the situation that it models.
   - ○ Priya ate x ounces of broccoli. Noah ate $\frac{1}{5}$ of that.
   - ○ Noah bought x pounds of chicken. Priya bought $\frac{1}{5}$ more than that.
   - ○ Priya walked x miles. Noah walked $\frac{2}{5}$ less than that.

Possibly remove question 4? Since removing lessons 2 and 3.

Break apart other questions into more parts - Question 7 could be broken into 3 different questions.

Change order of problems (remove part C from question 7)

Question 4 removed and replaced with #7 (part A)

Question 7 (part B) used for #5

Question 6 broken up into 2 parts

Part A: Lin's father is paying for a $20 meal. He has a 15%-off coupon for the meal. What is the price of the meal after the coupon

Part B: Use your answer from part A to help with Part B… After the discount a 7% sales tax is applied. What does Lin's father pay for the meal?

New Question #7 is old question #5 from test

Unit Title:

Unit 5: Rational Number Arithmetic

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	None Listed	Lesson 9	8.EE.A.3
Lesson 2	8.EE.A.1	Lesson 10	8.EE.A.3,8.EE.A.4
Lesson 3	8.EE.A.1	Lesson 11	8.EE.A.1, 8.EE.A.3, 8.EE.A.4
Lesson 4	8.EE.A.1	Lesson 12	8.EE.A.3, 8.EE.A.4
Lesson 5	8.EE.A.1	Lesson 13	8.EE.A.4
Lesson 6	8.EE.A.1	Lesson 14	8.EE.A.1, 8.EE.A.3, 8.EE.A.4
Lesson 7	8.EE.A.1	Lesson 15	8.EE.A.4
Lesson 8	8.EE.A.1	Lesson 16	8.EE.A.3, 8.EE.A.4

Essential Question(s):

- What do negative numbers represent in real-world contexts?
- How do the rules for arithmetic with negative numbers relate to positive numbers?
- How can position and movement be modeled using signed numbers?

Enduring Understanding(s):

- Negative numbers represent values relative to a reference point of zero, such as elevation below sea level, temperatures below freezing, or financial debt.
- Subtracting a number is equivalent to adding its additive inverse, and the sign of a product or quotient is determined by whether the two numbers have the same sign (positive result) or different signs (negative result).
- Velocity is a signed number indicating both speed and direction, allowing products to be interpreted as changes in position over time.

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 7)
CFA 2: Checkpoint B (after Lesson 12)
CFA 3: Checkpoint C (after Lesson 16)
Unit 5 End of Unit Assessment

Pacing for Unit

21 Days

Lessons to Add/Review:

- Combine Positive and Negative Numbers (6.7.1) / Points on the Number Line (6.7.2) / Interpreting Negative Numbers (7.5.1)
- Comparing Positive and Negative Numbers (6.7.3)
- Combine Ordering Rational Numbers (6.7.4) / Using Negative Numbers to Make Sense of Contexts (6.7.5)
- 6.7.6 Absolute Value of Numbers
- 6.7.7 Comparing Numbers and Distance from Zero
- Combine Points on the Coordinate Plane (6.7.11) / Constructing the Coordinate Plane (6.7.12)
- Interpreting Points on a Coordinate Plane (6.7.13)
- Distances on a Coordinate Plane (6.7.14) / Shapes on the Coordinate Plane (6.7.15)

Lesson Modifications:

- Combine lessons 6 and 7 if needed. (Deemphasize activities 2 and 3 in lesson 7 when combining)
- Combine lessons 8 and 9 if needed. (Deemphasize activity 2 from lesson 8, deemphasize activities 2 and 3 from lesson 9)
- Deemphasize lesson 10
- Combine lessons 12 and 14 if needed. (Deemphasize activity 2 on both lesson 12 and lesson 14)
- Move 7.5.17 to outside of class. In this culminating lesson on percentages, students work at home to collect news clippings that mention percentages and sort them according to whether they are about percent increase or percent decrease, and formulate questions about them. A discussion could take place in class.

Family Overview

https://accessim.org/6-8/grade-7/unit-5?a=family

Integration of Technology:

- Desmos Online Graphing Calculator

- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
7.5.1	absolute value degrees Celsius vertical elevation sea level	positive number negative number
7.5.2	signed numbers	temperature number line
7.5.3	sum opposite expression	
7.5.4	deposit withdrawal account balance debt	
7.5.6	difference	distance
7.5.7		absolute value x-coordinate y-coordinate
7.5.8	velocity	
7.5.11	solution (to an equation) factor	
7.5.13	rational number	sum difference
7.5.15	variable additive inverse multiplicative inverse	opposite solution (to an equation)
7.5.16	operation	
7.5.17		increase decrease

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 5.2 Winter Temperatures
- 5.3 Cliffs and Caves
- 5.7 Differences and Distances
- 5.9 Cruising, Rational Numbers Multiplication Grid
- 5.11 Drilling Down
- 5.13 Seagulls and Sharks Again
- 5.15 Match Solutions
- 5.16 Warmer or Colder than Before?

Provide access as needed throughout the unit:

- Four-function calculators
- Math Community Chart
- Receipt tape
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
1		Rational Numbers Cards (1 copy for every 3 students): Activity 3
3	Receipt tape: Activity 3	
6	Math Community Chart: Activity 2	
9		Rational Numbers Multiplication Grid Handout (1 copy for every student): Activity 3
10		• Temperature and Art Funds Cards (1 copy for every 4 students): Activity 1 • Matching Expressions Cards (1 copy for every 2 students): Activity 2
13		• The Same But Different Cards (1 copy for every 2 students): Activity 1
15		• Matching Inverses Cards (1 copy for every 2 students): Activity 3
16	Tools for creating a visual display: Activity 3	
17	Four-function calculators: Activity 1, Activity 2, Activity 3	

Opportunities for Interdisciplinary Connections:

- **Meteorology:** Students use signed numbers to model and calculate changes in daily temperatures
- **Oceanography/Earth Science:** Negative numbers represent positions relative to sea level and changes in elevation
- **Finance:** Rational numbers model bank account balances, including deposits, withdrawals, and debt

Anticipated misconceptions:

- **Magnitude vs. Value:** Students often struggle with the idea that $-2>-5$, confusing a number's distance from zero with its actual value.
- **Subtraction Signs:** Students may misread expressions like $-2.6-(-12/4)$, missing the significance of multiple negative signs.

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: • rational numbers • absolute value notation • understanding of the coordinate plane **Relevant Unit(s)/Lesson(s) to Review:** • Grade 6 Unit 7: Rational Numbers	Acts as a natural lead-in to solving equations and simplifying expressions in Unit 6. Prepares students for solving equations in the form px+q=r

Differentiation through *Universal Design for Learning*

Engagement:
- Provide tools like calculators to facilitate information processing and focus on key ideas (Lesson 8, Activity 2 Launch)
  LT3: Apply multiplication and division of signed numbers to represent situations and solve problems

Representation:
- Use physical objects or demonstrations of movement like walking east and west (Lesson 3, Activity 1 Launch)
  LT1: Apply addition and subtraction of signed numbers to represent situations and solve problems

Action & Expression:
- Support communication by identifying connections between different equations that represent the same scenario (Lesson 16, Activity 2 Synthesis)
  LT7: Write an equation of the form x+p=q or px=q to represent a situation

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
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MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:
- MLR1: Stronger and Clearer Each Time (Lessons 3, 6, 9, 17)
- MLR2: Collect and Display (Lessons 1, 3, 4, 9, 13, 15)
- MLR3: Critique, Correct, Clarify (Lesson 16)
- MLR4: Information Gap (Lesson 10)
- MLR5: Co-Craft Questions (Lessons 1, 3, 8, 14, 15)
- MLR6: Three Reads (Lessons 8, 12, 14, 17)
- MLR7: Compare and Connect (Lessons 2, 5, 7, 11, 15, 16)
- MLR8: Discussion Supports (Lessons 1, 2, 3, 4, 6, 9, 10, 13, 14, 15, 16)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes such as interpreting, representing, and generalizing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Interpret
- situations involving signed numbers (throughout Unit)
- tables with signed numbers (Lesson 3)
- bank statements with signed numbers (Lesson 4)

Represent
- addition of signed numbers on a number line (Lesson 2)
- situations involving signed numbers (Lessons 3 and 11)
- changes in elevation (Lesson 6)
- position, speed, and direction (Lesson 8)

Generalize
- about subtracting and adding signed numbers (Lesson 5)
- about differences and magnitude (Lesson 6)
- about multiplying negative numbers (Lesson 9)
- about additive and multiplicative inverses (Lesson 15)

Sentence Frames and Stems

Section A

- To add/subtract _____ and/from _____ on the number line, first I _____ then I...
- The equation _____ represents this situation because ...
- The sum of _____ and _____ is _____ because ...
- The difference between _____ and _____ is _____ because ...
- I used the number _____ to represent this situation because ...

Section B

- The product/quotient of _____ and _____ is _____ because ...
- The equation _____ fits this situation because ...
- _____ and _____ are opposites because ...
- The value of the expression _____ will be positive/negative because ...

Section C

- The expressions _____ and _____ are equivalent because ...
- To find the difference between _____ and _____, I can ...
- _____ is the multiplicative inverse of _____ because ...
- The equation _____ fits this situation, where the variable _____ represents ...
- The solution to the equation _____ is _____ because ...

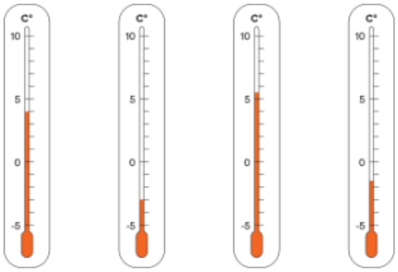
Section D

- The equation _____ can be used to find the missing value _____ for company _____ .
- The company saw their shares increase/decrease by _____ percent.

Unit Outline

In this unit, students perform operations on rational numbers, which are all numbers that can be written as a positive or negative fraction. This builds on grade 6 work with interpreting, comparing, and plotting rational numbers. It prepares students for a later unit when they will solve equations of the form $px+q=r$ or $p(x+q)=r$, where p, q, and r are rational numbers.

Students begin by revisiting how signed numbers are used to represent quantities above and below a reference point, such as measurements of temperature and elevation. They use tables and number line diagrams to represent changes in temperature or elevation. They extend addition and subtraction from fractions to all rational numbers. And they see that $a-b$ is equivalent to $a+(-b)$.



Next, students examine multiplication and division. They work with constant velocity, which is a signed number that indicates direction and speed. This allows products of signed numbers to be interpreted in terms of position, direction of movement, and time before or after a specific point. Students use the relationship between multiplication and division to understand how division extends to rational numbers.

Then students work with expressions that use the four operations on rational numbers. They also solve problems that involve interpreting negative numbers in context. They solve linear equations of the form $p+x=q$ or $px=q$, where p and q rational numbers. The focus of these lessons is representing situations with equations and what it means for a number to be a solution for an equation, rather than methods for solving equations. Such methods are the focus of a later unit

A note on using the terms "expression," "equation," and "signed number":
In these materials, an expression is built from numbers, variables, operation symbols (+, −, ·, ÷), parentheses, and exponents. (Exponents—in particular, negative exponents—are not a focus of this unit. Students work with integer exponents in grade 8 and noninteger exponents in high school.) An equation is a statement that two expressions are equal, thus it always has an equal sign. Signed numbers include all rational numbers, written as decimals or in the form a/b.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Adding and Subtracting Rational Numbers (Lessons 1-7)	**Learning Target #1:** Apply addition and subtraction of signed numbers to represent situations and solve problems. **Learning Target #2**	**Lesson 1 Interpreting** • I can compare rational numbers. • I can use rational numbers to describe temperature and elevation. **Lesson 2 Changing Temperatures** • I can use a number line to add positive and negative numbers. **Lesson 3 Changing Elevation**

	Calculate the sum or difference of two rational numbers.	● I can add positive and negative numbers. **Lesson 4 Money and Debts** ● I understand what positive and negative numbers mean in a situation involving money. **Lesson 5 Representing Subtraction** ● I can explain the relationship between addition and subtraction of rational numbers. ● I can use a number line to subtract positive and negative numbers. **Lesson 6 Finding Differences** ● I can subtract positive and negative numbers. **Lesson 7 Adding and Subtracting to Solve Problems** ● I can solve problems that involve adding and subtracting rational numbers. NOTE: Lesson 7 activity 1 directly related to EOU Question
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize If most students struggle with adding or subtracting rational numbers, revisit this concept as opportunities arise over the next several lessons. ● **Problem 2:** More Chances Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time.	
Section B Multiplying and Dividing Rational Numbers (Lessons 8-12)	**Learning Target #3** Apply multiplication and division of signed numbers to represent situations and solve problems **Learning Target #4** Calculate the product of quotient of two rational numbers	**Lesson 8 Multiplying Rational Numbers (Part 1)** ● I can multiply a positive number with a negative number **Lesson 9 Multiplying Rational Numbers (Part 2)** ● I can explain what it means when time is represented with a negative number in a situation about speed and direction ● I can multiply multiply two negative numbers **Lesson 10 Multiply** ● I can solve problems that involve multiplying rational numbers **Lesson 11 Dividing Rational Numbers** ● I can divide rational numbers **Lesson 12 Negative Rates** ● I can solve problems that involve multiplying and dividing rational numbers ● I can solve problems that involve negative rates NOTE: Activity 1 in Lesson 12 is directly related to EOU question
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize If most students struggle with multiplying or dividing rational numbers, revisit this concept as opportunities arise over the next several lessons. ● **Problem 2:** More Chances Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time.	
Section C Four operations with Rational Numbers (Lessons 13-16)	**Learning Target #5** Apply the four operations with rational numbers to solve problems **Learning Target #6** Solve an equation of the form x+p=q or px=q where p, q and x are rational numbers. **Learning Target #7** Write an equation of the form x+p=q or px=q (where p, q and x are rational numbers to represent a situation.	**Lesson 13 Expressions with Rational Numbers** ● I can add, subtract, multiply and divide rational numbers ● I can evaluate expressions that involve rational numbers **Lesson 14 Solving Problems with Rational Numbers** ● I can represent situations with expressions that include rational numbers ● I can solve problems using the four operations with rational numbers **Lesson 15 Solving Equations with Rational Numbers** ● I can solve equations that include rational numbers and have rational solutions **Lesson 16 Representing Contexts with Equations** ● I can explain what the solution to an equation means for the situation ● I can write and solve equations to represent situations that involve rational numbers
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Press Pause By this point in the unit, there should be some student mastery of solving equations of the form p + x = q or px=q . If most students struggle, make time to revisit related work in the activities referred to here.	

	• **Problem 2:** More Chances Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time. • **Problem 3:** Points to Emphasize If most students struggle with solving problems that involve the four operations with rational numbers, revisit this concept as opportunities arise over the next several lessons.

End of Unit Assessment

NOTES

Remove question 5c and replace with

$$\frac{15}{8} + c = \frac{51}{8}$$

Unit Title:

Unit 6: Expressions, Equations, and Inequalities

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1		Lesson 12	7.EE.A.2, 7.EE.B.3, 7.EE.B.4, 7.EE.B.4.a
Lesson 2	7.EE.B.3	Lesson 13	7.EE.B.4
Lesson 3	7.EE.B.3	Lesson 14	7.EE.B.4.b
Lesson 4	7.EE.B.3, 7.EE.B.4.a	Lesson 15	7.EE.B.4
Lesson 5	7.EE.B.3, 7.EE.B.4, 7.EE.B.4.a	Lesson 16	7.EE.B.4.b
Lesson 6	7.EE.B.3	Lesson 17	7.EE.B.4.b
Lesson 7	7.EE.B.4.a	Lesson 18	7.EE.A.1, 7.NS.A.1, 7.NS.A.1.c
Lesson 8	7.EE.B.4.a	Lesson 19	7.EE.A.1
Lesson 9	7.EE.B.4, 7.EE.B.4.a	Lesson 20	7.EE.A.1
Lesson 10	7.EE.B.4.a	Lesson 21	7.EE.A.1
Lesson 11	7.EE.B.3, 7.EE.B.4, 7.EE.B.4.a	Lesson 22	—

Essential Question(s):

- How can equations represent complex real-world situations?
- What does it mean to find a solution to an equation or inequality?
- How can I determine if two different algebraic expressions are equivalent?

Enduring Understanding(s):

- Situations involving a constant rate of change and a starting amount can be represented by equations of the form px+q=r or p(x+q)=r
- Solving an equation or inequality means finding all values for a variable that make the mathematical statement true, often by performing the same operations on each side to maintain balance.
- Expressions are equivalent if they yield the same value for any substitution of the variable, which can be proven using properties such as the distributive, commutative, and associative properties

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 6)
CFA 2: Checkpoint B (after Lesson 12)
Unit 6 Mid-Unit Assessment
CFA 3: Checkpoint C (after Lesson 17)
CFA 4: Checkpoint D (after Lesson 21)
Unit 6 End of Unit Assessment

Pacing for Unit

27 Days

Lessons to Add/Review:

- Practice Solving Equations and Representing Situations with Equations (6.6.4)
- The Distributive Property, Part 2 (6.6.10)
- Combine Two Related Quantities, Part 1 & 2 (6.6.16 and 6.6.17)

Lesson Modifications:

- Combine 7.6.4 and 7.6.5: Parts 1 and 2 of Reasoning about Equations and Tape Diagrams
- Combine 7.6.7 and 7.6.8: Parts 1 and 2 of Reasoning about Solving Equations
- Move 7.6.22 to outside of class: In this culminating lesson students investigate several real-world situations that can be represented by an expression with a variable. A discussion could take place in class.

Family Overview

https://accessim.org/6-8/grade-7/unit-6?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
7.6.2	unknown amount	
7.6.3	equivalent expressions	

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 6.2 Every Story Needs a Picture
- 6.3 Drawing Tape Diagrams to Represent Equations
- 6.4 Situations and Diagrams
- 6.5 More Situations and Diagrams

	commutative (property)	
7.6.4		unknown amount relationship
7.6.6		variable
7.6.7	balanced hanger each side (of an equation)	
7.6.8		equivalent expression each side (of an equation)
7.6.9		operation solve
7.6.10	distribute substitute	
7.6.13	inequality less than or equal to greater than or equal to open / closed circle	less than greater than
7.6.14	solution to an inequality boundary direction (of an inequality)	less than or equal to greater than or equal to substitute
7.6.15		open / closed circle
7.6.16		solution to an inequality
7.6.17		inequality
7.6.18	term	
7.6.19	factor (an expression) expand (an expression)	
7.6.20	combine like terms	term commutative (property)
7.6.21		distribute
7.6.22	associative property	factor (an expression) expand (an expression)

Provide access as needed throughout the unit:

- Index cards
- Math Community Chart
- Sticky notes
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
6		Categories of Equations Cards (1 copy for every 2 students): Activity 1
11	• Sticky notes: Activity 2 • Tools for creating a visual display: Activity 2	
12	• Sticky notes: Activity 2 • Tools for creating a visual display: Activity 2	
16	Tools for creating a visual display: Activity 2	
17	Math Community Chart: Activity 1	Giving Advice Cards (1 copy for every 4 students): Activity 1
21	Index cards: Warm-up	

Opportunities for Interdisciplinary Connections:

- **Aerospace Engineering:** The unit features "CubeSats" (small satellites) to provide a context for complex algebraic modeling
- **Social Science:** Algebraic expressions model participation in various school club activities and community festivals

Anticipated misconceptions:

- **Term Combination:** Students might incorrectly combine terms like 7x+2 into 9x, failing to recognize they are not like terms
- **Distribution Errors**: In equations like 2(x−9)=10, students may add 9 to both sides before dealing with the multiplier of 2

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- linear equations with variables
- tape diagrams
- exponential equations

Relevant Unit(s)/Lesson(s) to Review:

- Grade 6 Unit 6: Expressions and Equations

Connections to Future Units:

Prepares students for Grade 8 work with variables on both sides of an equation and systems of equations.

Differentiation through *Universal Design for Learning*

Engagement:

- Provide rubrics or checklists for multi-step projects like creating visual displays (Lesson 16, Activity 2 Launch)
  LT7: Write an inequality of the form px+q>r or px+q<r to represent a situation with a constraint

Representation:

- Provide blank templates of tape diagrams to help organize information (Lesson 3, Activity 2 Launch)

LT1: Create diagrams and equations in the form px+q=r and p(x+q)=r to represent situations

Action & Expression:

- Provide alternatives to writing by allowing students to share learning orally or through physical manipulatives (Lesson 20, Activity 1 Launch)
  LT8: Apply properties of operations to write an expression with fewer terms that is equivalent to a given expression

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 3, 8, 15, 18, 22)
- MLR2: Collect and Display (Lessons 3, 7, 10, 13, 16, 20, 21)
- MLR3: Critique, Correct, Clarify (Lessons 2, 4, 10, 13, 14, 15, 16, 17, 19, 21, 22)
- MLR4: Information Gap
- MLR5: Co-Craft Questions (Lesson 14)
- MLR6: Three Reads (Lessons 1, 6, 11, 12, 14, 17)
- MLR7: Compare and Connect (Lessons 1, 3, 5, 8, 9, 11, 15, 17, 22)
- MLR8: Discussion Supports (Occurs throughout)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes such as comparing, explaining, and justifying. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Compare

- stories with corresponding tape diagrams (Lesson 2)
- tape diagrams with corresponding equations (Lesson 3)
- hanger diagrams and equations (Lesson 7)
- solution pathways (especially Lesson 10)
- descriptions of situations with corresponding inequalities (Lesson 16)

Explain

- strategies for using hanger diagrams to solve equations (Lesson 8)
- different strategies for solving equations (Lesson 9) and inequalities (Lesson 14)
- reasoning about situations, tape diagrams, and equations (Lesson 12)
- strategies for identifying and writing equivalent expressions (Lesson 22)

Justify

- reasoning about inequalities (Lesson 13)
- reasoning about solutions to inequalities (Lesson 15)
- the need for specific information in order to write and solve inequalities (Lesson 17)
- reasoning about the distributive property (Lesson 19)
- whether different sequences of calculations give the same result (Lesson 23)

Sentence Frames and Stems

Section A

- In this situation, I notice _____.
- The equation _____ represents this situation because ...
- To represent this equation, I used _____ (strategy/tool) to show _____ because ...
- The tape diagram represents the equation _____ because ...
- I noticed _____, which means the equation _____ is equivalent to the equation _____.
- The solution to the equation _____ is _____ because ...

Section B

- The equation _____ represents this situation because ...
- To find the unknown weight on the hanger diagram, first I _____, then I ...

- The solution to the equation _____ is _____ because ...
- I began solving the equation by _____ on both sides. Then, I found the solution by _____.
- The solution _____ to the equation _____ makes sense because ...

Section C

- The solution to the inequality _____ can be modeled on a number line diagram by ...
- The solution is _____. This means any number _____ makes the inequality true.
- The value _____ is a solution to the inequality _____ because ...
- The inequality _____ represents this situation because ...

Section D

- I used the _____ property to simplify the expression from _____ to _____.
- I combined like terms ... to simplify the expression. My new expression is _____.
- The distributive property allowed me to expand/factor the expression _____ to _____.
- The expression _____ is equivalent to the expression _____ because ...

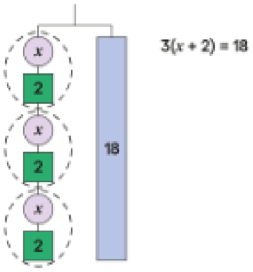
Section E

- I used the expression_____ to represent the situation _____ because ...
- The expression _____ and the expression _____ are equivalent.

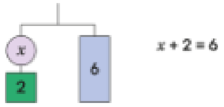
Unit Outline

In this unit, students deepen their algebraic reasoning as they write and solve equations of the forms $px+q=r$ and $p(x+q)=r$ and inequalities of the forms $px+q>r$ and $p(x+q)<r$, Students also work with equivalent expressions that are more complex than what they have seen previously. This builds on grade 6 work with equations of the form $p+x=q$ or $px=q$ and with simpler equivalent expressions. Students will build on this work in grade 8 when they solve equations that have a variable on both sides of the equal sign and when they work with systems of equations.

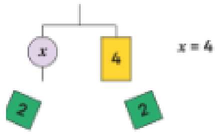
Students begin the unit by making sense of situations that involve both multiplication and addition. They represent such situations with tape diagrams and with equations. They see that different diagrams and equations can represent the same situation, and they use diagrams to find solutions to equations.



Next, students consider hanger diagrams as another way to represent equations. The diagrams help students understand solving equations in terms of “doing the same thing to each side of the equation.” Students examine different pathways for solving the same equation and consider whether one method is more efficient than another.



Then students apply what they have learned about equations to inequalities. They write inequalities to represent situations and solve inequalities by reasoning about the related equation. The inequality symbols ≥ and ≤ are introduced.



Lastly, students work with equivalent linear expressions that are more complex due to having more terms, more parentheses, and negative rational numbers. Students use properties of operations to justify why the expressions are equivalent.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Representing Situations of the Form px+q = r and p(x+q) = r (Lessons 1-6)	**Learning Target #1:** Create diagrams and equations in the form $px+q=r$ and $p(x+q)=r$ to represent situations. **Learning Target #2** Interpret equations in the form $px+q=r$ and $p(x+q)=r$ that represent relationships in diagrams and situations.	**Lesson 1 Relationships between Quantities** • I can think of ways to solve some more complicated word problems. **Lesson 2 Reasoning about Contexts with Tape Diagrams** • I can explain how a tape diagram represents parts of a situation and relationships between them. • I can use a tape diagram to find an unknown amount in a situation. **Lesson 3 Reasoning about Equations with Tape Diagrams** • I can match equations and tape diagrams that represent the same situation. • If I have an equation, I can draw a tape diagram that shows the same relationship. **Lesson 4 Reasoning about Equations and Tape Diagrams (Part 1)** • I can draw a tape diagram to represent a situation where there is a known amount and several copies of an unknown amount and explain what the parts of the diagram represent. • I can find a solution to an equation by reasoning about a tape diagram or about what value would make the equation true.

		Lesson 5 Reasoning about Equations and Tape Diagrams (Part 2) ● I can draw a tape diagram to represent a situation where there is more than one copy of the same sum and explain what the parts of the diagram represent. ● I can find a solution to an equation by reasoning about a tape diagram or about what value would make the equation true. **Lesson 6 Reasoning to Find Area** ● I understand the similarities and differences between the two main types of equations we are studying in this unit. ● When I have a situation or a tape diagram, I can represent it with an equation.
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize If most students struggle with coordinating the parts of the equation with the diagram, focus on the ways students see each part of the equation when students interpret hanger diagrams in the referenced lessons. ● **Problem 2:** More Chances Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time.	
Section B Parallelograms (Lessons 7-12)	**Learning Target #3** Solve equations of the form $px+q=r$ and $p(x+q)=r$, including those that involve fractions, decimals, and negative numbers and explain the solution method **Learning Target #4** Solve word problems leading to equations of the form $px+q=r$ or $p(x+q)=r$	**Lesson 7 Parallelograms** ● I can use reasoning strategies and what I know about the area of a rectangle to find the area of a parallelogram. ● I know how to describe the characteristics of a parallelogram using mathematical vocabulary. **Lesson 5 Bases and Heights of Parallelograms** ● I can identify pairs of base and height of a parallelogram. ● I can write and explain the formula for the area of a parallelogram. ● I know what the terms "base" and "height" refer to in a parallelogram. **Lesson 6 Area of Parallelograms** ● I can use the area formula to find the area of any parallelogram.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1**: Press Pause By this point in the unit, there should be some student mastery of solving equations. If most students struggle with solving equations of the form $px + q = r$, make time to revisit related work in the Sections referred to here. ● **Problem 2:** Points to Emphasize If most students struggle with representing and solving the problem, focus on connecting diagrams and equations to the relationships in problems throughout the next section. For example, invite multiple students to share how the tape diagram matches the stories in the referenced practice problem. Encourage students to use and explain diagrams and equations as needed when representing and solving problems in lesson activities and practice problems throughout the section.	
Section C Inequalities (Lessons 13-17)	**Learning Target #5** Draw and label a graph on a number line that represents all the solutions to an inequality. **Learning Target #6** Generalize the process for finding the area of a triangle. **Learning Target #7** Compare and contrast different strategies for finding areas of polygons.	**Lesson 13 Reintroducing Inequalities** ● I can explain what the symbols ≤ and ≥ mean ● I can represent an inequality on a number line. ● I understand what it means for a number to make an inequality true. **Lesson 14 Finding Solutions to Inequalities in Context** ● I can describe the solutions to an inequality by solving a related equation and then reasoning about values that make the inequality true. ● I can write an inequality to represent a situation. **Lesson 15 Efficiently Solving Inequalities** ● I can graph the solutions to an inequality on a number line. ● I can solve inequalities by solving a related equation and then checking which values are solutions to the original inequality. **Lesson 16 Interpreting Inequalities** ● I can match an inequality to a situation it represents, solve it, and then explain what the solution means in the situation. ● If I have a situation and an inequality that represents it, I can explain what the parts of the inequality mean in the situation. **Lesson 17 Modeling with Inequalities** ● I can use what I know about inequalities to solve real-world problems.
Checkpoint C	***Responding to Student Thinking***	

	• **Problem 1:** Press Pause By this point in the unit, there should be some student mastery of writing and solving inequalities. If most students struggle, make time to revisit related work in the referenced sections.	
Section D Writing Equivalent Expressions (Lessons 18-21)	**Learning Target #8** Apply properties of operations to write an expression with fewer terms that is equivalent to a given expression. **Learning Target #9** Apply the distributive property to factor or expand an expression.	**Lesson 18 Subtracting in Equivalent Expressions** • I can organize my work when I use the distributive property. • I can rewrite subtraction as adding the opposite and then rearrange terms in an expression. **Lesson 19 Expanding and Factoring** • I can organize my work when I use the distributive property. • I can use the distributive property to rewrite expressions with positive and negative numbers. • I understand that "factoring" and "expanding" are words used to describe using the distributive property to write equivalent expressions. **Lesson 20 Combining Like Terms (Part 1)** • I can figure out whether two expressions are equivalent to each other. • When possible, I can write an equivalent expression that has fewer terms. **Lesson 21 Combining Like Terms (Part 2)** • I am aware of some common errors when writing equivalent expressions, and I can avoid them. • When possible, I can write an equivalent expression that has fewer terms.
Checkpoint D	***Responding to Student Thinking*** • **Problem 1:** Points to Emphasize If students struggle with writing an equivalent expression with fewer terms, revisit this concept when opportunities arise over the next several lessons. • **Problem 2:** Points to Emphasize If students struggle with using the distributive property to factor or expand an expression, revisit this concept when opportunities arise over the next several lessons.	
End of Unit Assessment		

Unit Title:

Unit 7: Angles, Triangles, and Prisms

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.G.A, 7.G.B	Lesson 10	7.G.A.2
Lesson 2	7.G.B, 7.G.B.5	Lesson 11	7.G.A.3
Lesson 3	7.EE.A, 7.G.B.5	Lesson 12	7.G.B.6
Lesson 4	7.G.A, 7.G.B, 7.G.B.5	Lesson 13	7.G.A.3, 7.G.B.6
Lesson 5	7.EE.B.4, 7.G.B.5	Lesson 14	7.G.B.6
Lesson 6	7.G.A.2	Lesson 15	7.G.B, 7.G.B.6
Lesson 7	7.G.A.2	Lesson 16	7.G.B, 7.G.B.6, 7.RP.A
Lesson 8	7.G.A.2	Lesson 17	7.G.A.2, 7.G.B.6
Lesson 9	7.G.A, 7.G.A.2		

Essential Question(s):

- How do geometric relationships help us find unknown angle measures?
- What conditions determine if a triangle can be built or if it is unique?
- How do volume and surface area describe three-dimensional objects differently?

Enduring Understanding(s):

- Knowledge of complementary (90◦), supplementary (180◦), and vertical (equal) angle relationships allows us to write and solve equations for unknown measures
- The sum of the two shorter side lengths must be greater than the longest side to form a triangle, and specific combinations of side and angle measures can determine one unique triangle, more than one, or none at all
- Volume measures the total space inside a three-dimensional object (Area of Base × Height), while surface area measures the total area of all its outer faces

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 5)
CFA 2: Checkpoint B (after Lesson 10)
CFA 3 Checkpoint C (after Lesson 16)
Unit 7 End of Unit Assessment

Pacing for Unit

21 Days

Lessons to Add/Review:

- None

Lesson Modifications to Condense Unit if Needed:

- Remove optional Lesson 1, Activity 3.
- Remove optional Lesson 3, Activity 3.
- Remove optional Lesson 6, Activity 3.
- Remove optional Lesson 11, Activity 3.
- Remove optional Lesson 12, Activity 3.
- Remove optional Lesson 15, Activity 3.
- Remove optional Lesson 17.

Family Overview

https://accessim.org/6-8/grade-7/unit-7?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
7.7.1	straight angle adjacent angles degree	right angle
7.7.2	supplementary complementary angle measure	measurement error degrees

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 7.1 Visualizing Angles, Pattern Block Angles, More Pattern Block Angles
- 7.6 What Can You Build?, Building Shapes
- 7.7 Where is Lin?, How Long is the Third Side?, Swinging the Sides Around
- 7.9 Does Your Triangle Match Theirs?
- 7.10 Revisiting How Many Can You Draw?, Three Angles

	protractor	
7.7.3	vertical angles intersect vertex (of an angle)	
7.7.4		supplementary vertical angles
7.7.5	perpendicular	complementary
7.7.6	identical copy condition	angle measure side length quadrilateral
7.7.7	compass different triangle	intersect identical copy segment
7.7.8		condition different triangle
7.7.9	unique triangle parallel	
7.7.10		protractor compass
7.7.11	cross section base (of a prism or pyramid) vertex (of a pyramid) face	prism pyramid perpendicular parallel
7.7.12		volume cross section base (of a prism or pyramid)
7.7.14		face perimeter
7.7.15		surface area

- 7.11 What's the Cross-Section?, Drawing Cross-Sections
- 7.12 Finding Volume with Cubes, Can You Find the Volume?

Provide access as needed throughout the unit:

- Blank paper
- Compasses
- Copies of blackline masters
- Fruits or vegetables
- Geometry toolkits
- Knife
- Materials assembled from the blackline master
- Math Community Chart
- Metal paper fasteners Brass brads
- Paint
- Pattern blocks
- Pre-assembled polyhedra
- Pre-printed cards, cut from copies of the blackline master
- Pre-printed slips, cut from copies of the blackline master
- Protractors
- Clear protractors with no holes and with radial lines printed on them are recommended.
- Rulers marked with centimeters
- Scissors
- Snap cubes
- Straightedges
  A rigid edge that can be used for drawing line segments. Sometimes a ruler is okay to use as a straightedge, but sometimes it is preferable to use an unruled straightedge, like a blank index card.

Lesson	Materials to Gather	Materials to Copy
1	• Blank paper: Warm-up, Activity 1 • Scissors: Warm-up, Activity 1 • Pattern blocks: Activity 1, Activity 2 • Straightedges: Activity 1 • Protractors: Activity 3	
2	• Geometry toolkits: Activity 1 • Protractors: Activity 1 • Scissors: Activity 1 • Straightedges: Activity 1	Cutting Rectangles (1 copy for every 2 students): Activity 1
3	• Geometry toolkits: Activity 1, Activity 2	
4	• Math Community Chart: Activity 1 • Pre-printed slips, cut from copies of the blackline master: Activity 1	Angle Finding Cards (1 copy for every 2 students): Activity 1
6	• Geometry toolkits: Activity 1, Activity 2, Activity 3 • Metal paper fasteners: Activity 1, Activity 2, Activity 3 • Pre-printed slips, cut from copies of the blackline master: Activity 1, Activity 2, Activity 3	What Can You Build? Cutouts (1 copy for every 2 students): Activity 1

7	• Geometry toolkits: Warm-up, Activity 1, Activity 2 • Compasses: Activity 1, Activity 2 • Metal paper fasteners: Activity 1, Activity 2 • Copies of blackline masters: Activity 2	Swinging the Sides Around Handout (1 copy for every student) Activity 2
8	Geometry toolkits: Activity 1, Activity 2	
9	Geometry toolkits: Activity 1, Activity 2	
10	• Compasses: Warm-up, Activity 1, Activity 2 • Copies of blackline masters: Activity 1 • Geometry toolkits: Activity 1, Activity 2	
11	• Fruits or vegetables: Activity 1 • Knife: Activity 1 • Paint: Activity 1 • Pre-printed cards, cut from copies of the blackline master: Activity 2	Cross Sections Cards (1 copy for every 3 students): Activity 2
12	• Copies of blackline masters: Activity 1, Activity 2 • Snap cubes: Activity 1 • Pre-assembled polyhedra: Activity 2 • Rulers marked with centimeters: Activity 2	• Finding Volume with Cubes Handout (1 copy for every 6 students): Activity 1 • Can You Find the Volume Cutouts (1 copy for every 3 students): Activity 2
14	• Materials assembled from the blackline master: Lesson • Materials assembled from the blackline master: Warm-up	Multifaceted Cutouts (1 copy for every 1 student): Warm-up
15	Pre-printed slips, cut from copies of the blackline master: Activity 2	Surface Area or Volume Cards (1 copy for every 2 students): Activity 2
17	• Compasses: Activity 1 • Geometry toolkits: Activity 1, Activity 2 • Rulers marked with centimeters: Activity 1, Activity 2 • Copies of blackline masters: Activity 2	

Opportunities for Interdisciplinary Connections:	Anticipated misconceptions:
• **Construction Engineering:** Students study cross-sections and volume through the lens of 3-D Printed Houses • **Manufacturing:** Volume and surface area calculations are applied to designing packaging, such as octagonal or heart-shaped boxes	• **Protractor Reading:** Students may read the wrong scale on a protractor (e.g., 140° instead of 40°). • **Triangle Inequality:** Students may believe any three lengths can form a triangle, not realizing the two shorter sides must sum to more than the longest side See teacher's guide for specific misconceptions aligned to each

	lesson.
Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: • drawing angles, measuring angles, identifying angles **Relevant Unit(s)/Lesson(s) to Review:** • None	Builds understanding of unique triangle conditions needed for Grade 8 and high school congruence proofs.

Differentiation through *Universal Design for Learning*

Engagement:

- Foster interest by providing choices in how to label and solve for unknown angle measures (Lesson 5, Activity 1 Launch)
  LT1: Solve multi-step problems involving complementary, supplementary, and vertical angles

Representation:

- Use virtual or concrete manipulatives like cardboard strips and fasteners to associate symbols with side lengths (Lesson 10, Activity 1 Launch)
  LT3: Draw triangles with two given angle measures and one side length, one given angle measure and two side lengths, or three side lengths

Action & Expression:

- Reduce barriers by providing access to digital applets for drawing cross-sections (Lesson 11, Activity 3 Launch)
  LT5: Calculate the surface area and volume of a prism

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 10, 12, 15)
- MLR2: Collect and Display (Lessons 1, 2, 3, 11)
- MLR3: Critique, Correct, Clarify (Lessons 2, 8, 11, 12, 16)
- MLR4: Information Gap (Lesson 4)
- MLR5: Co-Craft Questions (Lesson 13)
- MLR6: Three Reads (Lessons 12, 14)
- MLR7: Compare and Connect (Lessons 6, 7, 13, 15, 16)
- MLR8: Discussion Supports (Lessons 2, 3, 4, 5, 7, 9, 11, 14, 15, 17)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes such as critiquing, explaining, interpreting, and justifying. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Critique

- reasoning about measuring angles (Lesson 1)
- reasoning about decomposition of prisms (Lesson 13)
- reasoning about surface area of prisms (Lesson 14)

Explain

- how to measure angles (Lesson 2)
- how to find unknown angle measurements (Lessons 4 and 5)
- how to find the volume of prisms (Lessons 12 and 13)
- how to find the surface area of prisms (Lesson 14)

Interpret

- situations involving intersecting lines in order to form a conjecture (Lesson 3)
- which information is relevant to answer questions (Lesson 4)
- equations representing angle measurements (Lesson 5)
- situations involving volume and surface area (Lesson 15 and 16)

Justify

- whether or not shapes are identical copies (Lesson 6)
- whether or not measurements determine identical copies (Lesson 9)
- whether or not measurements determine unique triangles (Lesson 10)

Sentence Frames and Stems

Section A

- Angle _____ (name e.g PQR) is an acute/obtuse angle because ...
- Angles _____and _____ (names) are complementary/supplementary angles because ...
- Since angles _____ and _____ (names) are complementary/supplementary, the missing angle measure is _____ because ...
- Lines _____ and _____ (names) cross each other, so angles _____ and _____ (names) are _____ ...
- I used the equation _____ for the relationship between angles_____ and _____ (names) because ...

Section B

- Side lengths _____, _____ and _____ will/will not form a triangle because ...
- Two side lengths of the triangle are _____ and _____. The length of the third side of the triangle will be longer than _____ but shorter than _____ because ...
- Triangles _____ and ______ (names) are/ are not identical because ...
- I think that angles _____ and _____ (names) with side length _____ will/will not form a unique triangle because ...

Section C

- The shape of the cross section is _____ because...
- The base area of the prism is _____ and the height is _____, so the volume of the prism is _____. I calculated it by ...
- Figure _____ is/is not a prism because ...
- The surface area of the prism is _____ . I calculated it by ...
- In this situation, I need to find _____ (e.g. volume, base, surface area) because ...

Section D

- The area of the triangle is _____.
- I chose this triangle because ...
- The volume/surface area of my prism is _____.

Unit Outline

In this unit, students investigate whether sets of angle and side length measurements determine unique triangles or multiple triangles, or fail to determine triangles. Students also study and apply angle relationships, learning to understand and use the terms "complementary," "supplementary," "vertical angles," and "unique." The work gives them practice working with rational numbers and equations for angle relationships. Students analyze and describe cross-sections of prisms, pyramids, and polyhedra. They understand and use the formula for the volume of a right rectangular prism and solve problems involving area, surface area, and volume. Students should have access to their geometry toolkits so that they have an opportunity to select and use appropriate tools strategically.

Note: It is not expected that students memorize which conditions result in a unique triangle, an impossible-to-create triangle, or multiple possible triangles. Understanding that, for example, side-side-side (SSS) information results in zero or exactly one triangle will be explored in high school geometry. At this level, students should attempt to draw triangles with the given information and notice that there is only one way to do it (or that it is impossible to do).

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Angle Relationships (Lessons 1-5)	**Learning Target #1** Solve multi-step problems involving complementary, supplementary and vertical angles **Learning Target #2** Write an equation to represent the relationship between angles and a given diagram	**Lesson 1 Relationships of Angles** • I can find unknown angle measurements by reasoning about adjacent angles with known measures • I can recognize when an angle measures 90°, 180°, or 360° **Lesson 2 Adjacent Angles** • I can find unknown angle measures by reasoning about complementary or supplementary angles • I can recognize when adjacent angles are complementary or supplementary **Lesson 3 Nonadjacent Angles** • I can determine if angles that are not adjacent are complimentary or supplementary • I can explain what vertical angles are in my own words **Lesson 4 Solving for Unknown Angles** • I can reason through multiple steps to find unknown angle measures • I can recognize when an equation represents a relationship between angle measures **Lesson 5 Using Equations to Solve for Unknown Angles** • I can write an equation to represent a relationship between angle measures and solve the equation to find unknown angle measures

Checkpoint A	*Responding to Student Thinking* ● **Problem 1:** Press Pause By this point in the unit, there should be some student mastery of representing angle relationships with equations. If most students struggle, make time to revisit related work in the lesson referred to here.	
Section B Drawing Polygons with Given Conditions (Lessons 6-10)	**Learning Target #3** Draw triangles with two given angle measures and one side length, one given angle measure and two side lengths, or three side lengths. **Learning Target #4** Justify whether 3 measures of angles or sides determine a unique triangle or more than one triangle, or if no triangle is possible.	**Lesson 6 Building Polygons (Part 1)** ● I can show that the 3 side lengths that form a triangle cannot be rearranged to form a different triangle. ● I can show that the 4 side lengths that form a quadrilateral can be rearranged to form different quadrilaterals. **Lesson 7 Building Polygons (Part 2)** ● I can reason about a figure with an unknown angle. ● I can show whether or not 3 side lengths will make a triangle. **Lesson 8 Triangles with 3 Common Measures** ● I understand that changing which sides and angles are next to each other can make different triangles. **Lesson 9 Drawing Triangles (Part 1)** ● Given two angle measures and one side length, I can draw different triangles with these measurements or show that these measurements determine one unique triangle or no triangle. **Lesson 10 Drawing Triangles (Part 2)** ● Given two side lengths and one angle measure, I can draw different triangles with these measurements or show that these measurements determine one unique triangle or no triangle.
Checkpoint B	*Responding to Student Thinking* ● **Problem 1:** Press Pause By this point in the unit, there should be some student mastery of creating triangles with 3 given measures. If most students struggle, make time to revisit related work in the lesson referred to here. ● **Problem 2:** More Chances Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time.	
Section C Solid Geometry (Lessons 11-16)	**Learning Target #5** Calculate the surface area and volume of a prism **Learning Target #6** Decide whether to calculate the surface area or volume of a prism to solve a problem in a real-world situation	**Lesson 11 Slicing Solids** ● I can explain that when a three-dimensional figure is sliced it creates a face that is two dimensional. ● I can picture different cross-sections of prisms and pyramids. **Lesson 12 Volume of Right Prisms** ● I can explain why the volume of a prism can be found by multiplying the area of the base by the height of the prism. **Lesson 13 Decomposing Bases for Area** ● I can calculate the volume of a prism with a complicated base by decomposing the base into quadrilaterals or triangles. **Lesson 14 Surface Area of Right Prisms** ● I can find and use shortcuts when calculating the surface area of a prism. ● I can picture the net of a prism to help me calculate its surface area. **Lesson 15 Distinguishing Volume and Surface Area** ● I can decide whether I need to find the surface area or the volume, when solving a problem about a real-world situation. **Lesson 16 Applying Volume and Surface Area** ● I can solve problems involving the volume and surface area of children's play structures.
Checkpoint C	*Responding to Student Thinking* ● **Problem 1:** More Chances Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time. ● **Problem 2:** Press Pause By this point in the unit, there should be some student mastery of finding surface area and volume of prisms. If most students struggle, make time to revisit related work in the lesson referred to here.	
End of Unit Assessment **NOTES**		

#7 on EOU the line segment that is 1.5 ft long needs to be 2 ft long in order to break the shape up into rectangles and triangles. As currently written the 1.5 ft line would require students to find area of a trapezoid which they do not go into enough detail in the unit (we see it briefly during lesson 13 activity 1)

Unit Title:

Unit 8: Probability and Sampling

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.SP.C.6	Lesson 11	7.SP.B, 7.SP.B.3
Lesson 2	7.SP.C.5	Lesson 12	7.SP.A.1, 7.SP.B
Lesson 3	7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.7.a	Lesson 13	7.SP.A, 7.SP.A.1, 7.SP.A.2
Lesson 4	7.RP.A, 7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.7.b	Lesson 14	7.SP.A.1, 7.SP.A.2, 7.SP.C.7
Lesson 5	7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.7.b	Lesson 15	7.SP.A.1, 7.SP.A.2, 7.SP.B.4
Lesson 6	7.SP.C, 7.SP.C.5, 7.SP.C.6, 7.SP.C.7.b, 7.SP.C.8.c	Lesson 16	7.NS.A.2.d, 7.RP.A, 7.SP.A, 7.SP.A.2, 7.SP.B.4
Lesson 7	7.RP.A, 7.SP.C.8.c	Lesson 17	7.SP.A, 7.SP.A.2
Lesson 8	7.SP.C.8.b	Lesson 18	7.SP.B.3, 7.SP.B.4
Lesson 9	7.SP.C.8.a, 7.SP.C.8.b	Lesson 19	7.SP.B.4
Lesson 10	7.SP.C.8.c	Lesson 20	7.RP.A, 7.SP.A, 7.SP.A.1, 7.SP.A.2, 7.SP.B.4, 7.SP.C.7.a

Essential Question(s):

- How can we predict the likelihood of a future event?
- How can complex, multi-step events be modeled mathematically?
- How can a small sample be used to understand a much larger population?

Enduring Understanding(s):

- Probability is a number from 0 to 1 that describes the long-run relative frequency of an event, which can be estimated through repeated experiments or theoretical sample spaces
- Compound events can be modeled using tree diagrams, lists, or tables to track all possible outcomes and calculate probabilities
- A representative, random sample can provide valid inferences about a larger population, though results are subject to sampling variability

Demonstration of Learning:

CFA 1: Checkpoint A (after Lesson 6)
CFA 2: Checkpoint B (after Lesson 10)
Unit 8 Mid-Unit Assessment
CFA 3 Checkpoint C (after Lesson 14)
CFA 4: Checkpoint D (after Lesson 19)
Unit 8 End of Unit Assessment

Pacing for Unit

24 Days

Lessons to Add/Review:

- Combine 6.8.2 and 6.8.3: introduce variability and distributions
- 6.8.5: describe distributions using center and spread
- Combine 6.8.6 and 6.8.7: focus on interpreting histograms
- Combine 6.8.9 and 6.8.10: focus on understanding mean
- Combine 6.8.11 and 6.8.12: focus on understanding MAD
- Combine 6.8.13 and 6.8.14: focus on understanding median
- Combine 6.8.15 and 6.8.16: focus on box plots and interquartile range

Lesson Modifications:

- Remove 7.8.1: simulation introduction that has analogs later in the unit
- Remove 7.8.5: additional practice that could be done outside of class
- Remove 7.8.11: reminder of mean and median that will be more fresh after doing 6.8 lessons
- Remove 7.8.16: inferring another measure from the population based on a sample
- Remove 7.8.17: an optional lesson examining how sample size affects the variability of sample means
- Remove 7.8.19: a lesson comprised primarily of an info gap that practices comparing populations

- Move to outside of class 7.8.20: culminating lesson incorporating work from the unit

BPS Modifications:

- Lesson 17 and 20 have historically been removed

Family Overview

https://accessim.org/6-8/grade-8/unit-6=8?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
7.8.1		more likely less likely
7.8.2	event chance experiment outcome equally likely as not	likely unlikely impossible certain
7.8.3	probability random sample space	outcome
7.8.5	simulation	probability random
7.8.7		event simulation
7.8.8	tree (diagram)	sample space
7.8.9		tree (diagram)
7.8.11	mean absolute deviation (MAD) distribution very different overlap	mean median dot plot
7.8.12	population sample survey	mean absolute deviation (MAD)
7.8.13	representative sample measure of center	distribution center (of a distribution) spread
7.8.14	random sample	
7.8.15	interquartile range (IQR) measure of variability box plot	population sample random sample symmetric
7.8.16	proportion	representative sample
7.8.17		interquartile range (IQR) measure of variability
7.8.18	meaningful difference	overlap measure of center
7.8.20		meaningful difference

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 8.2 Take a Chance
- 8.4 In the Long Run
- 8.5 Making My Head Spin
- 8.7 Alpine Zoom
- 8.10 Breeding Mice
- 8.13 Sampling the Fish Market

Provide access as needed throughout the unit:

- Coins (any fair, two-sided coins)
- Compasses
- Four-function calculators
- Graph paper
- Math Community Chart
- Number cubes (cubes with sides numbered from 1- 6)
- Paper bags
- Paper clips
- Paper cups
- Protractors
- Clear protractors with no holes and with radial lines printed on them are recommended.
- Rulers marked with inches
- Scissors
- Snap cubes
- Sticky notes
- Straightedges

Lesson	Materials to Gather	Materials to Copy
1	• Paper bags: Activity 1 • Snap cubes: Activity 1	
2	Number cubes: Activity 1, Activity 2	Likelihood Cards (1 copy for every 2 students): Activity 3
3	Paper bags: Activity 2	What's in the Bag Cutouts (1 copy for every 8 students): Activity 2
4	• Graph paper: Activity 1 • Number cubes: Activity 1	
5	• Paper bags: Activity 1, Activity 2 • Paper cups: Activity 1 • Snap cubes: Activity 2	Making My Head Spin Handout (1 copy for every 4 students): Activity 1
6	• Number cubes: Activity 1 • Paper bags: Activity 1 • Paper clips: Activity 1	Diego's Walk Cards (1 copy for every 18 students): Activity 1
7	• Activity 1 • Paper bags: Activity 2 • Snap cubes: Activity 2	Alpine Zoom Handout (1 copy for every 6 students): Activity 1
10	• Activity 1 • Compasses: Activity 2	

	Math Community Chart: Activity 2 Number cubes: Activity 2 Paper bags: Activity 2 Paper clips: Activity 2 Protractors: Activity 2 Scissors: Activity 2 Snap cubes: Activity 2 Straightedges: Activity 2	
13	Four-function calculators: Activity 1	
14	Paper bags: Activity 2 Rulers marked with inches: Activity 2 Straws: Activity 2	
16	Paper bags: Activity 1	Reaction Times Cutouts (1 copy for every 4 students): Activity 1
17	Sticky notes: Activity 1	
19	Math Community Chart: Activity 1	Comparing Populations Cards (1 copy for every 2 students): Activity 1
20	Paper bags: Activity 1, Activity 2 Number cubes: Activity 2 Paper clips: Activity 2	Collecting a Sample Handout (1 copy for every 2 students): Activity 1

Opportunities for Interdisciplinary Connections:

- **Marine Biology:** Students estimate probabilities using data from crabbing experiments
- **Anthropology:** Statistical variability is explored by comparing the chemical properties of steel tools from different geographical regions
- **Psychology:** Students collect data using memory tests to understand population sampling

Anticipated misconceptions:

Sample Bias: Students may not recognize that a sample of only their friends is biased and does not represent the whole school population

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- interpreting dot plots, histograms, and box plots
- describing distributions using measures of center (mean and median) and measures of variability (mean absolute deviation and interquartile range)

Relevant Unit(s)/Lesson(s) to Review:

- Grade 6, Unit 8: Data Sets and Distributions

Connections to Future Units:

Students will build on this by designing and using simulations in high school statistics and probability units.

Differentiation through *Universal Design for Learning*

Engagement:

- Develop effort by chunking activities into manageable parts and providing frequent check-ins (Lesson 11, Activity 2 Launch)
  LT7: Determine whether two populations are likely to be meaningfully different by reasoning about center and spread

Representation:

- Use gestures to explain tree diagrams by tracing paths of branches to highlight outcomes (Lesson 8, Activity 1 Synthesis)
  LT4: Interpret or create a list, table, or tree diagram that represents the sample space of a compound event

Action & Expression:

- Provide access to tools like graphing calculators or spreadsheet software to calculate statistics efficiently (Lesson 13, Activity 1 Launch)
- LT5: Describe methods to obtain a random sample from a population

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English

Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
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MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 3, 16, 18, 22)
- MLR2: Collect and Display (Lessons 2, 3, 8, 12, 13)
- MLR3: Critique, Correct, Clarify (Lessons 8, 16, 18)
- MLR4: Information Gap (Lesson 19)
- MLR5: Co-Craft Questions (Lessons 5, 7, 15, 18)
- MLR6: Three Reads (Lessons 3, 9, 15, 17)
- MLR7: Compare and Connect (Lessons 4, 8, 16, 17, 18, 20)
- MLR8: Discussion Supports (Lessons 1, 2, 3, 5, 10, 11, 14, 17)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes such as describing, explaining, justifying, and comparing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Describe

- observations and predictions during a game (Lesson 1)
- patterns observed in repeated experiments (Lesson 4)
- chance experiments to model situations (Lessons 6 and 7)
- a simulation used to model a situation (Lesson 10)
- observations about data sets (Lessons 11 and 17)

Explain

- predictions (Lesson 2)
- how to determine which events are more likely (Lesson 3)
- possible differences in experimental and theoretical probability (Lesson 5)
- how to use simulations to estimate probability (Lesson 7)
- how to use a simulation to answer questions about the situation (Lesson 10)

Justify

- whether situations are surprising and possible (Lesson 4)
- which samples are or are not representative of a larger population (Lesson 13)
- which samples correspond with each show, which show is most appropriate for a commercial, and whether a movie is eligible for an award (Lesson 15)
- reasoning about samples and populations (Lesson 16)
- whether or not differences between samples are meaningful (Lesson 18, 19, and 20)

Compare

- sample spaces and probably of outcomes for different spinners (Lesson 5)
- methods for writing sample spaces (Lesson 8)
- heights of two groups (Lesson 11)
- measures of center with samples (Lesson 13)
- sampling methods (Lesson 14)
- populations based on samples (Lessons 18 and 20)

Sentence Frames and Stems

Section A

- In this situation, the likelihood that _____ will occur is _____ because ...
- I used _____ to estimate the probability that _____ will occur is _____ because ...
- There are _____ possible outcomes in this experiment and the sample space is ...

Section B

- There are _____ possible outcomes in this experiment and the sample space is ...
- I used a _____ (method/tool) to represent the sample space because ...
- The probability of _____ is _____ because ...
- A simulation is useful to _____ when ...

Section C

- To obtain a random sample of ______, I _____. I chose this method because …
- To compare _____ (population) and _____ (population), I found the _____ to determine that …
- This sample is/is not representative of the population because …
- To gather data about _____ (population), at least _____ should be sampled by _____.
- The shape of the data from the sample is _____ which might mean …

Section D

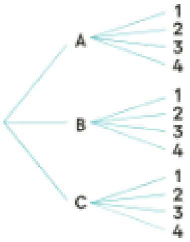
- For this data set, the ______ is the most appropriate measure of center to describe _____ because …
- I analyzed the data on a _____ (model) to determine the variability is _____.
- Using the data provided in a sample, I found the probability of _____ to be _____ because …
- The difference between _____ (population) and _____ (population) can be described as … because …

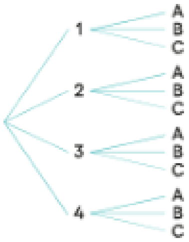
Section E

- We chose to use the _____ to describe the center of the data because …
- A random sample is important because …

Unit Outline

In this unit, students work with probability and sampling. They use their understanding of basic chance experiments to quantify how likely events are to happen and develop a working understanding of probability. Then they design and use simulations to further understand probability as the frequency of the event occurring when repeating an experiment many times. Students represent sample spaces using tables, tree diagrams, and lists, and use the number of outcomes in a sample space to calculate an expected probability.





Next, students examine different ways to collect data from samples within a population to understand why random selection is useful. Then students generate samples and estimate information about the population from sample data. Finally, students compare two groups by examining the measures of center and measures of variability calculated from sample data representing each group.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Probabilities of Single Step Events (Lessons 1-6)	**Learning Target #1** Use the results from a repeated experiment to estimate the probability of an event, and justify the estimate **Learning Target #2** Use the sample space to determine the probability of an event, and express it as a fraction, decimal, or percentage	**Lesson 1 Mystery Bags** • I can get an idea for the likelihood of an event by using results from previous experiments **Lesson 2 Chance Experiments** • I can describe the likelihood of events using the words “impossible,” “unlikely,” “equally likely as not,” “likely” and “certain” • I can tell which event is more likely when the chances of different events are expressed as fractions, decimals, or percentages **Lesson 3 What are Probabilities?** • I can use the sample space to calculate the probability of an event when all outcomes are equally as likely • I can write out the sample space for a simple chance experiment **Lesson 4 Estimating Probabilities Through Repeated Experiments** • I can estimate the probability of an event based on the results from repeating an experiment • I can explain whether certain results from repeated experiments would be surprising or not **Lesson 5 More Estimating Probabilities** • I can calculate the probability of an event when the outcomes in the sample space are not equally likely • I can explain why results from a repeating experiment may not exactly match the expected probability for an event **Lesson 6 Estimating Probabilities Using Simulation** • I can simulate a real world situation using a simple experiment that reflects the probability of an actual event
Checkpoint A	***Responding to Student Thinking***	

	● **Problem #1**: More Chances Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons. ● **Problem #2:** More Chances Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section B Probabilities of Multi-step Events (Lessons 7-10)	**Learning Target #3** Describe a multi-step experiment that could be used to simulate a compound event in a real-world situation, and justify that it represents the situation. **Learning Target #4** Interpret or create a list, table, or tree diagram that represents the sample space of a compound event, and use the sample space to write the probability for an event.	**Lesson 7 Simulating Multi-step Experiments** ● I can use a simulation to estimate the probability of a multi-step event. **Lesson 8 Keeping Track of All Possible Outcomes** ● I can write out the sample space for a multi-step experiment, using a list, table, or tree diagram. **Lesson 9 Multi-step Experiments** ● I can use the sample space to calculate the probability of an event in a multi-step experiment. **Lesson 10 Designing Simulations** ● I can design a simulation to estimate the probability of a multi-step real-world situation.
Mid Unit Assessment		
Checkpoint B	***Responding to Student Thinking*** ● **Problem #1:** Press Pause By this point in the unit, there should be some student mastery of finding probability. If most students struggle, make time to revisit related work in the lesson referred to here. ● **Problem #2:** Press Pause By this point in the unit, there should be some student mastery of designing simulations to estimate probability. If most students struggle, make time to revisit related work in the lesson referred to here.	
Section C Sampling (Lessons 11-14)	**Learning Target #5** Describe methods to obtain a random sample from a population, and explain why it is representative of the population. **Learning Target #6** Explain why samples are necessary and describe a sample and population for a given statistical question.	**Lesson 11 Comparing Groups** ● I can calculate the difference between two means as a multiple of the mean absolute deviation. ● When looking at a pair of dot plots, I can determine whether the distributions are very different or have a lot of overlap. **Lesson 12 Larger Populations** ● I can explain why it may be useful to gather data on a sample of a population. ● When I read or hear a statistical question, I can name the population of interest and give an example of a sample for that population. **Lesson 13 What Makes A Good Sample?** ● I can determine whether a sample is representative of a population by considering the shape, center, and spread of each of them. ● I know that some samples may represent the population better than others. ● I remember that when a distribution is not symmetric, the median is a better estimate of a typical value than the mean. **Lesson 14 Sampling in a Fair Way** ● I can describe ways to get a random sample from a population. ● I know that selecting a sample at random is usually a good way to get a representative sample.
Checkpoint C	***Responding to Student Thinking*** ● **Problem #1:** Points to Emphasize If students struggle to identify populations and samples, emphasize the concepts as they come up later in the unit. For example, as students work with samples in the practice problem referred to here, ask them to identify the population and how a sample might have been collected. ● **Problem #2:** Points to Emphasize If students struggle to explain that random sampling is useful for obtaining representative samples, emphasize the idea as students work through the next section. For example, in the activity referred to here, as students analyze data from a sample to estimate information about the population, ask them why it is important that the sample was collected using a random process.	
Section D	**Learning Target #7**	**Lesson 15 Estimating Populations Measures of Center**

Using Samples (Lessons 15-19)	Determine whether two populations are likely to be meaningfully different by reasoning about center and spread. **Learning Target #8** Use the proportion of a random sample that is within a certain category to make inferences about the population, and explain the reasoning.	• I can consider the variability of a sample to get an idea for how accurate my estimate is. • I can estimate the mean or median of a population based on a sample of the population. **Lesson 16 Estimating Population Proportions** • I can estimate the proportion of population data that are in a certain category based on a sample. **Lesson 17 More About Sampling Variability** • I can use the means from many samples to judge how accurate an estimate for the population mean is. • I know that as the sample size gets bigger, the sample mean is more likely to be close to the population mean. **Lesson 18 Comparing Populations Using Samples** • I can calculate the difference between two medians as a multiple of the interquartile range. • I can determine whether there is a meaningful difference between two populations based on a sample from each population. **Lesson 19 Comparing Populations with Friends** • I can decide what information I need to know to be able to compare two populations based on a sample from each.
Checkpoint D	***Responding to Student Thinking*** • **Problem #1:** Press Pause By this point in the unit, there should be some student mastery of finding and interpreting proportions. If most students struggle, make time to revisit related work in the lesson referred to here. • **Problem #2:** Press Pause By this point in the unit, there should be some student mastery of comparing populations from samples. If most students struggle, make time to revisit related work in the lesson referred to here	
End of Unit Assessment		

Course Title	Content Area	Grade Level	Credit (if applicable)
Grade 7 Math: Bridge to Algebra	**Mathematics**	**Grade 7**	**N/A**

Course Description

This course bridges student knowledge from the cumulative K-6 math experience to Algebra 1 in Grade 8. The course is a cohesive 9-unit sequence covering the final three units of Accelerated Grade 6 and the first six units of Accelerated Grade 7. This combined pathway is designed for students transitioning from regular Grade 6 to Accelerated Grade 7, ensuring they build essential foundations before accelerating.

This combined sequence emphasizes the development of proportional reasoning, rational number operations, transformational geometry, and algebraic thinking. It builds progressively from concrete representations to abstract reasoning. Students engage with problem-based learning that activates prior knowledge and builds toward increasingly sophisticated mathematical thinking. The course prioritizes multiple representations (visual, tabular, algebraic, contextual) to deepen conceptual understanding and prepare students for advanced mathematics.

Aligned Core Resources

CT Core Standards
(aligned to National Common Core Standards)

Imagine Learning iM Resources (Imagine 6-8)
BPS teacher login through ClassLink required

Grade 6 ACC
https://accessim.org
https://accessim.org/6-8-accelerated/accelerated-6/course-guide/further-reading?a=teacher
Grade 7 ACC
https://accessim.org/6-8-accelerated/accelerated-7/course-guide/further-reading?a=teacher

- Empowering All Storytellers: Tips for Engaging Special Populations Using IM® v.360 for Grade 6–12
- Tackling Wordy Problems: How the Three Reads Math Language Routine Supports Access for All Learners
- Think Pair Share
- Making Sense of Story Problems
- Math Language Routines: Discourse with a Purpose
- Unlocking Learners' Thinking Using the Mathematical Language Routines

Connection to the *BPS Vision of the Graduate*

Common Core State Standards: Math Practice (MP) Standards

- MP 1: Make sense of problems and persevere in solving them.
- MP 2: Reason abstractly and quantitatively.
- MP 3: Construct viable arguments and critique the reasoning of others.
- MP 4: Model with mathematics.
- MP 5: Use appropriate tools strategically.
- MP 6: Attend to precision.
- MP 7: Look for and make use of structure.
- MP 8: Look for and express regularity in repeated reasoning.

	Lessons that Showcase Math Practice Standards								
	Unit 1 *6ACC U5*	**Unit 2** *6ACC U6*	**Unit 3** *6ACC U7*	**Unit 4** *7ACC U3*	**Unit 5** *7ACC U4*	**Unit 6** *7ACC U1*	**Unit 7** *7ACC U2*	**Unit 8** *7ACC U5*	**Unit 9** *7ACC U6*
MP 1	4, 6, 13, 18–20	1, 4, 5, 8, 10–12	1, 5, 8, 11, 17	1, 4, 5, 8, 10, 11, 17	-	1, 5, 12, 15	1, 9, 11, 18, 19	2, 4, 17, 18, 24	1, 8, 15, 19–21
MP 2	1–3, 7, 8, 13, 16, 19	2, 3, 6, 9, 13	1, 3, 4, 6, 8, 10, 12, 14, 17, 19–21	4, 5, 10, 12–14	5, 12	-	4, 19	1, 3–8, 10, 14, 17–20, 22–24, 26–28	3–7, 13, 14, 17, 18
MP 3	4, 11, 15–17, 19	1, 3, 5, 9–11, 13	2, 3, 9, 18, 20, 21	2, 3, 6, 9, 11, 13, 16, 18	2–4, 6–8	2, 10, 12, 16	1, 12, 13, 19	5, 8, 9, 12, 14–17	3, 11, 13
MP 4	7, 10, 14, 17, 18, 20	11	23	2, 17	12	-	18, 19	4, 5, 7, 8, 11, 14	10, 14
MP 5	11	-	-	-	-	6, 10	2, 4, 9, 10	28	-
MP 6	1, 2, 5–7, 9, 11, 13, 15, 16, 19	3–8, 10, 12	3, 5, 6, 11, 13, 15, 16, 19, 22	3, 7, 8, 13, 15, 17	1, 3, 4, 7, 12	1–3, 5, 9, 12, 17	1, 3, 7, 8, 10–12	1, 2, 8–10, 17, 19, 21, 22, 24	2, 5, 21
MP 7	3, 5, 8, 9, 12, 14–16	1–4, 6–8, 11	1, 2, 7, 9, 11, 15, 16, 18, 20	2, 4–6, 9, 12, 14, 16, 18	1–4, 6, 9–11	1, 3, 4, 7–9, 13–16	2, 5, 6, 8–10, 13, 15–17	2, 5, 7, 12, 15, 16, 18, 20, 23, 24	2, 10–13, 16, 19, 20
MP 8	1–3, 8, 10, 12, 15	2, 6–8	6, 7, 9, 10, 13–15	1, 15	10	7, 12, 13, 15	2, 3, 6, 14–17	6, 8, 9, 11	3, 23

Bristol Public Schools Vision of the Graduate

Problem Solving
- iM's focus on real-world modeling and problem-solving strategies
- Multiple solution pathways are encouraged and explored
- Students develop perseverance through challenging tasks

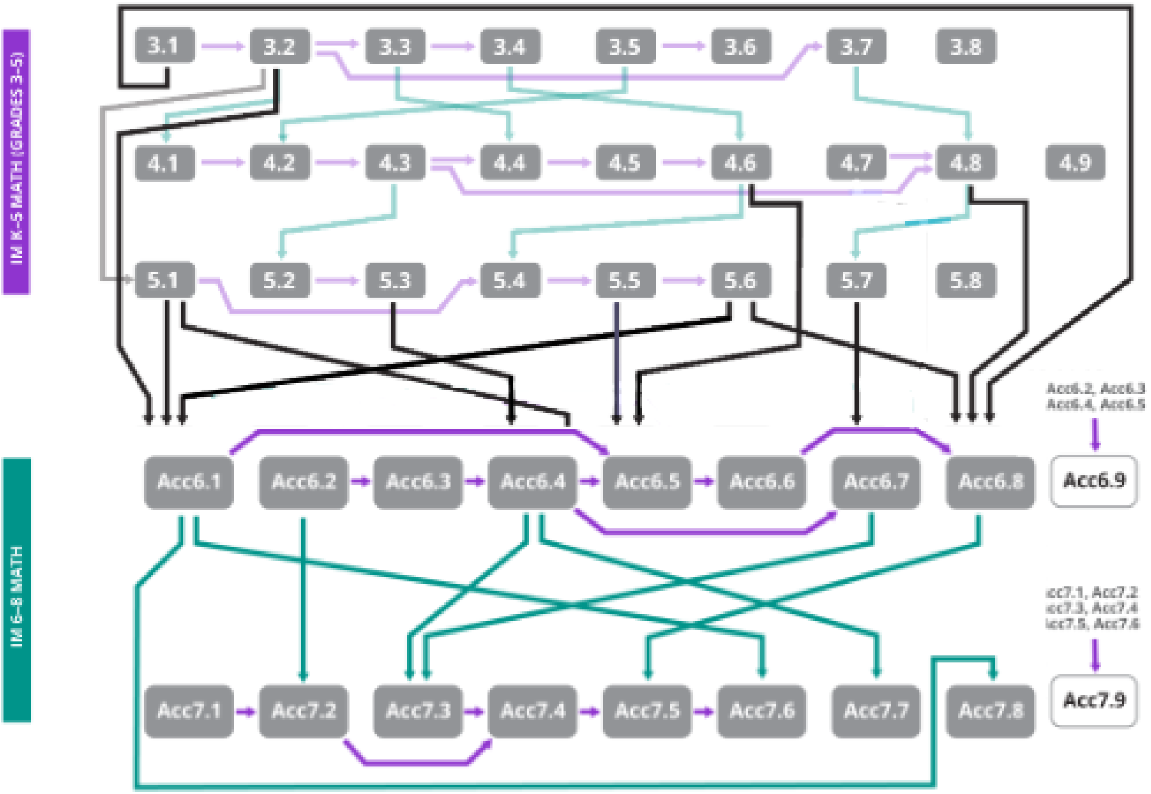
Critical Thinking
- Students analyze mathematical relationships and justify their reasoning
- Regular opportunities to critique others' reasoning
- Emphasis on understanding "why" not just "how"

Communication and Collaboration
- Structured mathematical discourse is built into lessons
- Students explain their thinking both verbally and in writing
- Many activities involve partner and group work

Link to *Equity Audit*	Equity Curriculum Review Audit (Gr. 7 Bridge)

Additional Course Information:

Knowledge/Skill Dependent courses/prerequisites



Standard Matrix

Standard	Unit 1 *6ACC U5*	Unit 2 *6ACC U6*	Unit 3 *6ACC U7*	Unit 4 *7ACC U3*	Unit 5 *7ACC U4*	Unit 6 *7ACC U1*	Unit 7 *7ACC U2*	Unit 8 *7ACC U5*	Unit 9 *7ACC U6*
6.G.A.3			22						
6.NS.C.5			1, 3						
6.NS.C.6			1, 3, 5, 14						
6.NS.C.6.a			3						
6.NS.C.6.b			11, 13						
6.NS.C.6.c			11, 12, 13						
6.NS.C.7			3, 4, 5						
6.NS.C.7.a			2, 5						
6.NS.C.7.b			2						
6.NS.C.7.c			4, 12						
6.NS.C.7.d			4, 5						
6.NS.C.8			12, 13, 22						
7.EE.A					5				
7.EE.A.1					1-4				
7.EE.A.2		2, 6, 8		11					
7.EE.B.3	20		17, 20 ,23	2-5, 10, 11					
7.EE.B.4			20, 21	5, 8, 10, 11, 15,18					

7.EE.B.4.a				4-11					
7.EE.B.4.b				14, 16, 17					
7.G.A	11								
7.G.A.1	14, 20						1-7, 18		
7.G.A.2	11					15-17, 22			
7.G.A.3									8, 10
7.G.B	14, 15								14
7.G.B.4	12, 13, 14, 16, 29, 20								
7.G.B.5				18		12			
7.G.B.6	14								9, 10, 13, 14, 22
7.NS.A			18, 20						
7.NS.A.1			1, 8		1				
7.NS.A.1.a			6-8						
7.NS.A.1.b			6, 7						
7.NS.A.1.c			9 ,10 ,13		1				
7.NS.A.1.d			7, 10 ,18						
7.NS.A.2.a			14, 17						
7.NS.A.2.b			16						
7.NS.A.2.c			14, 15, 18						
7.NS.A.2.d		3							
7.NS.A.3			10, 17, 19, 20, 21, 23						
7.RP.A	2, 6, 17		14, 17						14
7.RP.A.1	5	1							
7.RP.A.2	1-9. 12, 17, 18	1-3							
7.RP.A.2.a	4, 5, 10, 12, 15								
7.RP.A.2.b	2, 7, 9								
7.RP.A.2.c	1, 2, 4, 5, 9								
7.RP.A.2.d	7 9								
7.RP.A.3		4-13	23						
8.EE.B								1-11	
8.EE.B.5								2, 3, 5	
8.EE.B.6							15 - 17, 6, 9, 10, 26		
8.EE.C					5-8, 11, 12				
8.EE.C.7					6-9				
8.EE.C.7.a					10, 11				
8.EE.C.7.b					9				
8.EE.C.8								13-17	
8.EE.C.8.a								12, 14, 15, 26	
8.EE.C.8.b								14, 27	
8.EE.C.8.c								17, 27	

8.F.A									3, 23
8.F.A.1									1-4, 17
8.F.A.2									6, 7
8.F.A.3									4, 6, 7, 17, 18
8.F.B									17, 18
8.F.B.4									5, 7, 8
8.F.B.5									4, 6, 8
8.G.A						18	9-11, 13, 14, 17		14
8.G.A.1						2, 3,5, 10 ,12			
8.G.A.1.a						6-9, 11			
8.G.A.1.b						6-9			
8.G.A.1.c						8			
8.G.A.2						10, 11, 13			
8.G.A.3						4, 5	10, 11, 17		
8.G.A.4							12, 14		
8.G.A.5						12-14	13, 19		
8.G.C									17, 19, 20
8.G.C.9									11, 12, 15-21, 23
8.SP.A								28	
8.SP.A.1								18-23	
8.SP.A.2								20-23	
8.SP.A.3								19, 22, 23	
8.SP.A.4								24, 25	

Unit Links

Grade 7 Mathematics: Bridge to Algebra
Unit 1: Proportional Relationships (G6 ACC U5)
Unit 2: Percent Increase and Decrease (G6 ACC U6)
Unit 3: Rational Numbers (G6 ACC U7)
Unit 4: Equations and Inequalities (G7 ACC U3)
Unit 5: Expressions and More Equations (G7 ACC U4)
Unit 6: Rigid Transformations & Congruence (G7 ACC U1)
Unit 7: Scale Drawings, Similarity, & Slope (G7 ACC U2)
Unit 8: Linear Relationships (G7 ACC U5)
Unit 9: Functions and Volume (G7 ACC U6)
Course Assessment Map

Use of Instructional Time (181 School Days)

- ➔ 162 iM Content and Assessment Days
- ➔ 6 Climate and Culture Days: 2 days at start of year, 2 shortened days before breaks, and 2 days at end of year
- ➔ 9 IAB Days: 1 day Strategic Review and 2 day IAB in fall, winter, and spring
- ➔ 4 SBA Days: 1 day Strategic Review and 3 day SBA

Unit Title:

Unit 1: Proportional Relationships (G6 ACC U5)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.RP.A.2, 7.RP.A.2.c	Lesson 11	7.G.A, 7.G.A.2
Lesson 2	7.RP.A7.RP.A.2, 7.RP.A.2.b, 7.RP.A.2.c	Lesson 12	7.G.B.4, 7.RP.A.2, 7.RP.A.2.a
Lesson 3	7.RP.A.2	Lesson 13	7.G.B.4
Lesson 4	7.RP.A.2, 7.RP.A.2.a, 7.RP.A.2.c	Lesson 14	7.G.A.1, 7.G.B, 7.G.B.6
Lesson 5	7.RP.A.1, 7.RP.A.2, 7.RP.A.2.a , 7.RP.A.2.c	Lesson 15	7.G.B7.G.B.4, 7.RP.A.2.a
Lesson 6	7.RP.A , 7.RP.A.2	Lesson 16	7.G.B.4
Lesson 7	7.RP.A.2, 7.RP.A.2.b 7.RP.A.2.d	Lesson 17	7.RP.A, 7.RP.A.2
Lesson 8	7.RP.A.2	Lesson 18	7.RP.A.2
Lesson 9	7.RP.A.2, 7.RP.A.2.b, 7.RP.A.2.c, 7.RP.A.2.d	Lesson 19	7.G.B.4
Lesson 10	7.RP.A.2.a	Lesson 20	7.EE.B.3, 7.G.A.1, 7.G.B.4

Essential Question(s):

- How can a proportional relationship be identified and interpreted across tables, equations, and graphs?
- Why does every proportional relationship have two reciprocal constants of proportionality?
- How does the relationship between a circle's diameter and circumference illustrate a proportional relationship?

Enduring Understanding(s):

- A proportional relationship is defined by a constant ratio between quantities, appearing as a straight line through the origin on a graph and represented by an equation of the form y=kx
- Because a proportional relationship relates two quantities, there are two unit rates (e.g., cups per tablespoon and tablespoons per cup) that are reciprocals of each other
- The circumference of any circle is proportional to its diameter, and the constant of proportionality is always the value of pi (π)

Demonstration of Learning:

Checkpoint A is an opportunity for feedback
Checkpoint B is an opportunity for feedback
CFA 1: Checkpoint C (after lesson 9)
CFA 2: Checkpoint D (after Lesson 13)
CFA 3: Checkpoint E (after lesson 16)
EoU: Assessment A (after lesson 16)

Pacing for Unit

20 Days

Lesson Notes:

- Covering Lessons 1-16
- 2 days for review/assessment
- 2 flex days
- Optional Lessons: 17, 18, 19 & 20

Family Overview

https://accessim.org/6-8-accelerated/accelerated-6/unit-5?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
Acc6.5.1	constant of proportionality proportional relationship	___ is proportional to ___
Acc6.5.2	steady situation	reciprocal
Acc6.5.4		constant of proportionality proportional relationship

Aligned Unit Materials, Resources, and Technology

For whole course:
https://accessim.org/6-8/grade-7/course-guide/required-materials?a=teacher

Digital Applets

- Acc6.5.7 Notice These Points, T-Shirts for Sale
- Acc6.5.8 Race to the Bumper Cars, Space Rocks, and the Price of Rope
- Acc6.5.9 Tables, Graphs, and Equations, Hot Dog Eating Contest
- 6.5.10 Perimeter of a Square
- 6.5.11 Drawing Circles
- 6.5.12 Measuring Circumference and Diameter
- 6.5.13 Using pi
- 6.5.15 Estimating Areas of Circles, Making Another

Acc6.5.5		constant
Acc6.5.7	origin coordinate plane quantity axes	coordinates
Acc6.5.9	x-coordinate y-coordinate	origin
Acc6.5.10	perimeter	
Acc6.5.11	radius diameter circumference center (of a circle)	circle
Acc6.5.12	pi (π)	
Acc6.5.13	half-circle rotation approximation	diameter circumference pi (π)
Acc6.5.14	floor plan	approximate estimate
Acc6.5.15	area of a circle formula	radius
Acc6.5.16	in terms of π	area of a circle
Acc6.5.17		axes
Acc6.5.18	reasonable	
Acc6.5.19		squared center (of a circle) formula
Acc6.5.20	design	

Polygon out of a Circle

Provide access as needed throughout the unit:

- Blank paper
- Colored pencils
- Compasses
- Cylindrical household items
- Empty toilet paper roll
- Four-function calculators
- Geometry toolkits (Tracing paper, graph paper, colored pencils, scissors, an index card to use as a straightedge or to mark right angles, a ruler, and a protractor. Clear protractors with no holes and with radial lines printed on them are recommended)
  Notes: (1) "Tracing paper" is easiest to use when it's smaller. Commercially available "patty paper" is 5 inches by 5 inches and is ideal for this. If using larger sheets of tracing paper, consider cutting them down for student use. (2) When compasses are required, they are listed as separate Required Material.
- Glue or glue sticks
- Internet-enabled device
- Markers
- Math Community Chart
- Measuring tapes
- Rulers
- Rulers marked with centimeters
- Scissors
- Snap cubes
- Tools for creating a visual display
  Any way for students to create work that can be easily displayed to the class. Examples: chart paper and markers, whiteboard space and markers, shared online drawing tool, access to a document camera.

Lesson	Materials to Gather	Materials to Copy
4	• Four-function calculators: Lesson • Math Community Chart: Activity 2	
5	Snap cubes: Activity 2	
6		Biking and Rain Cards (1 copy for every 4 students): Activity 1
7	Rulers: Activity 1	
8	• Colored pencils: Activity 1 • Rulers: Activity 1	
9	Rulers: Activity 1	Tables, Graphs, and Equations Handout (1 copy for every 3 students): Activity 1
10	• Rulers marked with centimeters: Activity 1 • Four-function calculators: Activity 2	Perimeter of a Square Handout (1 copy for every student): Activity 1
11	• Compasses: Activity 3 • Rulers: Activity 3	Sorting Round Objects Cards (1 copy for every 2 students): Activity 1
12	• Empty toilet paper roll: Warm-up • Cylindrical household items: Activity 1	

	• Measuring tapes: Activity 1	
13	Four-function calculators: Activity 1	
14	Geometry toolkits: Lesson, Activity 1	
15	• Geometry toolkits: Activity 1 • Blank paper: Activity 2 • Glue or glue sticks: Activity 2 • Markers: Activity 2 • Scissors: Activity 2	• Estimating Areas of Circles Handout (1 copy for every 12 students): Activity 1 • Making a Polygon out of a Circle Cutouts (1 copy for every 12 students): Activity 2
17	Tools for creating a visual display: Activity 1	Creating and Representing Situations Handout (1 copy for every student): Activity 1
18	• Internet-enabled device: Activity 1 • Tools for creating a visual display: Activity 2	
19	Math Community Chart: Activity 1	• Circle Problems Cards (1 copy for every 2 students): Activity 1 • Visual Display of Circle Problem Handout (1 copy for every 10 students): Activity 2 • Merry-go-round and Unicycle Cards (1 copy for every 4 students): Activity 4
20	• Blank paper: Activity 3 • Compasses: Activity 3 • Geometry toolkits: Activity 3	

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
• **Geography**: Students use scale drawings and maps to calculate actual real-world distances • **Art and Design:** Students explore scaling in the context of printing portraits and analyzing the proportions of various artistic figures • **Biology:** Scaling is explored through the lens of "Movie Monsters," examining how size changes affect physical properties	**Unit Rate Reversal:** Students may find the reciprocal unit rate (e.g., cups per tablespoon instead of tablespoons per cup) and apply it incorrectly. See teacher's guide for specific misconceptions aligned to each lesson.
Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: • Tables of equivalent ratios • Representations of sets of equivalent ratios **Relevant Unit(s)/Lesson(s) to Review:** • 6ACC Unit 1 • 6ACC Unit 2, Lesson 9, Activity 2 • 6 ACC Unit 2 Lesson 18	This unit builds on previous work with equivalent ratios and prepares students for the study of linear functions in later courses. It also applies to measuring circles and later to the volume of spheres, cylinders, and cones
Differentiation through *Universal Design for Learning*	

Engagement:

- Provide calculators to facilitate information processing (Lesson 6, Activity 2 Launch)
  LT2: Write an equation of the form y=kx to represent a proportional relationship

Representation:

- Use physical snap cubes to connect symbols to concrete objects like "side length" (Lesson 5, Activity 2 Launch)
  LT1: Use an equation to solve problems involving a proportional relationship

Action & Expression:

- Chunk the task of drawing a classroom floor plan into manageable parts (Lesson 13, Activity 3 Launch)
  LT9: Solve problems involving circumference

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR5: Co-Craft Questions (Lessons 2, 3, 5, 7, 10, 11, 13, 14, 16, 19)
- MLR7: Compare and Connect (Lessons 1, 5, 8, 9, 13, 14, 18, 19, 20)
- MLR8: Discussion Supports (Lessons 1, 2, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as comparing, justifying, and generalizing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Compare

- Approaches to solving problems involving proportional relationships (Lesson 3).
- Proportional relationships with nonproportional relationships (Lesson 5).
- Tables, descriptions, and graphs representing the same situations (Lesson 7).
- Graphs of proportional relationships (Lesson 8).
- The relationships of square diagonals and perimeters to square diagonals and areas (Lesson 10).
- The relationships of diameters and circumferences to diameters and areas (Lesson 15).

Justify

- Reasoning about circumference and perimeter (Lesson 13).
- Estimates for the areas of circles (Lesson 15).
- Reasoning about areas of curved figures (Lesson 16).
- Whether or not a relationship is proportional (Lesson 17).
- Reasoning about the cost of stained-glass windows (Lesson 20).

Generalize

- About proportional relationships (Lesson 1).
- About equations that represent proportional relationships (Lesson 2).
- About categories for sorting circles (Lesson 11).
- About the relationships between circumference and diameter (Lesson 12).

Sentence Frames and Stems

Section A

- The equation _____ represents this proportional relationship because ...
- Two equations that represent the same proportional relationship are _____ and _____.
- I used _____ to represent the relationship and find the unknown values to be ...
- I used the equation _____ to find the number of _____ when the number of _____ is _____.

Section B

- This situation is/is not a proportional relationship because ...
- The values in this table do/do not represent a proportional relationship because ...
- The equation _____ represents a proportional relationship because ...

Section C

- The graph does/does not represent a proportional relationship because …
- Using the graph, I found the constant of proportionality to be _____ because …
- The constant of proportionality of this graph describes the relationship between _____ and _____.
- The coordinates _____ represent …
- The constant of proportionality of _____ is greater/less than the constant of proportionality of _____ because …
- The equation _____ represents the proportional relationship shown in the graph because …

Section D

- The diameter of the circle is _____.
- I know the radius of the circle is _____ because the diameter is _____ and …
- The equation _____ can be used to find the circumference of a circle with a diameter/radius of _____.
- The diameter of the circle is _____ with a circumference of _____. I know these values have a proportional relationship because …
- If I know the _____ of a circle, I can find the _____ by …
- The circumference of the circle is _____ because …

Section E

- The difference between circumference and area of a circle is …
- I calculated the area of the circle by …
- The area of the circle is _____ because …
- The equation _____ can be used to find the area of a circle with a diameter/radius of _____.
- To find the area of a shaded region, first I _____, then I _____ …

Section F

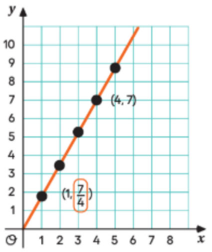
- I created a proportional relationship between _____ and _____. The constant of proportionality is _____ and an equation to represent the relationship is _____.
- I am most comfortable representing a proportional relationship with _____ because …
- For this question, I need to find the _____ of a circle because…
- I know the _____ of the circle, which I can use to find the _____. This will help me solve this problem because …
- I used the equation _____ to solve this problem because …

Unit Outline

In this unit, students develop the idea of a proportional relationship. They work with proportional relationships that are represented in tables, as equations, and on graphs. This builds on previous work with equivalent ratios and helps prepare students for the study of linear functions in later courses.

In a table of equivalent ratios, a multiplicative relationship between a pair of rows is given by a scale factor, while the multiplicative relationship between the columns is given by a unit rate. Students learn that the relationship between pairs of values in the two columns is called a “proportional relationship,” and the unit rate that describes this relationship is called a “constant of proportionality.” Students use equations of the form $y = kx$ to represent proportional relationships and solve problems. They determine whether given tables and equations could represent a proportional relationship.

Then students investigate graphs of proportional relationships. They recognize that the graph of a proportional relationship is a straight line through (0,0). They interpret points on the graph, including the point $(1,k)$. Here is an example of a graph, an equation, and a table that all represent the same proportional relationship.



$y = \boxed{\frac{7}{4}}x$

x	y
0	0
1	$\boxed{\frac{7}{4}}$
2	$\frac{7}{2}$
3	$\frac{21}{4}$
4	7

Next, students apply their knowledge of proportional relationships to the context of measuring circles. This builds on students’ work from previous grades with perimeter and area of polygons. Students will build on this work in later courses when they study the volume of spheres, cylinders, and cones. The terms “center,” “radius,” “diameter,” and “circumference” are introduced. Then students investigate the relationship between circumference and diameter and see that it is a proportional relationship. They apply this relationship to solve problems. Next, students explore the area of circular regions. They see an informal derivation that shows where the formula $A=\pi r^2$ comes from and then use this formula to solve problems.

A note on using the terms "ratio," "proportional relationship," and "unit rate":
In these materials, the term "ratio" is used to mean a type of association between two or more quantities. A quantity is a measurement that can be specified by a number and a unit, for example 4 oranges, 4 centimeters, or "my height in feet." A proportional relationship is a collection of equivalent ratios.

A unit rate is the numerical part of a rate per 1 unit, for example, the 6 in 6 miles per hour. The fractions a/b and b/a are never called ratios. The fractions a/b and b/a are identified as "unit rates" for the ratio a:b.

In high school—after the study of ratios, rates, and proportional relationships—students discard the term "unit rate" and start referring to a to b, $a:b$, and a/b as "ratios."

In Accelerated 6 and 7, students write rates without abbreviated units, for example as "3 miles per hour" or "3 miles in every 1 hour." Use of notation for derived units such as mi/hr waits for high school—except for the special cases of area and volume.

A note on using the term "circle":
Strictly speaking, a circle is one-dimensional. It is the boundary of a two-dimensional region, rather than the region itself. The circular region is called a "disk." Because students are not yet expected to make this distinction, these materials refer to both disks and the boundaries of disks as "circles," using illustrations to eliminate ambiguity.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Representing Proportional Relationships with Equations (Lessons 1-3)	**Learning Target #1** Use an equation to solve problems involving a proportional relationship. **Learning Target #2** Write an equation of the form $y=kx$ to represent a proportional relationship, given a table or a description of the situation.	**Lesson 1 Proportional Relationships and Equations** ● I can write an equation of the form $y=kx$ to represent a proportional relationship shown in a table or described in a story. ● I can write the constant of proportionality as an entry in a table. **Lesson 2 Two Equations for Each Relationship** ● I can find two constants of proportionality for a proportional relationship. ● I can write two equations representing a proportional relationship described by a table or story. **Lesson 3 Writing Equations to Represent Relationships** ● I can find missing information in a proportional relationship using the constant of proportionality. ● I can relate all parts of an equation like $y=kx$ to the situation it represents.
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with writing an equation that represents a proportional relationship, as opportunities arise over the next several lessons, revisit the structure and meaning of an equation of the form $y=kx$. For example, in the activity referred to here, invite multiple students to share their thinking about the structure of the equations. ○ Accelerated 6, Unit 5, Lesson 5, Activity 2 Total Edge Length, Surface Area, and Volume ● **Problem 2:** Points to Emphasize: If most students struggle with using an equation to find unknown values, revisit this concept as opportunities arise over the next several lessons. For example, in the activity referred to here, invite multiple students to share their thinking about substituting values and evaluating expressions. ● Accelerated 6, Unit 5, Lesson 5, Activity 1 More Conversions	
Section B Comparing Proportional and Nonproportional Relationships (Lessons 4-6)	**Learning Target #3** Determine whether the values in a table could represent a proportional relationship **Learning Target #4** Use a table to determine whether an equation represents a proportional relationship.	**Lesson 4 Comparing Relationships with Tables** ● I can decide if a relationship represented by a table could be proportional and when it is definitely not proportional. **Lesson 5 Comparing Relationships with Equations** ● I can decide if a relationship represented by an equation is proportional or not. **Lesson 6 Solving Problems about Proportional Relationships** ● I can ask questions about a situation to determine whether two quantities are in a proportional relationship. ● I can solve all kinds of problems involving proportional relationships.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of determining whether or not a table could represent a proportional relationship. If students struggle with this, make time to examine related work in the section referred to here. The Course Guide provides additional ideas for revisiting earlier work. ○ Accelerated 6, Unit 5, Section B Comparing Proportional and Nonproportional Relationships ● **Problem 2:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section C Representing Proportional Relationships with	**Learning Target #5** Determine whether a given graph represents a proportional relationship.	**Lesson 7 Graphs of Proportional Relationships** ● I can find the constant of proportionality from a graph. ● I know that the graph of a proportional relationship lies on a line through $(0,0)$

Graphs (Lessons 7-9)	**Learning Target #6** Identify the constant of proportionality from the graph of a proportional relationship. **Learning Target #7** Interpret points on the graph of a proportional relationship.	● I can write an equation representing a proportional relationship from a graph. **Lesson 8 Using Graphs to Compare Relationships** ● I can compare two, related proportional relationships based on their graphs. ● I know that the steeper graph of two proportional relationships has a larger constant of proportionality. **Lesson 9 Two Graphs for Each Relationship** ● I can interpret a graph of a proportional relationship using the situation.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with determining whether or not a graph represents a proportional relationship, revisit this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about this using the graphs in the lessons referred to here. ○ Accelerated 6, Unit 5, Lesson 10 How Well Can You Measure ○ Accelerated 6, Unit 5, Lesson 12 Exploring Circumference ● **Problem 2:** Press Pause: By this point in the unit, there should be some student mastery of interpreting points on the graph of a proportional relationship. If students struggle with this, make time to examine related work in the lessons referred to here. The Course Guide provides additional ideas for revisiting earlier work. ○ Accelerated 6, Unit 5, Lesson 7 Interpreting Graphs of Proportional Relationships ○ Accelerated 6, Unit 5, Lesson 9 Two Graphs for Each Relationship	
Section D Circumference of a Circle (Lessons 10-13)	**Learning Target #8** Recognize that there are proportional relationships between the circumference, diameter, and radius of circles and express these relationships using equations. **Learning Target #9** Solve problems involving circumference.	**Lesson 10 How Well Can You Measure?** ● I can examine quotients and use a graph to decide whether two associated quantities are in a proportional relationship. ● I understand that it can be difficult to measure the quantities in a proportional relationship accurately. **Lesson 11 Exploring Circles** ● I can describe the characteristics that make a shape a circle. ● I can identify the diameter, center, radius, and circumference of a circle. **Lesson 12 Exploring Circumference** ● I can describe the relationship between circumference and diameter of any circle. ● I can explain what π means. **Lesson 13 Applying Circumference** ● I can choose an approximation for π based on the situation or problem. ● If I know the radius, diameter, or circumference of a circle, I can find the other two.
Checkpoint D	***Responding to Student Thinking*** ● **Problem 1:** More chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons. ● **Problem 2:** Press Pause: By this point in the unit, there should be some student mastery of finding the circumference of a circle given its radius. If students struggle with this, make time to examine related work in the section referred to here. The Course Guide provides additional ideas for revisiting earlier work. ○ Accelerated 6, Unit 5, Section D Circumference of a Circle	
Section E Area of a Circle (Lessons 14-16)	**Learning Target #10** Justify that the area of a circle can be calculated with the formula A=pir^2 **Learning Target #11** Recognize that the area of a circle is not proportional to its diameter or radius. **Learning Target #12** Solve problems involving the area of a circle.	**Lesson 14 Estimating Areas** ● I can calculate the area of a complicated shape by breaking it into shapes whose area I know how to calculate. **Lesson 15 Area of a Circle** ● I know the formula for the area of a circle. ● I know whether or not the relationship between the diameter and area of a circle is proportional and can explain how I know. **Lesson 16 Applying Area of Circles** ● I can calculate the area of more complicated shapes that include fractions of circles.

		● I can write exact answers in terms of π
Checkpoint E	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of recognizing that the area of a circle is not proportional to the diameter. If students struggle with this, make time to examine related work in the lessons referred to here. The Course Guide provides additional ideas for revisiting earlier work. ○ Accelerated 6, Unit 5, Lesson 15 Area of a Circle ● **Problem 2:** Points to Emphasize: If most students struggle with finding the area of a circle and expressing it in terms of π, revisit this concept when opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the situations involving area in this activity: ○ Accelerated 6, Unit 5, Lesson 19, Activity 1 Card Sort: Circle Problems	
Section F Let's Put it To Work (Lesson 17-20)	**No new learning targets**	**Lesson 17 Four Representations** ● I can make connections between the graphs, tables, and equations of a proportional relationship. ● I can use units to help me understand information about proportional relationships. **Lesson 18 Using Water Efficiently** ● I can answer a question by representing a situation using proportional relationships. **Lesson 19 Distinguishing Circumference and Area** ● I can decide whether a situation about a circle has to do with area or circumference. ● I can use formulas for circumference and area of a circle to solve problems. **Lesson 20 Stained-Glass Windows** ● I can apply my understanding of area and circumference of circles to solve more complicated problems.
End of Unit Assessment		

Unit Title:

Unit 2: Percent Increase and Decrease (G6 ACC U6)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.RP.A.1, 7.RP.A.2	Lesson 8	7.EE.A.2, 7.RP.A.3
Lesson 2	7.EE.A.2, 7.RP.A.2	Lesson 9	7.RP.A.3
Lesson 3	7.NS.A.2.d, 7.RP.A.2	Lesson 10	7.RP.A.3
Lesson 4	7.RP.A.3	Lesson 11	7.RP.A.3
Lesson 5	7.RP.A.3	Lesson 12	7.RP.A.3
Lesson 6	7.EE.A.2, 7.RP.A.3	Lesson 13	7.RP.A.3
Lesson 7	7.RP.A.3		

Essential Question(s):

- How can the distributive property simplify multi-step percent problems?
- What is the significance of "100%" when modeling changes in value?
- How do we quantify the accuracy of a measurement using percentages?

Enduring Understanding(s):

- Percent increase and decrease can be represented as a single multiplication operation (e.g., 1.15x for a 15% increase) by applying the distributive property to the expression x+0.15x
- In any situation involving percent increase or decrease, the original amount always corresponds to 100% on a double number line or tape diagram
- Percent error is a measurement of how far off an estimate is from the actual value, expressed as a percentage of that actual value

Demonstration of Learning:

CFA1: Checkpoint A (after lesson 3)
CFA 2: Checkpoint B (after lesson 7)
CFA 3: Checkpoint C (after lesson 11)
EoU: Assessment A (after lesson 11)

Pacing for Unit

17 Days

Lesson Modifications:

- Covering Lessons 1-11
- Optional Lessons: 7, 12, 13
- 2 days for review/assess
- 4 flex days for reteaching of prior percent content (Acc 6th unit 2, lessons 21-26 suggested for teachers to take a look at)

Family Overview

https://accessim.org/6-8-accelerated/accelerated-6/unit-6?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
Acc6.6.2	(a fraction) more than (a fraction) less than initial / original amount final / new amount	tape diagram distributive property
Acc6.6.3	repeating decimal decimal representation	
Acc6.6.4	percent increase percent decrease	(a fraction) more than (a fraction) less than
Acc6.6.5	discount	initial / original amount final / new amount
Acc6.6.8	sales tax tax rate tip	percent increase
Acc6.6.9	interest commission	percent decrease

Aligned Unit Materials, Resources, and Technology

Provide access as needed throughout the unit:

- Four-function calculators
- Grocery store circulars (Grocery store advertisements from the newspaper or that are picked up at the store. If students have internet access, an online version could be substituted.)
- Math Community Chart
- Sticky notes
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
2		Fractional Relationship Cards (1 copy for every 2 students): Activity 2
3		More Representations Cards (1 copy for every 2 students): Activity 3
6	Four-function calculators: Activity 1	

	markup markdown	
Acc6.6.10		discount
Acc6.6.11	measurement error percent error	

8	Four-function calculators: Activity 1, Activity 2, Activity 3	
9	• Math Community Chart • Four-function calculators: Activity 2	
10	Four-function calculators: Activity 1	
11	Four-function calculators: Activity 3	
13	• Grocery store circulars: Warm-up, Activity 1 • Sticky notes: Activity 2 • Tools for creating a visual display: Activity 2	

Opportunities for Interdisciplinary Connections:

- **Culinary Arts:** Students apply proportional reasoning to scale food and drink recipes
- **Environmental Science:** The unit explores water usage efficiency in households and the economic value of recycling aluminum cans

Anticipated misconceptions:

Additive Discounts: Students may think that two successive 25% discounts are the same as one 50% discount

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Use proportional relationships to find equivalent ratios
- Ratios and unit rates
- Solving percent problems

Relevant Unit(s)/Lesson(s) to Review:

- Acc Unit 2 Lessons 21-24
- Grade 7, Unit 4, Lesson 2

Connections to Future Units:

Groundwork for Grade 9/high school work with exponential functions representing compounded percent changes. It also prepares students for real-world applications like tax, tip, simple interest, markup, and markdown.

Differentiation through *Universal Design for Learning*

Engagement:

- Provide rubrics or checklists for creating visual displays for news reports (Lesson 13, Activity 2 Student Task Statement)
  LT3: Create algebraic expressions or equations that represent a situation involving percent increase or decrease

Representation:

- Use a double number line diagram to help organize information (Lesson 5, Activity 2 Launch)
  LT3: Create algebraic expressions or equations that represent a situation involving percent increase or decrease

Action & Expression:

- Invite students to demonstrate measurement ideas using a physical ruler (Lesson 11, Activity 1 Student Task Statement)
  LT4: Calculate measurement error and express it as a percentage

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 1, 6, 11, 12)
- MLR6: Three Reads (Lessons 5, 11, 12)
- MLR8: Discussion Supports (Lessons 2, 3, 4, 6, 7, 8, 9, 11, 13)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as interpreting, explaining, and representing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sensemaking and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Interpret

- Concrete problems involving percent increase and decrease (Lesson 5).
- Problems involving sales tax and tip (Lesson 8).
- Concrete situations involving percent error (Lesson 11).

Explain

- How to solve concrete and abstract problems involving an amount plus (or minus) a fraction of that amount (Lesson 2).
- How to solve percent change problems (Lesson 4).
- Strategies for solving percent problems with fractional percentages (Lesson 7).
- How to measure lengths and interpret measurement error (Lesson 11).
- Strategies for solving percent error problems (Lesson 11).

Represent

- Situations involving percent increase and decrease (Lessons 6 and 12).
- Situations from the news involving percent change (Lesson 13).

Sentence Frames and Stems

Section A

- I know _____ is/is not a scaled copy of _____ because ...
- The scale factor from _____ to _____ is _____ because ...
- The constant of proportionality is ____, and I can use it to help me find _____ because ...
- I can use the distributive property to represent _____ more than _____ with the equation _____.
- I used long division to generate the decimal _____ from the fraction _____.

Section B

- The amount increased/decreased by _____ which is _____ percent of the original amount _____.
- I used _____ to represent _____ percent increase/decrease because ...
- I found the new amount to be _____ after the original amount _____ increased/decreased by _____ percent.
- I wrote the equation_____ to model this situation because ...

Section C

- In this situation, the _____ can be represented with a percent increase/decrease and the equation _____.
- I used the decimal value _____ to represent the percent _____ in the expression _____ to find the _____.
- If the regular price is _____, a discount of _____ percent would make the sale price _____.
- The percent error in this situation is _____ because ...

Section D

- There is a percent increase/decrease of _____ from _____ to _____.
- I know this situation is asking about a percent increase/decrease because ...
- I used _____ to model the situation because ...
- I used the equation _____ to solve this problem because ...

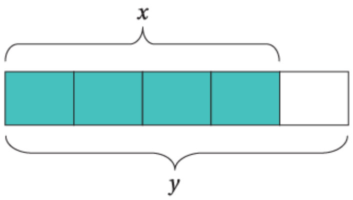
Unit Outline

In this unit, students deepen their understanding of proportional relationships and percentages. They solve multi-step problems and work with situations that involve fractional amounts. This builds on the work students did in previous units with ratios, rates, percentages, and proportional relationships. Students will build on this work in high school with exponential functions representing compounded percent increase and decrease.

Students begin the unit by revisiting proportional relationships, but this time the given values are fractional amounts. To determine the constant of proportionality, students must compute the quotient of two fractions. Students also make sense of situations where an increase or decrease is expressed as a fraction of the initial amount. They create diagrams and apply the distributive property to generate expressions that represent these situations. They also use long division to write fractions as decimals, including their first introduction to repeating decimals.

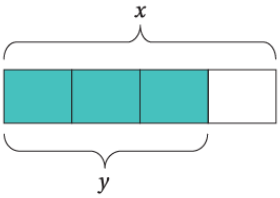
Next, students make sense of situations where an increase or decrease is expressed as a percentage of the initial amount. They continue creating diagrams and writing equations to represent the situations. They solve for any one of the three quantities—the initial amount, the final amount, or the percentage of the change—given the other two quantities. They also reason about fractional percentages.

Then students apply percent increase and decrease to solve problems in a variety of real-world situations, such as tax, tip, interest, markup, discount, depreciation, and commission. Lastly, students make sense of situations where the difference between a correct measurement and an incorrect measurement is expressed as a percentage of the correct amount.



$y = x + \frac{1}{4}x$
$y = (1 + \frac{1}{4})x$
$y = \frac{5}{4}x$

$y = (1 + 0.25)x$
$y = 1.25x$
$''a\ 25\%\ increase\,''$



$y = x - \frac{1}{4}x$
$y = (1 - \frac{1}{4})x$
$y = \frac{3}{4}x$

$y = (1 - 0.25)x$
$y = 0.75x$
$''a\ 25\%\ decrease\,''$

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Revisiting Proportional Relationships (Lessons 1-3)	**Learning Target #1** Create algebraic expressions that represent a situation involving adding or subtracting a fraction of the initial value. **Learning Target #2** Solve problems about proportional relationships with fractional quantities. Use long division to generate a decimal representation of a fraction.	**Lesson 1 Revisiting Proportional Relationships** ● I can use a table with 2 rows and 2 columns to find an unknown value in a proportional relationship. ● When there is a constant rate, I can identify the two quantities that are in a proportional relationship. **Lesson 2 Percent Increase and Decrease** ● I can use the distributive property to rewrite an expression like x+12x as (1+12)x ● I understand that "half as much again" and "multiply by 3/2" mean the same thing. **Lesson 3 Applying Percentages** ● I can use the distributive property to rewrite an equation like x+0.5x=1.5x ● I can write fractions as decimals. ● I understand that "half as much again" and "multiply by 1.5" mean the same thing.
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time. ● **Problem 2:** Press Pause: By this point in the unit, there should be some student mastery of using the distributive property to generate expressions that represent a fractional increase. If students struggle, make time to revisit related work in the lesson referred to here. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 6, Unit 6, Lesson 2 More than That, Less than That ● **Problem 3:** Points to Emphasize: If students struggle with converting a fraction to a decimal, revisit this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about finding the percent error in this activity: ○ Accelerated 6, Unit 6, Lesson 11, Activity 2 Plants, Bicycles, and Crowds	
Section B Percent Increase and Decrease (Lessons 4-7)	**Learning Target #3** Create algebraic expressions or equations that represent a situation involving percent increase or decrease. **Learning Target #4** Use diagrams to solve problems involving percent increase or decrease.	**Lesson 4 Increasing and Decreasing** ● I can draw a tape diagram that represents a percent increase or decrease. ● When I know the starting amount and the percent increase or decrease, I can find the new amount. **Lesson 5 One Hundred Percent** ● I can use a double number line diagram to help me solve percent increase and decrease problems. ● I understand that if I know how much a quantity has grown, then the original amount represents 100%. ● When I know the new amount and the percentage of increase or decrease, I can find the original amount. **Lesson 6 Percent Increase and Decrease with Equations** ● I can solve percent increase and decrease problems by writing an equation to represent the situation and solving it. **Lesson 7 Part of a Percent** ● I can find fractional percentages (like 12.5% or 0.4%) of quantities. ● I understand that to find 0.1% of a quantity, I have to multiply by 0.001.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If students struggle with finding the percentage of an increase or decrease, revisit this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about finding the percentages in this activity: ○ Accelerated 6, Unit 6, Lesson 8, Activity 3 Dining at a Restaurant ● **Problem 2:** Press Pause: By this point in the unit, there should be some student mastery of representing situations involving percent increase or decrease. If students struggle, make time to	

	revisit related work in the activities referred to here. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 6, Unit 6, Lesson 4, Activity 2 Using Tape Diagrams ○ Accelerated 6, Unit 6, Lesson 6, Activity 1 Matching Equations	
Section C Applying Percentages (Lessons 8-11)	**Learning Target #5** Calculate measurement error, and express it as a percentage of the actual value. **Learning Target #6** Solve problems involving tax, tip, simple interest, markup, markdown, or commission.	**Lesson 8 Tax and Tip** ● I understand and can solve problems about sales tax and tip. **Lesson 9 Percentage Contexts** ● I understand and can solve problems about commission, interest, markups, and discounts. **Lesson 10 Solving Multi-Step Percentage Problems** ● I can solve problems that involve multiple percentages. **Lesson 11 Expressing Error as a Percentage** ● I can represent measurement error as a percentage of the correct measurement. ● I can solve problems that involve percent error.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of finding the value after tax, tip, markup, or interest is added. If students struggle, make time to revisit related work in this section. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 6, Unit 6, Section C Applying Percentages ● **Problem 2:** More Chances: Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time.	
Section D Let's Put it to Work (Lessons 12-13)	**No new learning targets**	**Lesson 12 Changes on the Earth** ● I can use percentages to describe changes in real-world situations. **Lesson 13 Posing Percentage Problems** ● I can write and solve problems about real-world situations that involve percent increase and decrease.
End of Unit Assessment		

Unit Title:

Unit 3: Rational Numbers (G6 ACC U7)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	6.NS.C.5, 6.NS.C.6, 7.NS.A.1	Lesson 13	6.NS.C.6, 6.NS.C.6.b, 6.NS.C.6.c, 6.NS.C.8, 7.NS.A.1.c
Lesson 2	6.NS.C.7.a, 6.NS.C.7.b	Lesson 14	7.NS.A.2.a, 7.NS.A.2.c, 7.RP.A
Lesson 3	6.NS.C, 6.NS.C.5, 6.NS.C.6, 6.NS.C.6.a, 6.NS.C.7	Lesson 15	7.NS.A.2.c
Lesson 4	6.NS.C.7, 6.NS.C.7.c, 6.NS.C.7.d	Lesson 16	7.NS.A.2.b
Lesson 5	6.NS.C.6, 6.NS.C.7, 6.NS.C.7.a, 6.NS.C.7.d	Lesson 17	7.EE.B.3, 7.NS.A.2.a, 7.NS.A.3, 7.RP.A
Lesson 6	7.NS.A.1.a, 7.NS.A.1.b	Lesson 18	7.NS.A, 7.NS.A.1.d, 7.NS.A.2.c
Lesson 7	7.NS.A.1.a, 7.NS.A.1.b, 7.NS.A.1.d	Lesson 19	7.NS.A.3
Lesson 8	7.NS.A.1, 7.NS.A.1.a	Lesson 20	7.EE.B.3, 7.EE.B.4, 7.NS.A, 7.NS.A.3
Lesson 9	7.NS.A.1.c	Lesson 21	7.EE.B.4, 7.NS.A.3
Lesson 10	7.NS.A.1.c, 7.NS.A.1.d, 7.NS.A.3	Lesson 22	6.G.A.3, 6.NS.C.8
Lesson 11	6.NS.C.6.b, 6.NS.C.6.c	Lesson 23	7.EE.B.3, 7.NS.A.3, 7.RP.A.3
Lesson 12	6.NS.C.6.c, 6.NS.C.7.c, 6.NS.C.8		

Essential Question(s):

- How do negative numbers and absolute value describe position and distance?
- What is the relationship between addition and subtraction of rational numbers?
- How are the signs of products and quotients determined when multiplying or dividing rational numbers?

Enduring Understanding(s):

- Negative numbers represent values relative to a reference point of zero, while absolute value represents the distance of a number from zero regardless of its direction.
- Subtracting a rational number is equivalent to adding its additive inverse (the opposite of the number)
- Multiplying or dividing numbers with the same sign results in a positive value, while numbers with different signs result in a negative value

Demonstration of Learning:

CFA 1: Checkpoint B (after lesson 10)
CFA 2: Checkpoint D (after lesson 17)
CFA 3: Checkpoint E (after lesson 21)
EoU: Assessment A (after lesson 21)

- NOTE: Combine mid unit and end of unit (take away 2 coordinate plane questions and add #4 and #6 from mid unit to replace those)

Pacing for Unit

20 Days

Lesson Modifications:

- Optional lessons: 4 (Lessons 17, 21, 22, and 23)
- Omit Lessons 1-5 (absolute value, ordering of #s)
- Omit Lessons 11-13 (coordinate plane)
- Covering Lessons 6-10, 14-21
- 5 flex days

Family Overview

https://accessim.org/6-8-accelerated/accelerated-6/unit-7?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
Acc6.7.1	positive number negative number temperature degrees Celsius elevation sea level closer to 0 farther from 0	number line below zero
Acc6.7.2	rational number sign	greater than less than

Aligned Unit Materials, Resources, and Technology

Digital Applets:

- 7.1 High Places, Low Places
- 7.4 Jumping Bug
- 7.6 Water Temperatures
- 7.7 Cliffs and Caves
- 7.13 Coordinate Patterns, Signs of Numbers in Coordinates, Funding Distances on a Coordinate Plane, Plotting Polygons
- 7.15 Rational Numbers Multiplication Grid
- 7.16 Drilling Down
- 7.18 Seagulls and Sharks Again
- 7.20 Match Solutions
- 7.21 Cat Pictures, Design Your Own Image

	inequality	
Acc6.7.3	opposite (numbers) from least to greatest	
Acc6.7.4	absolute value	positive number negative number distance (away) from 0
Acc6.7.5		closer to 0 farther from 0
Acc6.7.6	signed numbers	temperature
Acc6.7.7	sum expression	
Acc6.7.8	deposit withdrawal account balance debt	
Acc6.7.10	difference	absolute value distance
Acc6.7.11	quadrant coordinate plane x-coordinate y-coordinate (line) segment	axis
Acc6.7.12	degrees Fahrenheit	degrees Celsius
Acc6.7.13		absolute value x-coordinate y-coordinate
Acc6.7.14	velocity	
Acc6.7.16	solution (to an equation) factor	
Acc6.7.18	additive inverse multiplicative inverse rational number variable	sum difference
Acc6.7.20		opposite solution (to an equation)
Acc6.7.23		increase decrease

Provide access as needed throughout the unit:

- Four-function calculators
- Graphing technology
  Examples of graphing technology are a handheld graphing calculator, a computer with a graphing calculator application installed, and an internet-enabled device with access to a site like desmos.com/calculator. For students using the digital materials, a separate graphing calculator tool isn't necessary because interactive applets are embedded throughout, and a graphing calculator tool is accessible on the student digital toolkit page.
- Graph paper
- Math Community Chart
- Receipt tape
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
3		Ordering Rational Numbers Cards (1 copy for every 2 students): Activity 1
5		Points on the Number Line Cards (1 copy for every 4 students): Activity 1
7	Receipt tape: Activity 3	
10	Math Community Chart: Activity 2	
15		• Rational Numbers Multiplication Grid Handout (1 copy for each student): Activity 1 • Matching Expressions Cards (1 copy for every 2 students): Activity 2
18		The Same but Different Cards (1 copy for every 2 students): Activity 1
20		Matching Inverses Cards (1 copy for every 2 students): Activity 3
21	Tools for creating a visual display: Activity 3	
22	• Graph paper: Warm-up, Activity 1 • Graphing technology: Warm-up, Activity 1	
23	Four-function calculators: Activity 1, Activity 2, Activity 3	Your Own Stock Portfolio Handout (1 copy for each student): Activity 3

Opportunities for Interdisciplinary Connections:

Geography: Students use absolute value and signed numbers to describe distances and locations relative to sea level

Anticipated misconceptions:

Absolute Value Confusion: Students might treat absolute value as the opposite of a number rather than its distance from zero

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Whole numbers and non-negative fractions (Grades K–4)

Connections to Future Units:

Serves as a natural lead-in to solving equations and simplifying expressions in Unit 5 of this course. It also facilitates the transition to plotting coordinate pairs in all four quadrants of the

• Understanding of fractions, decimals, (Grades 4-5) • Ordering/comparing numbers from (Grade 5) • First-quadrant coordinate graphing (Grade 5) • Multiplication and division of whole numbers and fractions (Grades 3–6) **Relevant Unit(s)/Lesson(s) to Review:** • Truth and Equations (Acc6.4.2) • Staying in Balance (Acc6.4.3) • Practice Solving Equations (Acc6.4.4) • Equivalent Expressions (Acc6.4.7)	coordinate plane

Differentiation through *Universal Design for Learning*

Engagement:

- Leverage choice around perceived challenge by inviting students to select specific polygons to plot (Lesson 13, Activity 3 Student Task Statement)
  LT7: Use coordinates and absolute value to find distances between points

Representation:

- Maintain a visible vocabulary display for terms like "absolute value" with pictures (Lesson 4, Activity 2 Activity Synthesis)
  LT1: Interpret a rational number and the absolute value of a number in context

Action & Expression:

- Provide students with access to blank number lines from -10 to 30 to support representing transactions (Lesson 8, Activity 1 Student Task Statement)
  LT4: Apply addition and subtraction of signed numbers to represent situations

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR2: Collect and Display (Lessons 3, 7, 8, 13, 18, 20)
- MLR7: Compare and Connect (Lessons 4, 6, 9, 13, 16, 20, 21)
- MLR8: Discussion Supports (Lessons 1, 4, 6, 10, 11, 14, 15, 18, 19, 20, 21)

Progression of Interdisciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as interpreting, representing, and generalizing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sensemaking and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Interpret

- Situations involving negative numbers (Lessons 1 and 5).
- Graphs involving positive and negative numbers (Lesson 12).
- Tables and situations involving signed numbers (throughout unit).

Represent

- Addition of signed numbers on a number line (Lesson 6).
- Situations involving signed numbers (Lessons 7, 10, and 16).
- Changes in elevation (Lesson 10).
- Position, speed, and direction (Lesson 14).

Generalize

- About subtracting and adding signed numbers (Lesson 9).
- About differences and magnitude (Lesson 10).
- About multiplying negative numbers (Lessons 14 and 15).
- About additive and multiplicative inverses (Lesson 20).

Sentence Frames and Stems

Section A
- _____ is greater/less than _____ because ...
- The opposite of _____ is _____ because ...
- The absolute value of _____ is _____.
- The value _____ is located _____ spaces to the right/left of zero on a number line which means its opposite, _____ is located _____ spaces to the right/left of zero.
- The value _____ makes sense in this situation because ...
- To add/subtract _____ and/from _____ on the number line, first I _____ then I...
- The equation _____ represents this situation because ...
- The sum of _____ and _____ is _____ because ...
- The difference between _____ and _____ is _____ because ...
- I used the number _____ to represent this situation because ...

Section B
- To add/subtract _____ and/from _____ on the number line, first I _____ then I...
- The equation _____ represents this situation because ...
- The sum of _____ and _____ is _____ because ...
- The difference between _____ and _____ is _____ because ...
- I used the number _____ to represent this situation because ...

Section C
- Point _____ is in quadrant _____ because ...
- The distance between the point _____ and the point _____ is _____ because ...
- To plot the point _____, first I _____, then I _____ and place the point.
- The expressions _____ and _____ are equivalent because ...
- To find the difference between _____ and _____, I can ...
- _____ is the multiplicative inverse of _____ because ...
- The equation _____ fits this situation, where the variable _____ represents ...
- The solution to the equation _____ is _____ because ...

Section D
- The product/quotient of _____ and _____ is _____ because ...
- The equation _____ fits this situation because ...
- _____ and _____ are opposites because ...
- The value of the expression _____ will be positive/negative because ...

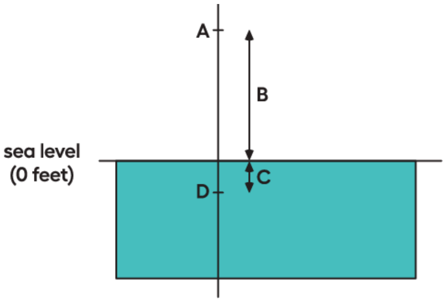
Section E
- The expressions _____ and _____ are equivalent because ...
- To find the difference between _____ and _____, I can ...
- _____ is the multiplicative inverse of _____ because ...
- The equation _____ fits this situation, where the variable _____ represents ...
- The solution to the equation _____ is _____ because ...

Section F
- I chose to design a _____ on the coordinate plane and used the ordered pairs _____.
- I began my design in the _____ quadrant because ...
- The equation _____ can be used to find the missing value _____ for company _____ .
- The company saw their shares increase/decrease by _____ percent.

Unit Outline

In this unit, students learn about negative numbers and ways to represent them on a number line and the coordinate plane. They perform operations on rational numbers, which are all numbers that can be written as a positive or negative fraction or zero.

Students begin by considering situations involving temperature or elevation and interpreting what negative numbers mean in those contexts. Previously, when students worked only with nonnegative numbers, magnitude and order were indistinguishable. In this unit, when comparing two signed numbers, students learn to distinguish between the absolute value of a number (magnitude) and a number's relative position on the number line (order).



- A represents 15 feet.
- B represents $|15|$ feet.
- C represents $|-4|$ feet.
- D represents -4 feet.

Then students use tables and number line diagrams to represent changes in temperature or elevation. They extend addition and subtraction from fractions to all rational numbers. And they see that $a - b$ is equivalent to $a + (-b)$.

Then students use ordered pairs to describe pairs of numbers that include negative numbers. In Grade 5, they plotted pairs of positive numbers on the coordinate grid. Here, they plot pairs of rational numbers in all four quadrants of the coordinate plane. They interpret the meanings of plotted points in given contexts and use coordinates to calculate horizontal or vertical distances between two points.

Next, students examine multiplication and division. They work with constant velocity, which is a signed number that indicates direction and speed. This allows products of signed numbers to be interpreted in terms of position, direction of movement, and time before or after a specific point. Students use the relationship between multiplication and division to understand how division extends to rational numbers.

Then students work with expressions that use the four operations on rational numbers. They also solve problems that involve interpreting negative numbers in context. They solve linear equations of the form $x+p=q$ or $px=q$, where p and q are rational numbers.

A note on using the terms "expression," "equation," and "signed number":
In these materials, an expression is built from numbers, variables, operation symbols (+,−, ·,÷), parentheses, and exponents. (exponents—in particular, negative exponents—are not a focus of this unit. Students work with integer exponents in a future course and noninteger exponents in high school.) An equation is a statement that two expressions are equal, thus it always has an equal sign. Signed numbers include all rational numbers, written as decimals or in the form ab.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Negative Numbers and Absolute Value (Lessons 1-5)	**Learning Target #1** Interpret a rational number and the absolute value of a number in context. **Learning Target #2** Plot rational numbers and their opposites on a number line; know that a number and its opposite have the same absolute value. **Learning Target #3** Use words and symbols to compare rational numbers, where a rational number could also be the absolute value of a number.	**Lesson 1 Positive and Negative Numbers** • I can explain what 0 , positive numbers and negative numbers mean in the context of temperature and elevation. • I can use positive and negative numbers to describe temperature and elevation. • I know what positive and negative numbers are. **Lesson 2 Comparing Positive and Negative Numbers** • I can explain how to use the positions of numbers on a number line to compare them. • I can use inequalities to compare positive and negative numbers. **Lesson 3 Ordering Rational Numbers** • I can compare and order rational numbers. • I can use phrases like "greater than," "less than," and "opposite" to compare rational numbers. **Lesson 4 Absolute Value of Numbers** • I can explain what the absolute value of a number is. • I can find the absolute values of rational numbers. • I can recognize and use the notation for absolute value. **Lesson 5 Comparing Numbers and Distance from Zero** • I can explain what absolute value means in situations involving elevation. • I can use absolute values to describe elevations. • I can use inequalities to compare rational numbers and the absolute values of rational numbers.
Checkpoint A	***Responding to Student Thinking*** • **Problem 1:** Point to Emphasize: If most students struggle with locating points on the number line, including opposites and absolute values, reinforce the idea in the next section. For example, when students notice and wonder about points on the number line in the Warm-up referred to here, ask students to determine possible values for each letter based on its location. ○ Accelerated 6, Unit 7, Lesson 7, Activity 1, That's the Opposite • **Problem 2:** Points to Emphasize: If most students struggle with using inequality signs to compare values, especially absolute values, reinforce the idea in the next section. For example, when finding the distances between points in the coordinate plane in the activity referred to here, relate the idea of finding the distance of each point to the x - or y -axis with absolute value. ○ Accelerated 6, Unit 7, Lesson 13, Activity 1, Signs of Numbers in Coordinates • **Problem 3:** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time.	
Section B Adding and Subtracting Rational Numbers	**Learning Target #4** Apply addition and subtraction of signed numbers to represent	**Lesson 6 Changing Temperatures** • I can use a number line to add positive and negative numbers. **Lesson 7 Changing Elevation** • I can add positive and negative numbers.

(Lessons 6-10)	situations and solve problems. **Learning Target #5** Calculate the sum or difference of two rational numbers.	**Lesson 8 Money and Debts** ● I understand what positive and negative numbers mean in a situation involving money. **Lesson 9 Representing Subtraction** ● I can explain the relationship between addition and subtraction of rational numbers. ● I can use a number line to subtract positive and negative numbers. **Lesson 10 Finding Differences** ● I can subtract positive and negative numbers.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with adding or subtracting rational numbers, revisit this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the addition and subtraction expressions in this activity: ○ Accelerated 6, Unit 7, Lesson 18, Activity 1 Card Sort: The Same but Different ● **Problem 2:** More Chances: Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time.	
Section C The Coordinate Plane (Lessons 11-13)	**Learning Target #6** Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. **Learning Target #7** Use coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. **Learning Target #8** Working in all four quadrants, plot a point given its coordinates, or identify the coordinates of a given point in the coordinate plane.	**Lesson 11 Constructing the Coordinate Plane** ● I can plot points with negative coordinates in the coordinate plane. ● I know what a coordinate plane is and can describe the four quadrants. ● When given points to plot, I can construct a coordinate plane with an appropriate scale and pair of axes. **Lesson 12 Interpreting Points in a Coordinate Plane** ● I can explain how rational numbers represent balances in a money context. ● I can explain what points in a four-quadrant coordinate plane represent in a situation. ● I can plot points in a four-quadrant coordinate plane to represent situations and solve problems. **Lesson 13 Distances in the Coordinate Plane** ● I can find horizontal and vertical distances between points on the coordinate plane.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of plotting and labeling the coordinates of points in the coordinate plane. If most students struggle, make time to revisit related work in the section referred to here. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 6, Unit 7, Section C The Coordinate Plane ● **Problem 2:** Point to Emphasize: If most students struggle to recognize that when points are related by reflections, their coordinates only differ by signs, revisit this idea in the next section. For example, in the practice problem referred to here, sketch the possible locations of points C and D on a coordinate plane, and notice how the coordinates are opposites. ○ Accelerated 6, Unit 7, Lesson 15, Practice Problem 6 ● **Problem 3:** Points to Emphasize: If most students struggle to find the distance between two points that both lie on the same vertical or horizontal line, revisit this idea in the next section. For example, ask students to plot the points in the practice problem referred to here, and ask them if they notice any connections between the length of the side and the numbers in the coordinates. ○ Accelerated 6, Unit 7, Lesson 14, Practice Problem 5	
Section D Multiplying and Dividing Rational Numbers (Lessons 14-17)	**Learning Target #9** Apply multiplication and division of signed numbers to represent situations and solve problems.	**Lesson 14 Multiplying Rational Numbers** ● I can explain what it means when time is represented with a negative number in a situation about speed and direction. ● I can use rational numbers to represent speed and direction. **Lesson 15 Multiply!** ● I can solve problems that involve multiplying rational numbers.

	Learning Target #10 Calculate the product or quotient of two rational numbers.	**Lesson 16 Dividing Rational Numbers** ● I can divide rational numbers. ● I can solve problems that involve multiplying and dividing rational numbers. **Lesson 17 Negative Rates** ● I can solve problems that involve negative rates.
Checkpoint D	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with multiplying or dividing rational numbers, revisit this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the multiplication and division expressions in this activity: ○ Accelerated 6, Unit 7, Lesson 18, Activity 1 Card Sort: The Same but Different ● **Problem 2:** More Chances: Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time.	
Section E Four Operations with Rational Numbers (Lessons 18-21)	**Learning Target #11** Apply the four operations with rational numbers to solve problems. **Learning Target #12** Solve an equation of the form x+p=q or px=q, where p, q, and x are rational numbers. **Learning Target #13** Write an equation of the form x+p=q or px=q (where p, q, and x are rational numbers) to represent a situation.	**Lesson 18 Expressions with Rational Numbers** ● I can add, subtract, multiply, and divide rational numbers. ● I can evaluate expressions that involve rational numbers. **Lesson 19 Solving Problems with Rational Numbers** ● I can solve equations that include rational numbers and have rational solutions. **Lesson 20 Solving Equations with Rational Numbers** ● I can explain what the solution to an equation means for the situation. **Lesson 21 Representing Contexts with Equations** ● I can write and solve equations to represent situations that involve rational numbers.
Checkpoint E	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of solving equations of the form x+p=q or px=q. If most students struggle, make time to revisit related work in the activities referred to here. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 6, Unit 7, Lesson 20, Activity 1 Match Solutions ○ Accelerated 6, Unit 7, Lesson 21, Activity 1 Warmer or Colder Than Before? ● **Problem 2:** More Chances: Students will have more opportunities to develop this understanding in later units. There is no need to slow down or add additional work to review this concept at this time. ● **Problem 3:** Points to Emphasize: If most students struggle with solving problems that involve the four operations with rational numbers, revisit this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the operations they use to complete the table in this activity: ○ Accelerated 6, Unit 7, Lesson 23, Activity 2 What Is a Stock Portfolio?	
Section F Let's Put it To Work (Lesson 22-23)	**No new learning targets**	**Lesson 22 Drawing in the Coordinate Plane** ● I can use ordered pairs to draw a picture. **Lesson 23 The Stock Market** ● I can solve problems about the stock market using rational numbers and percentages.
End of Unit Assessment ● Combine mid unit and end of unit (take away 2 coordinate plane questions and add #4 and #6 from mid unit to replace those)		

Unit Title:

Unit 4: Equations and Inequalities (G7 ACC U3)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1		Lesson 10	7.EE.B.3, 7.EE.B.4, 7.EE.B.4.a
Lesson 2	7.EE.B.3	Lesson 11	7.EE.A.27.EE.B.3, 7.EE.B.4, 7.EE.B.4.a
Lesson 3	7.EE.B.3	Lesson 12	6.EE.B.6, 6.EE.B.8, 6.NS.C.7.b
Lesson 4	7.EE.B.3, 7.EE.B.4.a	Lesson 13	6.EE.A.2.b, 6.EE.B.5, 6.EE.B.8
Lesson 5	7.EE.B.3, 7.EE.B.4, 7.EE.B.4.a	Lesson 14	7.EE.B.4.b
Lesson 6	7.EE.B.4.a	Lesson 15	7.EE.B.4
Lesson 7	7.EE.B.4.a	Lesson 16	7.EE.B.4.b
Lesson 8	7.EE.B.4, 7.EE.B.4.a	Lesson 17	7.EE.B.4.b
Lesson 9	7.EE.B.4.a	Lesson 18	7.EE.B.4, 7.G.B.5

Essential Question(s):

- How can visual models like tape diagrams and hanger diagrams be used to solve multi-step equations?
- What does it mean to find a solution to an equation or an inequality?
- How do the solutions to an inequality differ from the solutions to an equation?
- How can I determine the direction of an inequality's solution set?

Enduring Understanding(s):

- Algebraic equations can be solved by performing the same operations on both sides to maintain balance, effectively "undoing" the operations within the expression
- A solution is a value that makes a mathematical statement true; equations typically have one specific solution, while inequalities represent a range of possible values
- While an equation typically has one specific solution, an inequality represents a range of possible values that make the statement true, which is visualized as a shaded region on a number line
- To solve an inequality, find the boundary value by solving the related equation and then test values on either side to see which satisfy the original constraint.

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 5)
CFA 2: Checkpoint B (after lesson 11)
CFA 3: Checkpoint C (after lesson 17)
EoU: Assessment A (after lesson 17)

Pacing for Unit

19 Days

Lesson Modifications:

- Optional lessons: 2 (Lessons 11 and 18)
- Covering Lessons 1-17
- 2 days for review/assessment
- 2 flex days

Family Overview

https://accessim.org/6-8-accelerated/accelerated-7/unit-3?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

Aligned Unit Materials, Resources, and Technology

	New Terminology	
Lesson	receptive	productive
Acc7.3.1		equation
Acc7.3.2	unknown amount	
Acc7.3.3	equivalent expressions commutative (property)	expression
Acc7.3.4	solution to an equation	unknown amount relationship
Acc7.3.5		variable
Acc7.3.6	balanced hanger each side (of an equation)	solution to an equation
Acc7.3.7		equivalent expression each side (of an equation)
Acc7.3.8		operation solve
Acc7.3.9	distribute substitute	
Acc7.3.12	inequality maximum minimum	less than greater than
Acc7.3.13	solution to an inequality less than or equal to greater than or equal to open / closed circle	
Acc7.3.14	boundary direction (of an inequality)	less than or equal to greater than or equal to substitute
Acc7.3.15		open / closed circle
Acc7.3.16		solution to an inequality
Acc7.3.17		inequality
Acc7.3.18	perpendicular	
Acc7.3.1		equation

Digital Applets
- 3.2 Every Story Needs a Picture
- 3.3 Drawing Tape Diagrams to Represent Equations
- 3.4 Situations and Diagrams
- 3.5 More Situations and Diagrams

Provide access as needed throughout the unit:
- Blank paper
- Math Community Chart
- Sticky notes
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to
10	Sticky notes: Activity 3 Tools for creating a visual display: Activity 3	
11	Sticky notes: Activity 3 Tools for creating a visual display: Activity 3	
12	Blank paper: Lesson	Stories about 9 copy for every 2 students): Activi
16	Tools for creating a visual display: Activity 3	
17	Math Community Chart: Activity 2	Giving Advice C copy for every 4 students): Activi

Opportunities for Interdisciplinary Connections:

Finance: Students write equations to model business costs, such as pizza delivery fees

Anticipated misconceptions:

Parentheses in Equations: When solving p(x+q)=r, students often subtract q from r before dividing by p

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- Understanding variables and solving simple equations (Grade 6, Accelerated 6 Unit 4
- Substitution & evaluating expressions (Grade 6)
- The meaning of "solution"
- Adding, subtracting, multiplying, dividing rational numbers (Accelerated 6 Unit 7 or Grade 7)
- Commutative, associative, distributive properties (Grades 3–6)
- Ordering and comparing numbers (K–6)

Relevant Unit(s)/Lesson(s) to Review:
- 6ACC Unit 4 (Equations—lessons 2–4)
- 6ACC Unit 7 (Rational Numbers) Lessons 1–4

Connections to Future Units:

Students will build on this work when they solve equations with a variable on both sides of the equal sign and when they work with systems of equations.

Differentiation through *Universal Design for Learning*

Engagement:

- Provide tools like calculators to facilitate focus on key mathematical ideas in solving inequalities (Lesson 15, Activity 2 Student Task Statement)
  LT6: Solve an inequality of the form px+q>r or px+q<r and interpret the solution

Representation:

- Provide blank templates of tape diagrams labeling the different parts (Lesson 3, Activity 2 Student Task Statement)
  LT1: Create diagrams and equations in the form px+q=r and p(x+q)=r to represent situations

Action & Expression:

- Invite students to plan a strategy, including tools, before starting to solve word problems (Lesson 10, Activity 1 Student Task Statement)
  LT3: Solve equations of the form px+q=r and p(x+q)=r

Supporting Multilingual Learners

Math Language Routines

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MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR2: Collect and Display (Lessons 3, 13, 16)
- MLR3: Clarify, Critique, Correct (Lessons 2, 11, 16)
- MLR6: Three Reads (Lessons 1, 11, 17)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as comparing, explaining, and describing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Interpret

- Non-proportional situations with constant rates of change (Lessons 1 and 10).
- Solutions to equations (Lessons 4 and 5).
- Equations representing angle measurements (Lesson 18).

Compare

- Stories with corresponding tape diagrams (Lesson 2).
- Tape diagrams with corresponding equations (Lesson 3).
- Hanger diagrams and equations (Lesson 6).
- Solution pathways (especially Lesson 9).
- Descriptions of situations with corresponding inequalities (Lesson 16).

Explain

- Strategies for using hanger diagrams to solve equations (Lesson 7).
- Different strategies for solving equations (Lesson 8) and inequalities (Lesson 14).
- Reasoning about situations, tape diagrams, and equations (Lesson 11).
- How to find unknown angle measurements (Lesson 18).

Sentence Frames and Stems

Section A

- In this situation, I notice _____.
- The equation _____ represents this situation because …
- To represent this equation, I used _____ (strategy/tool) to show _____ because …
- The tape diagram represents the equation _____ because …
- I noticed _____, which means the equation _____ is equivalent to the equation _____.
- The solution to the equation _____ is _____ because …

Section B

- The equation _____ represents this situation because …
- To find the unknown weight on the hanger diagram, first I _____, then I …
- The solution to the equation _____ is _____ because …
- I began solving the equation by _____ on both sides. Then, I found the solution by _____.
- The solution _____ to the equation _____ makes sense because …

Section C

- The phrase _____ means _____ and can be represented by the inequality _____.
- The value _____ is a solution to the inequality _____ because ...
- The solution to the inequality _____ can be represented on a number line diagram by ...
- The inequality _____ represents this situation because ...
- The equation _____ represents this situation because ...
- To find the unknown weight on the hanger diagram, first I _____, then I ...
- The solution to the equation _____ is _____ because ...
- I began solving the equation by _____ on both sides. Then, I found the solution by _____.
- The solution _____ to the equation _____ makes sense because ...
- The solution to the inequality _____ can be modeled on a number line diagram by ...
- The solution is _____. This means any number _____ makes the inequality true.
- The value _____ is a solution to the inequality _____ because ...
- The inequality _____ represents this situation because ...

Section D

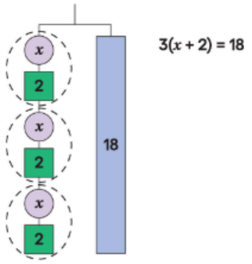
- Angle _____ (name e.g PQR) is an acute/obtuse angle because ...
- Angles _____and _____ (names) are complementary/supplementary angles because ...
- Since angles _____ and _____ (names) are complementary/supplementary, the missing angle measure is _____ because ...
- Lines _____ and _____ (names) cross each other, so angles _____ and _____ (names) are _____ ...
- I used the equation _____ for the relationship between angles_____ and _____ (names) because ...

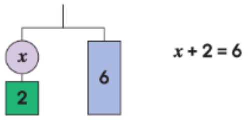
Unit Outline

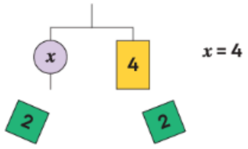
In this unit, students deepen their algebraic reasoning as they write and solve equations of the forms px+q=r and p(x+q)=r and inequalities of the forms px+q>r and px+q<r. This builds on grade 6 work with equations of the form p+x=q or px=q. Students will build on this work in future units when they solve equations that have a variable on both sides of the equal sign and when they work with systems of equations.

Students begin the unit by making sense of situations that involve both multiplication and addition. They represent such situations with tape diagrams and with equations. They see that different diagrams and equations can represent the same situation, and they use diagrams to find solutions to equations.

Next, students consider hanger diagrams as another way to represent equations. The diagrams help students understand solving equations in terms of “doing the same thing to each side of the equation.” Students examine different pathways for solving the same equation and consider whether one method is more efficient than another.







Then students apply what they have learned about equations to inequalities. They write inequalities to represent situations and solve inequalities by reasoning about the related equation. The inequality symbols and are introduced.

Lastly, students use what they know about equations to solve problems involving relationships between angles.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Representing Situations of the Form px+q=r and p(x+q)=r (Lessons 1-5)	**Learning Target #1** Create diagrams and equations in the form px+q=r and p(x+q)=r to represent situations. **Learning Target #2** Interpret equations in the form px+q=r and p(x+q)=r that represent relationships in diagrams and situations.	**Lesson 1 Relationships between Quantities** • I can use a tape diagram to find an unknown amount in a situation. • I can think of ways to solve some more complicated word problems. **Lesson 2 Reasoning about Contexts with Tape Diagrams** • I can explain how a tape diagram represents parts of a situation and relationships between them. **Lesson 3 Reasoning about Equations with Tape Diagrams** • I can match equations and tape diagrams that represent the same situation. • If I have an equation, I can draw a tape diagram that shows the same relationship. **Lesson 4 Reasoning about Equations and Tape Diagrams (Part 1)** • I can draw a tape diagram to represent a situation where there is a known amount and several copies of an unknown amount and explain what the parts of the diagram represent.

		● I can find a solution to an equation by reasoning about a tape diagram or about what value would make the equation true. **Lesson 5 Reasoning about Equations and Tape Diagrams (Part 2)** ● I can draw a tape diagram to represent a situation where there is more than one copy of the same sum and explain what the parts of the diagram represent. ● I can find a solution to an equation by reasoning about a tape diagram or about what value would make the equation true.
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with coordinating the parts of the equation with the diagram, focus on the ways students see each part of the equation when students interpret hanger diagrams in the referenced lessons. ○ Accelerated 7, Unit 3, Lesson 6 Reasoning about Solving Equations (Part 1) ○ Accelerated 7, Unit 3, Lesson 7 Reasoning about Solving Equations (Part 2) ● **Problem 2:** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this time.	
Section B Solving Equations of the Form $px+q=r$ and $p(x+q)=r$ and Problems That Lead to Those Equations (Lessons 6-11)	**Learning Target #3** Solve equations of the form $px+q=r$ and $p(x+q)=r$, including those that involve fractions, decimals, and negative numbers, and explain the solution method. **Learning Target #4** Solve word problems leading to equations of the form $px+q=r$ or $p(x+q)=r$	**Lesson 6 Reasoning about Solving Equations (Part 1)** ● I can explain how a balanced hanger and an equation represent the same situation. ● I can find an unknown weight on a hanger diagram and solve an equation that represents the diagram. ● I can write an equation that describes the weights on a balanced hanger diagram. **Lesson 7 Reasoning about Solving Equations (Part 2)** ● I can explain how a balanced hanger and an equation represent the same situation. ● I can explain why some balanced hangers can be represented by two different equations, one with parentheses and one without. ● I can find an unknown weight on a hanger diagram and solve an equation that represents the diagram. ● I can identify an equation that represents the weights on a balanced hanger diagram. **Lesson 8 Dealing with Negative Numbers** ● I can use the idea of doing the same to each side to solve equations that have negative numbers or solutions. **Lesson 9 Different Options for Solving One Equation** ● For an equation like , I can solve it in two different ways: by first dividing each side by 3, or by first rewriting using the distributive property. ● For equations with more than one way to solve, I can choose the most efficient way depending on the numbers in the equation. **Lesson 10 Using Equations to Solve Problems** ● I can solve story problems by drawing and reasoning about a tape diagram or by writing and solving an equation. **Lesson 11 Solving Problems about Percent Increase or Decrease** ● I can solve story problems about percent increase or decrease by drawing and reasoning about a tape diagram or by writing and solving an equation.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of solving equations. If most students struggle with solving equations of the form $px+q=r$, make time to revisit related work in the Sections referred to here. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 7, Unit 3, Section A Representing Situations of the Form $px+q=r$ and $p(x+q)=r$ ○ Accelerated 7, Unit 3, Section B Solving Equations of the Form $px+q=r$ and $px+q=r$ and Problems That Lead to Those Equations ● **Problem 2:** Points to Emphasize: If most students struggle with representing and solving the problem, focus on connecting diagrams and equations to the relationships in problems throughout the next section. For example, invite multiple students to share how the tape diagram matches the stories in the referenced practice problem. Encourage students to use and explain diagrams and equations as needed when representing and solving problems in lesson activities and practice problems throughout the section.	

	○ Grade 7, Unit 6, Lesson 13, Practice Problem 4	
Section C Inequalities (Lessons 12-17)	**Learning Target #5** Draw and label a graph on a number line that represents all the solutions to an inequality. **Learning Target #6** Solve an inequality of the form px+q>r or px+q<r and interpret the solution. **Learning Target #7** Write an inequality of the form px+q>r or px+q<r to represent a situation with a constraint.	**Lesson 12 Writing and Graphing Inequalities** ● I can graph inequalities on a number line. ● I can write an inequality to represent a situation. **Lesson 13 Solutions of Inequalities** ● I can explain what it means for a number to be a solution to an inequality. ● I can explain what the symbols ≥ and ≤ mean. ● I can graph the solutions to an inequality on a number line. **Lesson 14 Finding Solutions to Inequalities in Context** ● I can describe the solutions to an inequality by solving a related equation and then reasoning about values that make the inequality true. ● I can write an inequality to represent a situation. **Lesson 15 Efficiently Solving Inequalities** ● I can graph the solutions to an inequality on a number line. ● I can solve inequalities by solving a related equation and then checking which values are solutions to the original inequality. **Lesson 16 Interpreting Inequalities** ● I can match an inequality to a situation it represents, solve it, and then explain what the ● solution means in the situation. ● If I have a situation and an inequality that represents it, I can explain what the parts of the inequality mean in the situation. **Lesson 17 Modeling with Inequalities** ● I can use what I know about inequalities to solve real-world problems.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of representing inequalities on a number line. If most students struggle, make time to revisit related work in the referenced lessons. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 7, Unit 3, Lesson 12 Writing and Graphing Inequalities ○ Accelerated 7, Unit 3, Lesson 13 Solutions of Inequalities ● **Problem 2:** Press Pause: By this point in the unit, there should be some student mastery of writing and solving inequalities. If most students struggle, make time to revisit related work in the referenced sections. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 7, Unit 3, Section B Solving Equations of the Form px+q=r and p(x + q)= r and Problems That Lead to Those Equations. ○ Accelerated 7, Unit 3, Section C Inequalities	
Section D Let's Put it To Work (Lesson 18)	**No new learning targets**	**Lesson 18 Using Equations to Solve for Unknown Angles** ● I can write an equation to represent a relationship between angle measures and solve the equation to find unknown angle measures.
End of Unit Assessment		

Unit Title:

Unit 5: Expressions and More Equations (G7 ACC U4)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.EE.A.1, 7.NS.A.1, 7.NS.A.1.c	Lesson 7	8.EE.C, 8.EE.C.7
Lesson 2	7.EE.A.1	Lesson 8	8.EE.C, 8.EE.C.7
Lesson 3	7.EE.A.1	Lesson 9	8.EE.C.7, 8.EE.C.7.b
Lesson 4	7.EE.A.1	Lesson 10	8.EE.C.7.a
Lesson 5	7.EE.a, 8.EE.C	Lesson 11	8.EE.C.7.a
Lesson 6	8.EE.C, 8.EE.C.7	Lesson 12	–

Essential Question(s):

- How can we prove that two algebraic expressions are equivalent?
- What algebraic "moves" keep an equation balanced when solving?
- How can the structure of an equation tell us how many solutions it has?

Enduring Understanding(s):

- Expressions are equivalent if they have the same value for any variable substitution; this equivalence is maintained using the distributive, commutative, and associative properties to combine like terms
- Solving equations with variables on both sides involves using "balanced moves" to gather all variable terms on one side and constant terms on the other while maintaining equality
- An equation can have one solution, no solution (if it implies two different values are equal), or infinitely many solutions (if both sides are identical)

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 4)
CFA 2: Checkpoint B (after lesson 9)
CFA 3: Checkpoint C (after lesson 11)
EoU: Assessment A (after lesson 11)

Pacing for Unit

13 Days
Lesson Modifications:

- Optional lessons: 1 (Lesson 12)
- Covering Lessons 1-11
- 2 days for review/assessment

Family Overview

https://accessim.org/6-8-accelerated/accelerated-7/unit-4?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
Acc7.4.1	term	
Acc7.4.2	factor (an expression) expand (an expression)	
Acc7.4.3	combine like terms	term commutative (property)
Acc7.4.4		distribute
Acc7.4.8	distributive property	
Acc7.4.9		like terms common denominator
Acc7.4.10	no solution (only) one solution	
Acc7.4.11	constant term coefficient infinitely many solutions	

Aligned Unit Materials, Resources, and Technology

Provide access as needed throughout the unit:

- Index cards
- Math Community Chart

Lesson	Materials to Gather	Materials to Copy
4	Index cards: Warm-up	
6	Math Community Chart: Activity 1	Matching Equation Moves Cards (1 copy for every 2 students): Activity 1
8		Trading Moves Cards (1 copy for every 2 students): Activity 2
11		Thinking About Solutions Some More Cards (1 copy for every 3 students): Activity 1

Opportunities for Interdisciplinary Connections:

Earth Science: Algebraic operations are performed

Anticipated misconceptions:

Variable Consistency: Students may forget that a

within the context of a gold mine	variable (like x) must represent the same value throughout a single problem or diagram See teacher's guide for specific misconceptions aligned to each lesson.
Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: • Writing and evaluating expressions; equivalent equations (Grade 6, Accelerated 6 Unit 4) • Combining like terms (Grade 6–7) • Distributive property (Grade 3, formalized in Grade 6–7) • Solving $px+q=r$ (Grade 7 Unit 3 or Accelerated 6 Unit 4) • Understanding solution types (Unit 3) • Fluency with signed numbers (Accelerated 6 Unit 7) **Relevant Unit(s)/Lesson(s) to Review:** • 6ACC Unit 4, Lessons 7–9 • 6ACC Unit 7, Lesson 6–10	This work builds toward solving systems of linear equations in future units.

Differentiation through *Universal Design for Learning*

Engagement:

- Differentiate the degree of difficulty by starting with more accessible expressions like $6x-(2x+8)$ (Lesson 4, Activity 2 Student Task Statement)
  LT1: Apply properties of operations to write an expression with fewer terms

Representation:

- Use color coding and annotations to highlight connections between a hanger diagram and its corresponding equation (Lesson 6, Activity 1 Launch)
  LT3: Write equivalent equations and describe the moves used

Action & Expression:

- Provide students with a blank two-column table to keep track of moves and variables in number puzzles (Lesson 8, Activity 3 Launch)
  LT4: Write equivalent equations to solve linear equations in one variable

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 1, 11)
- MLR7: Compare and Connect (Lessons 4, 6, 7, 8, 12)
- MLR8: Discussion Supports (Lessons 1, 2, 3, 4, 6, 8, 9, 10, 11)

Progression of Interdisciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as critiquing, justifying, and generalizing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Critique

- Reasoning of peers about expressions and corresponding diagrams (Lesson 1).
- Reasoning about equivalent expressions (Lesson 4).
- Reasoning about maintaining balance in equations (Lesson 6).
- Solutions of linear equations (Lessons 7 and 8).

Justify

- Reasoning about the distributive property (Lesson 2).
- Strategies for writing equivalent equations (Lesson 8).

- Predictions about maintaining balance (Lesson 5).
- Predictions about solutions of linear equations (Lesson 9).
- Whether different sequences of calculations give the same result (Lesson 12).

Generalize

- About when expressions are equivalent (Lesson 3).
- About the structures of equations that have one, infinite, and no solutions (Lessons 10 and 11).

Sentence Frames and Stems

Section A

- I used the _____ property to simplify the expression from _____ to _____.
- I combined like terms … to simplify the expression. My new expression is _____.
- The distributive property allowed me to expand/factor the expression _____ to _____.
- The expression _____ is equivalent to the expression _____ because …

Section B

- The moves … show that the equation _____ is equivalent to the equation _____.
- To solve the equation _____, the first move was to _____ on both sides, then …
- To find the unknown weight on the hanger diagram, first I _____, then I …
- I know that equation _____ will have a positive/negative/zero solution because …

Section C

- The equation _____ has _____ solution(s). I know this because …
- The equation _____ represents …
- The solution _____ to the equation _____ makes sense because …

Section D

- I used the expression_____ to represent the situation _____ because …
- The expression _____ and the expression _____ are equivalent.

Unit Outline

In this unit, students work with writing equivalent expressions and use reasoning to solve equations, including equations that have a variable on both sides of the equal sign. This builds on students' previous work solving equations of the form px+q=r or p(x+q)=r. Students will build on this work in future units when they solve systems of linear equations.

First, students work with equivalent linear expressions that are more complex due to having more terms, more parentheses, and negative rational numbers. Students use properties of operations to justify why the expressions are equivalent.

Next, the unit focuses on moves that can be done to write equivalent equations. At first, students use hanger diagrams as an intuitive representation of equality and represent their reasoning by labeling arrows that connect equivalent representations. With the reintroduction of negative values, students move away from hanger diagrams to algebraic equations and writing equivalent equations with the intention of solving for a variable.

	$9 - 2b + 6 = -3(b + 5) + 4b$
Use the distributive property	$9 - 2b + 6 = -3b - 15 + 4b$
Combine like terms	$15 - 2b = b - 15$
Add $2b$ to each side	$15 = 3b - 15$
Add 15 to each side	$30 = 3b$
Divide each side by 3	$10 = b$

Lastly, students examine the conditions under which equations could have 0, 1, or infinite solutions as a transition to thinking about similar situations involving systems of equations.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Writing Equivalent Expressions (Lessons 1-4)	**Learning Target #1** Apply properties of operations to write an expression with fewer terms that is equivalent to a given expression **Learning Target #2** Apply the distributive property to factor or expand an expression	**Lesson 1 Subtraction in Equivalent Expressions** • I can organize my work when I use the distributive property. • I can rewrite subtraction as adding the opposite and then rearrange terms in an expression. **Lesson 2 Expanding and Factoring** • I can organize my work when I use the distributive property. • I can use the distributive property to rewrite expressions with positive and negative numbers. • I understand that "factoring" and "expanding" are words used to describe using the distributive property to write equivalent expressions. **Lesson 3 Combining Like Terms (Part 1)** • I can figure out whether two expressions are equivalent to each other. • When possible, I can write an equivalent expression that has fewer terms.

		Lesson 4 Combining Like Terms (Part 2) ● I am aware of some common errors when writing equivalent expressions, and I can avoid them. ● When possible, I can write an equivalent expression that has fewer terms.
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If students struggle with writing an equivalent expression with fewer terms, revisit this concept when opportunities arise over the next several lessons. For example, make sure to invite multiple students to share their thinking about these practice problems: ○ Accelerated 7, Unit 4, Lesson 5, Practice Problem 4 ○ Accelerated 7, Unit 4, Lesson 6, Practice Problem 5 ● **Problem 2:** Points to Emphasize: If students struggle with using the distributive property to factor or expand an expression, revisit this concept when opportunities arise over the next several lessons. For example, make sure to invite multiple students to share their thinking about these practice problems: ○ Accelerated 7, Unit 4, Lesson 6, Practice Problem 6 ○ Accelerated 7, Unit 4, Lesson 7, Practice Problem 5	
Section B Equivalent Expressions (Lessons 5-9)	**Learning Target #3** Write equivalent equations and describe the moves that are used. **Learning Target #4** Write equivalent equations to solve equations in one variable.	**Lesson 5 Keeping the Equation Balanced** ● I can add or remove blocks from a hanger and keep the hanger balanced. ● I can represent balanced hangers with equations. **Lesson 6 Balanced Moves** ● I can add, subtract, multiply, or divide each side of an equation by the same expression to get a new equation with the same solution. **Lesson 7 More Balanced Moves** ● I can make sense of multiple ways to solve an equation. **Lesson 8 Solving any Linear Equation** ● I can solve an equation where the variable appears on both sides. **Lesson 9 Strategic Solving** ● I can solve linear equations in one variable.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons. ● **Problem 2:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section C Linear Equations in One Variable (Lessons 10-11)	**Learning Target #5** Describe features of linear equations that have one solution, no solution, or many solutions. **Learning Target #6** Interpret the solution of an equation in one variable in context.	**Lesson 10 All, Some, or No Solutions** ● I can determine whether an equation has no solutions, one solution, or infinitely many solutions. **Lesson 11 How Many Solutions?** ● I can solve equations with different numbers of solutions.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If students struggle to connect an equation to the number of solutions, revisit the idea when a similar situation arises for systems of equations. For example, the inclusion of graphs to see why there are no solutions can help make the connection between coefficients and slope. ○ Accelerated 7, Unit 5, Lesson 15 Solving Systems of Equations ● **Problem 2:** Points to Emphasize: If students struggle to solve the equation, make time for students to practice solving linear equations, especially those involving the distributive property. For example, encourage students to fully solve this practice problem: ○ Accelerated 7, Unit 5, Lesson 1, Practice Problem 3	
Section D Let's Put it To Work (Lesson 12)	**No new learning targets**	**Lesson 12 Applications of Expressions** ● I can write algebraic expressions to understand and justify a choice between two options.
End of Unit Assessment		

Unit Title:

Unit 6: Rigid Transformations & Congruence (G7 ACC U1)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1		Lesson 10	8.G.A.1, 8.G.A.2
Lesson 2	8.G.A.1	Lesson 11	8.G.A.1.a, 8.G.A.2
Lesson 3	8.G.A.1	Lesson 12	7.G.B.5, 8.G.A.1, 8.G.A.5
Lesson 4	8.G.A.3	Lesson 13	8.G.A.2, 8.G.A.5
Lesson 5	8.G.A.1, 8.G.A.3	Lesson 14	8.G.A.5
Lesson 6	8.G.A.1.a, 8.G.A.1.b	Lesson 15	7.G.A.2
Lesson 7	8.G.A.1.a, 8.G.A.1.b	Lesson 16	7.G.A.2
Lesson 8	8.G.A.1.a, 8.G.A.1.b, 8.G.A.1.c	Lesson 17	7.G.A.2
Lesson 9	8.G.A.1.a, 8.G.A.1.b	Lesson 18	8.G.A

Essential Question(s):

- How do translations, rotations, and reflections affect the properties of a figure?
- What does it mean for two geometric figures to be "congruent"?
- What universal relationship exists among the interior angles of any triangle?

Enduring Understanding(s):

- Rigid transformations change a figure's position in the plane but preserve all side lengths and angle measures
- Two figures are congruent if there is a sequence of rigid transformations that takes one figure exactly onto the other
- The sum of the interior angle measures of any triangle is always 180 degrees, a fact that can be demonstrated through rigid motions or parallel line relationships

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 5)
CFA 2: Checkpoint B (after lesson 9)
MoU: Assessment A (after lesson 9)
Checkpoint C is an opportunity for feedback
CFA 3: Checkpoint D (after lesson 14)
CFA 4: Checkpoint E (after lesson 17)
EoU: Assessment A (after lesson 17)

Pacing for Unit

17 Days

Lesson Modifications:

- Covering Lessons 1-17
- Omit Lesson 1, 6, 9, 10
- Omit Lesson 10 (one of two congruence lessons)
- Add complementary and supplementary angles to the end of unit (Lesson 12 and 13)
- Could omit Lesson 15 (building polygons)
- Combine 16 and 17 in one day (drawing triangles)
- 4 days for review/assess

Family Overview

https://accessim.org/6-8-accelerated/accelerated-7/unit-1?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
Acc7.1.1	vertex plane measure direction figure	slide turn
Acc7.1.2	clockwise counterclockwise reflection rotation translation original	opposite
Acc7.1.3	image	vertex

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 1.3 Image Information, A to B to C
- 1.6 Sides and Angles, Which One?
- 1.7 A Pattern of Four Triangles
- 1.15 Where is Lin? Building Diego's and Jada's Shapes, How Long is the Third Side?
- 1.16 How Many Can You Draw?, Revisiting How Many Can You Draw
- 1.17 Revisiting How Many Can You Draw, Three Angles

Provide access as needed throughout the unit:

- Chart paper
- Compasses
- Geometry toolkits

	angle of rotation center (of rotation) line of reflection transformations sequence of transformations distance	clockwise counterclockwise reflect rotate translate
Acc7.1.4	coordinate plane point segment coordinates x-axis y-axis	
Acc7.1.5	polygon	angle of rotation center (of rotation) line of reflection
Acc7.1.6	rigid transformation corresponding measurements preserve	reflection rotation translation measure point
Acc7.1.7	midpoint	segment
Acc7.1.8	vertical angles parallel intersect	distance
Acc7.1.9		image rigid transformation midpoint parallel
Acc7.1.10	congruent perimeter area	
Acc7.1.11		right angle x-axis y-axis area corresponding
Acc7.1.12	alternate interior angles transversal supplementary complementary	vertical angles congruent
Acc7.1.13	straight angle	supplementary
Acc7.1.14		alternate interior angles transversal straight angle
Acc7.1.15	identical copy condition compass different triangle	
Acc7.1.16	unique triangle	condition different triangle
Acc7.1.17		protractor compass
Acc7.1.18	tessellation symmetry	

- Math Community Chart
- Metal paper fasteners (brass brads)
- Rulers
- Scissors
- Sticky notes
- Tracing paper

Lesson	Materials to Gather	Materials to Copy
1	• Geometry toolkits: Lesson, Warm-up • Chart paper: Warm-up • Sticky notes: Warm-up	• 6-12 Blank Math Community Chart (1 copy for every 30 students): Warm-up • Triangle Square Dance Handout (1 copy for every 2 students): Activity 1
2	• Geometry toolkits: Warm-up, Activity 1 • Math Community Chart: Warm-up • Sticky notes: Warm-up	Move Cards (1 copy for every 3 students): Activity 2
3	• Geometry toolkits: Activity 1, Activity 2	
4	• Geometry toolkits: Activity 2	
5	• Geometry toolkits: Warm-up • Math Community Chart: Warm-up	Transformation Information Cards (1 copy for every 2 students): Activity 1
6	Geometry toolkits: Activity 2	
7	• Math Community Chart: Lesson, Warm-up • Sticky notes: Warm-up • Geometry toolkits: Activity 1, Activity 2	
8	• Tracing paper: Warm-up, Activity 1 • Geometry toolkits: Activity 2	
9	Geometry toolkits: Warm-up, Activity 1, Activity 2, Activity 3	
10	• Geometry toolkits: Warm-up, Activity 1, Activity 2 • Math Community Chart: Warm-up, Activity 1	
11	• Chart paper: Warm-up • Geometry toolkits: Warm-up, Activity 1, Activity 2 • Math Community Chart: Warm-up • Rulers: Activity 2	

12	- Geometry toolkits: Warm-up, Activity 1, Activity 2 - Math Community Chart: Activity 4	Angle Finding Cards (1 copy for every 2 students): Activity 4
13	- Sticky notes: Warm-up - Geometry toolkits: Activity 1, Activity 2 - Scissors: Activity 2	- Find All Three Cards (1 copy for every 2 students): Activity 4 - Tear it Up Cards (1 copy for every 4 students): Activity 2
14	Geometry toolkits: Activity 1	
15	- Geometry toolkits: Warm-up, Activity 1, Activity 2 - Metal paper fasteners: Activity 1, Activity 2 - Compasses: Activity 2	What Can You Build? Cutouts (1 copy for every 2 students): Activity 1
16	Geometry toolkits: Activity 1, Activity 2	
17	- Compasses: Warm-up, Activity 1, Activity 2 - Geometry toolkits: Activity 1, Activity 2	Revisiting How Many Can You Draw? Handout (1 copy for each student): Activity 1
18	Geometry toolkits: Warm-up, Activity 1, Activity 2	Deducing Angle Measures Handout (1 copy for every 2 students): Warm-up

Opportunities for Interdisciplinary Connections:	Anticipated misconceptions:
Computer Science: The unit uses video game movement to introduce translations, rotations, and reflections	**Clockwise/Counterclockwise:** Students often confuse the direction of rotation, especially when it is not explicitly demonstrated See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:
- Understanding angles and angle measure (Grade 4)
- Angle relationships (Grade 4–5)
- Coordinate planes (Grade 5)
- Measuring distance (Grades K–5)
- Polygons and their properties (Grade 5)
- Area and perimeter (Grades 3–5)
- Visualizing and describing movements (K–2)

Relevant Unit(s)/Lesson(s) to Review:
- Brief review of angle measurement (protractor use), coordinate plotting in all quadrants, and polygon naming. Focus on fluency, not conceptual depth, so students can participate in Unit 1 activities without tool/notation barriers.

Connections to Future Units:

Builds toward exploring dilations and similar figures in the plane. Lays foundation for high school geometry congruence proofs.

Differentiation through Universal Design for Learning

Engagement:
- Use visible timers to help learners anticipate transitions between sharing strategies (Lesson 4, Activity 1 Launch)
  LT1: Determine coordinates that represent the image after a transformation

Representation:
- Begin with a physical demonstration using tracing paper to perform transformations (Lesson 3, Activity 1 Launch)

LT2: Draw and label the image of figures from transformations

Action & Expression:

- Invite students to talk about their ideas with a partner before writing them down (Lesson 2, Activity 1 Launch)
  LT2: Draw and label the image of figures from transformations

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 7, 8, 9, 11, 17)
- MLR2: Collect and Display (Lessons 1, 2, 6, 10, 12, 16)
- MLR8: Discussion Supports (Lessons 2, 3, 4, 6, 7, 12, 14, 15)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as describing, generalizing, and justifying. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Describe

- Movements of figures (Lessons 1 and 2).
- Observations about transforming parallel lines (Lesson 8).
- Transformations using corresponding points, line segments, and angles (Lesson 9).
- Observations about angle measurements (Lesson 14).
- Transformations found in tessellations and in designs with rotational symmetry (Lesson 18).

Generalize

- About categories for movement (Lesson 2).
- About rotating line segments 180° (Lesson 7).
- About the relationship between vertical angles (Lesson 8).
- About transformations and congruence (Lesson 11).
- About corresponding segments and length (Lesson 11).
- About alternate interior angles (Lesson 12).
- About the sum of angles in a triangle (Lesson 14).
- About categories for unique triangles (Lesson 16).

Justify

- Whether or not rigid transformations could produce an image (Lesson 6).
- Whether or not shapes are congruent (Lesson 10).
- Whether or not polygons are congruent (Lesson 11).
- Whether or not triangles can be created from given angle measurements (Lesson 13).
- Whether or not measurements determine unique triangles (Lesson 17).

Sentence Frames and Stems

Section A

- The coordinates of the image are … after a _____ (transformation).
- When a figure is transformed using a _____ (transformation), the coordinates change by …
- A _____ (transformation) of a figure on a grid looks like …
- To draw an image of figure _____ using a _____ (transformation), first I _____, then I …

Section B

- Between the original figure _____ and its image, side _____ corresponds to side _____ …
- The image of line _____ is _____ to the original because …
- I know the image was created using a _____ (transformation) because …

Section C

- Figure _____ is/is not congruent to figure _____ because …
- I can prove figure _____ is congruent to figure _____ by using the following transformations …

Section D

- Given the parallel lines _____ and transversal _____, angles _____ and _____ are congruent because ...
- If I know the measure of angle _____ is _____ degrees, then angle _____ must be _____ degrees because ...
- The sum of the measures of angles _____ and _____ is _____ degrees because ...
- To find the angle measures in the triangle, first I _____, then I ...

Section E

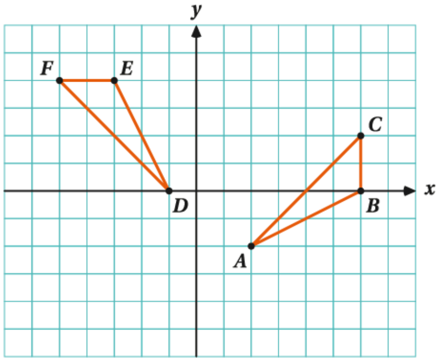
- Side lengths _____, _____ and _____ will/will not form a triangle because ...
- Two side lengths of the triangle are _____ and _____. The length of the third side of the triangle will be longer than _____ but shorter than _____ because ...
- Triangles _____ and ______ (names) are/ are not identical because ...
- I think that angles _____ and _____ (names) with side length _____ will/will not form a unique triangle because ...

Section F

- To create a tessellation, first I _____, then I ...
- _____ are shapes that work well in tessellations because ...
- To create a figure with rotational symmetry, I have to think about ...

Unit Outline

In this unit, students explore translations, rotations, and reflections of plane figures in order to understand the structure of rigid transformations. They use the properties of rigid transformations to formally define what it means for shapes to be congruent.



In earlier grades, students studied geometric measurement to find angle measures and side lengths of two-dimensional figures as well as applied area and perimeter formulas for polygons including rectangles, parallelograms, and triangles.

In this unit, students build on this work as they identify corresponding congruent angles and side lengths of figures and their images under rigid transformations. In an upcoming unit, students will explore dilations and similar figures in the plane.

In the first section, students begin with an informal exploration of transformations in the plane, then increase their precision of language to describe translations, rotations, and reflections with formal descriptions, including coordinates.

Then students identify corresponding parts of figures and conclude that angles and distances are preserved under rigid transformations. Students use this property to reason about plane figures, including parallel lines cut by a transversal.

Students then learn the formal definition of "congruent" and use this definition to show that corresponding parts of congruent figures are also congruent. Students apply their understanding of congruence and rigid motions to justify that the sum of the interior angles in a triangle must be 180°.

Students investigate whether sets of angle and side length measurements determine unique triangles or multiple triangles, or fail to determine triangles. Students also study and apply angle relationships, learning to understand and use the terms “complementary,” “supplementary,” “vertical angles,” and “unique.”

Note: It is not expected that students memorize which conditions result in a unique triangle, an impossible-to-create triangle, or multiple possible triangles. Understanding that, for example, side-side-side (SSS) information results in zero or exactly one triangle will be explored in high school geometry. At this level, students should attempt to draw triangles with the given information and notice that there is only one way to do it (or that it is impossible to do). In this unit, students reason about congruence and justify properties of figures using rigid transformations, but they are not required to create a formal proof. They will prove these and other geometric properties more formally in later courses.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Rigid Transformations (Lessons 1-5)	**Learning Target #1** Determine coordinates that represent the image of a polygon or line segment in the coordinate plane after a transformation. **Learning Target #2** Draw and label the image of figures that result from translations, rotations, and reflections on a square or isometric grid. **Learning Target #3**	**Lesson 1 Moving in the Plane** • I can describe how a figure moves and turns to get from one position to another. **Lesson 2 Naming the Moves** • I can identify corresponding points before and after a transformation. • I know the difference between translations, rotations, and reflections. **Lesson 3 Making the Moves** • I can use grids to carry out transformations of figures. • I can use the terms translation, rotation, and reflection to precisel describe transformations. **Lesson 4 Coordinate Moves** • I can apply transformations to points on a grid if I know their coordinates.

<table>
<tr><td></td><td>Explain the sequence of transformations that takes one figure to its image.</td><td>Lesson 5 Describing Transformations
● I can apply transformations to a polygon on a grid if I know the coordinates of its vertices.</td></tr>
<tr><td>Checkpoint A</td><td colspan="2"><i>Responding to Student Thinking</i>
● Problem 1: Points to Emphasize: If students struggle with identifying coordinates of a point or line segment after a translation or reflection, spend time addressing this in a future lesson. For example, the Activity Synthesis of the activity referred to here, draw a set of axes on a grid and ask students t identify the coordinates of a few points on the figure and its image.
○ Accelerated 7, Unit 1, Lesson 6,Activity 1 Sides and Angles
● Problem 2: Points to Emphasize: If students struggle with describing a translation, rotation, or reflection, spend time in a future lesson addressing the description of a sequence of transformation For example, in the activity referred to here, ask students to describe the sequence of transformatio needed to get from the first figure to the second.
○ Accelerated 7, Unit 1, Lesson 7, Warm-up Notice and Wonder:Building a Quadrilateral</td></tr>
<tr><td>Section B
Properties of Rigid Transformations
(Lessons 6-9)</td><td>Learning Target #4
Draw and label rigid transformations of lines and parallel lines and explain the relationship between the original and its image under the transformation.

Learning Target #5
Identify a rigid transformation using a drawing of a figure and its image.

Learning Target #6
Identify side lengths and angles that have equivalent measurements in composite shapes and explain why they are equivalent.</td><td>Lesson 6 No Bending or Stretching
● I can describe the effects of a rigid transformation on the lengths and angles in a polygon.
Lesson 7 Rotation Patterns
● I can describe how to move one part of a figure to another using a rigid transformation.
Lesson 8 Moves in Parallel
● I can describe the effects of a rigid transformation on a pair of parallel lines.
● If I have a pair of vertical angles and know the angle measure of o of them, I can find the angle measure of the other.
Lesson 9 Composing Figures
● I can find missing side lengths or angle measures using propertie rigid transformations.</td></tr>
<tr><td>Checkpoint B</td><td colspan="2"><i>Responding to Student Thinking</i>
● Problem 1: Points to Emphasize: If students struggle with constructing the image of a segment after a rotation, spend time in a future lesson addressing strategies for constructing transformations. For example, in the activity referred to here, select students to demonstrate or describe their strategy for rotating the congruent figures.
○ Accelerated 7, Unit 1, Lesson 11, Activity 1 Congruent Pairs
● Problem 2: More Chances: Students will have more opportunities to understand the mathematical idea addressed here. There is no need to slow down or add additional work to the next lessons.</td></tr>
<tr><td>Section C
Congruence
(Lessons 10-11)</td><td>Learning Target #7
Compare and contrast side lengths, angle measures, and other features of shapes using rigid transformations to explain why a shape is or is not congruent to another.

Learning Target #8
Justify that two polygons on a grid are congruent using the definition of congruence in terms of rigid transformations.</td><td>Lesson 10 What is the Same?
● I can decide whether or not two figures are congruent using rigid transformations.
Lesson 11 Congruence
● I can decide using rigid transformations whether or not two figure are congruent.
● I can use distances between points to decide if two figures are congruent.</td></tr>
<tr><td>Checkpoint C</td><td colspan="2"><i>Responding to Student Thinking</i>
● Problem 1: Press Pause: By this point in the unit, there should be some student mastery of describing ri transformations between congruent figures and justifying why two figures are not congruent. If most students struggle with these concepts, make time to examine related work in the section referred to he The Course Guide provides additional ideas for revisiting earlier work.
○ Accelerated 7, Unit 1, Section C Congruence</td></tr>
<tr><td colspan="3">Mid-Unit Assessment</td></tr>
<tr><td>Section D</td><td>Learning Target #9</td><td>Lesson 12 Alternate Interior Angles</td></tr>
</table>

Angles in a Triangle (Lessons 12-16)	Calculate angle measures using alternate interior, vertical, and supplementary angles to solve problems. **Learning Target #10** Generalize that the sum of angles in a triangle is 180 degrees using rigid transformations or the congruence of alternate interior angles of parallel lines cut by a transversal.	- I can find unknown angle measures by reasoning about complementary or supplementary angles. - I can recognize when adjacent angles are complementary or supplementary. - If I have two parallel lines cut by a transversal, I can identify altern interior angles and use that to find missing angle measurements. **Lesson 13 Adding the Angles in a Triangle** - I can determine whether three angles could make a triangle using their sum. **Lesson 14 Parallel Lines and the Angles in a Triangle** - I can explain using pictures why the sum of the angles in any trian is 180 degrees.
Checkpoint D	***Responding to Student Thinking*** - **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of solving problems using corresponding angles and properties of parallel lines. If students struggle with these concepts, make time to examine related work in the section referred to here. The Course Guide provide additional ideas for revisiting earlier work. ○ Accelerated 7, Unit 1, Section D Angles in a Triangle - **Problem 2:** More Chances: Students will have more opportunities to understand the mathematical idea addressed here. There is no need to slow down or add additional work to the next lessons.	
Section E Drawing Polygons with Given Conditions (Lessons 17-18)	**Learning Target #11** Draw triangles with two given angle measures and one side length, one given angle measure and two side lengths, or three side lengths. **Learning Target #12** Justify whether 3 measures of angles or sides determine a unique triangle or more than one triangle, or if no triangle is possible.	**Lesson 15 Building Polygons** - I can show that the 3 side lengths that form a triangle cannot be rearranged to form a different triangle. - I can show that the 4 side lengths that form a quadrilateral can be rearranged to form different quadrilaterals. - I can show whether or not 3 side lengths will make a triangle. **Lesson 16 Drawing Triangles (Part 1)** - Given two angle measures and one side length, I can draw differe triangles with these measurements or show that these measurements determine one unique triangle or no triangle. **Lesson 17 Drawing Triangles (Part 2)** - Given two side lengths and one angle measure, I can draw differe triangles with these measurements or show that these measurements determine one unique triangle or no triangle.
Checkpoint E	***Responding to Student Thinking*** - **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of creating triangles with 3 given measures. If most students struggle, make time to revisit related work in the lesson referred to here. See the Course Guide for ideas to help students re-engage with earlier work - **Problem 2:** More Chances: Students will have more opportunities to develop this understanding in later lessons. There is no need to slow down or add additional work to review this concept at this tim	
Section F Let's Put it To Work (Lesson 19)	**No new learning targets**	**Lesson 18 Rotate and Tessellate** - I can repeatedly use rigid transformations to make interesting repeating patterns of figures. - I can use properties of angle sums to reason about how figures w fit together.
End of Unit Assessment		

Unit Title:

Unit 7: Scale Drawings, Similarity, & Slope (G7 ACC U2)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	7.G.A.1	Lesson 11	8.G.a, 8.G.A.3
Lesson 2	7.G.A.1	Lesson 12	8.G.A.4
Lesson 3	7.G.A.1	Lesson 13	8.G.a, 8.G.A.5
Lesson 4	7.G.A.1	Lesson 14	8.G.a, 8.G.A.4
Lesson 5	7.G.A.1	Lesson 15	8.EE.B.6
Lesson 6	7.G.A.1	Lesson 16	8.EE.B.6
Lesson 7	7.G.A.1	Lesson 17	8.EE.B.6, 8.G.a, 8.G.A.3
Lesson 8	–	Lesson 18	7.G.A.1
Lesson 9	8.G.A	Lesson 19	8.G.A.5
Lesson 10	8.G.a, 8.G.A.3		

Essential Question(s):

- How is a dilation different from a rigid transformation?
- What defines similarity between two geometric figures?
- How does triangle similarity explain the concept of slope?

Enduring Understanding(s):

- Unlike rigid transformations, a dilation changes the size of a figure based on a scale factor and a center of dilation, while still keeping the shape (angles) the same
- Two figures are similar if one can be transformed into the other using a sequence of rigid transformations and dilations
- The slope of a line is constant because any two "slope triangles" drawn on the same line are similar, meaning the ratio of vertical change to horizontal change is always the same

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 2)
Checkpoint B (after lesson 5) is an opportunity for feedback
CFA 2: Checkpoint C (after Lesson 10)
CFA 3: Checkpoint D (after lesson 17)
EoU: Assessment A (after lesson 17)

Pacing for Unit

10 Days

Lesson Modifications:

- Lessons to cover: 2,4,5,10, 12,15, 16, 17
- Optional lessons: 1 (Lesson 18)
- 2 days for review/assessment

Family Overview

https://accessim.org/6-8-accelerated/accelerated-7/unit-2?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
Acc7.2.1	scaled copy	
Acc7.2.2	scale factor	
Acc7.2.3	reciprocal measurement	scale factor original
Acc7.2.4	scale drawing scale two-dimensional three-dimensional represent actual	scaled copy
Acc7.2.5	floor plan	scale

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 2.1 Printing Portraits, Scaling F, Pairs of Scaled Polygons
- 2.9 Quadrilateral on a Circular Grid, Getting Perspective
- 2.11 Notice and Wonder, Many Dilations of a Triangle
- 2.12 Similarity Transformations (Part 1)

Provide access as needed throughout the unit:

- Blank paper
- Dried linguine pasta (We specified linguine since it is flatter and less likely to roll around than spaghetti.)
- Geometry toolkits
- Graph paper
- Long straightedge
- Math Community Chart

Acc7.2.6	appropriate dimension	
Acc7.2.7	scale without units _ to _ equivalent scales	scale drawing
Acc7.2.8	scaling	
Acc7.2.9	dilation center of dilation dilate	
Acc7.2.10		center of a dilation
Acc7.2.12	similar	dilation dilate
Acc7.2.14	quotient	
Acc7.2.15		slope slope triangle
Acc7.2.16	similarity x-coordinate y-coordinate equation of a line	quotient
Acc7.2.19	estimate approximate / approximately	

- Measuring tapes
- Measuring tools
- Metric and customary unit conversion charts
- Protractors
- Rulers
- Scissors
- Straightedges
- Tape
- Tracing paper
- Yardsticks

Lesson	Materials to Copy	Materials to Gather
1		• Pairs of Scaled Polygons Cards (1 copy for every 2 students): Activity 2
3	• Protractors: Activity 1 • Geometry toolkits: Activity 3	• Scaled Copies Cards (1 copy for every 3 students): Activity 2 • Scaling A Puzzle Cutouts (1 copy for every 3 students): Activity 3
4	• Geometry toolkits: Activity 1, Activity 2	• Sizing Up a Basketball Court Handout (1 copy for each student): Activity 1
5	• Geometry toolkits: Activity 2	
6	• Geometry toolkits: Activity 2	• Same Plot, Different Drawings Cards (1 copy for every 24 students): Activity 1
7	• Geometry toolkits: Activity 1 • Metric and customary unit conversion charts: Activity 2	• Units of Length Reference Sheet (1 copy for every 2 students): Activity 2
8	• Math Community Chart: Warm-up • Blank paper: Activity 1 • Long straightedge: Activity 1 • Scissors: Activity 1 • Rulers: Activity 2	
9	• Straightedges: Activity 1 • Geometry toolkits: Activity 2, Activity 3	
10	• Geometry toolkits: Warm-up, Activity 1	• Matching Dilations on a Coordinate Plane Cards (1 copy for every 2 students): Activity 2
11	• Math Community Chart: Warm-up • Geometry toolkits: Activity 1	• Dilation Cards (1 copy for every 2 students): Activity 1
12	• Geometry toolkits: Activity 1	• Find Someone Similar Cards (1 copy for every 10 students): Activity 3

13	• Blank paper: Activity 1 • Dried linguine pasta: Activity 1 • Geometry toolkits: Activity 1, Activity 2 • Protractors: Activity 1 • Rulers: Activity 1 • Tape: Activity 1	• Making Pasta Angles and Triangles Cards (1 copy for every 4 students): Activity 1
14	• Geometry toolkits: Warm-up	
15	• Geometry toolkits: Warm-up • Tracing paper: Warm-up • Straightedges: Activity 2	
16	• Rulers: Warm-up • Straightedges: Warm-up	
17	• Geometry toolkits: Warm-up, Activity 1, Activity 2 • Straightedges: Activity 2	
18	• Blank paper: Activity 1 • Measuring tools: Activity 1 • Graph paper: Activity 2	
19	• Measuring tapes: Activity 2, Activity 3 • Rulers: Activity 2, Activity 3 • Yardsticks: Activity 2, Activity 3	

Opportunities for Interdisciplinary Connections:

Astronomy: Students use unitless scales to calculate the vast distances between the sun and various planets

Anticipated misconceptions:

Slope Calculation: Students may divide the horizontal change by the vertical change (x/y) instead of y/x

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Fractions as numbers (Grades 3–5)
- Equivalent fractions (Grade 4–5)
- Ratios and unit rates (Grade 6)
- Whole number and decimal multiplication/division (Grades 4–6)
- Angle measurement (Grade 4)
- Measuring lengths (Grades K–5)
- Graphing points and finding distances (Grade 5)
- Area formulas for rectangles, triangles (Grades 3–5)

Relevant Unit(s)/Lesson(s) to Review:

- Fractions and equivalent fractions → Ratios & unit rates → Multiplying by scale factors. If students lack ratio fluency, they will struggle with the entire unit.

Connections to Future Units:

Transitions students from dilations and similarity to understanding linear relationships

Differentiation through *Universal Design for Learning*

Engagement:

- Provide access to pre-cut materials like rectangles to reduce barriers for students with fine-motor skill needs (Lesson 8, Activity 1 Launch)
  LT5: Create a dilation of a figure given a scale factor and center

Representation:

- Use multiple examples and non-examples to reinforce the differences between similar and non-similar polygons (Lesson 12, Activity 3 Launch)
  LT9: Justify that two triangles are similar by finding a sequence of transformations

Action & Expression:

- Invite students to create stories for equations that connect to their own lives (Lesson 6, Activity 2 Student Task Statement)
  LT4: Create a scale drawing given actual measurements or another scale drawing

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
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MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR1: Stronger and Clearer Each Time (Lessons 7, 12, 15, 19)
- MLR7: Compare and Connect (Lessons 5, 7, 10, 13, 14, 17)
- MLR8: Discussion Supports (Lessons 1, 2, 3, 4, 5, 12, 13, 15, 16, 18)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as describing, explaining, representing, and justifying. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sensemaking and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Describe

- Features of scaled copies (Lesson 1 and 2).
- Observations about scaled rectangles (Lesson 8).
- Observations about dilated points, circles, and polygons (Lesson 9).
- Sequences of transformations (Lesson 12).
- Observations about side lengths in similar triangles (Lesson 14).

Explain

- How to use scale drawings to find actual distances (Lesson 4 and 7).
- How to apply dilations to find specific images (Lesson 10).
- How to determine whether triangles are congruent, similar, or neither (Lesson 13).
- Strategies for finding missing side lengths (Lesson 14).
- How to apply dilations to find specific images of points (Lesson 17).
- Reasoning for a conjecture (Lesson 19).

Represent

- A scaled copy for a given scale factor (Lessons 2 and 3).
- Distances using different scales (Lesson 7).
- Dilations using given scale factors and coordinates (Lesson 10).
- Figures using specific transformations (Lesson 12).
- Graphs of lines using equations (Lesson 17).
- Relevant features of a classroom with a scale drawing (Lesson 18).

Sentence Frames and Stems

Section A

- I know _____ is/is not a scaled copy of _____ because ...
- Corresponding side lengths in scaled copies _____ . Angle measures in scaled copies _____.
- The scale factor between _____ and _____ is _____ because ...
- To create a scaled copy of the figure _____ , I multiplied each side length by the scale factor _____ to get side lengths ...
- If the scale factor is greater/less than one, the copy will be _____ because ...

Section B

- The scale shows that _____ on the drawing represents _____ on the actual object.
- Since the scale is _____ to _____ , then _____ on the drawing means _____ on the actual object.
- When a scale drawing has a scale of _____ to _____ with no units, it means ...
- The scale _____ to _____ and _____ to _____ are equivalent because ...
- If the scale of the drawing is _____, the area of the actual object would be _____ because...

Section C

- To create a dilation of figure _____ with center _____, first I _____, then I ...
- I know the scale factor is _____ because ...
- I know the center of dilation is _____ because ...
- The image of figure _____ was dilated with a scale factor of _____ and a center _____. The coordinates of the image are ...
- I used _____ to dilate figure _____ because ...

Section D

- The ratio of side lengths _____ and _____ is equivalent to the ratio of the corresponding side lengths _____ and _____. This means ...
- The transformations ... move figure _____ to figure _____. The figures are similar because ...
- Figure _____ is similar to figure _____ because ...
- Triangle _____ is similar to triangle _____ because ...

Section E

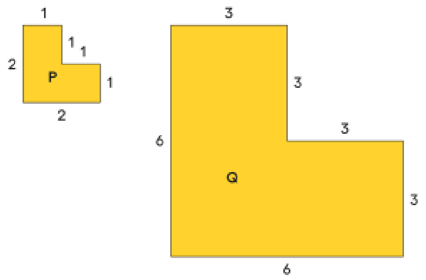
- The slope of a line is a value that describes ...
- I know that line _____ has a slope of _____ because ...
- To draw a line with a slope of _____, first I _____, then I ...
- The point _____ is on the line because the equation for the line is _____ and ...

Section F

- I chose to use a scale of _____ to _____ because ...
- Since the length of _____ is _____ and I want to make a drawing with length of _____, my scale will be _____ to _____.
- To make a scale floor plan of _____, first I would ...
- If I know the shadow length of the _____ is _____, then the height of the lamppost is _____ because ...
- The triangles created by the objects and their shadows are similar because ...

Unit Outline

In this unit, students study scaled copies of plane figures and scale drawings of real-world objects. Students learn that all lengths in a scaled copy are the result of multiplying the original lengths by a scale factor.
Also, the angle measures in a scaled copy are the same as in the original figure.



This work builds on what students learned in previous grades about measuring lengths, areas, and angles. This unit provides a geometric context to preview the type of reasoning that students will use with proportional relationships and also lays the foundation for work on dilations and similarity.

Students begin the unit by looking at copies of a picture and describing what differentiates scaled and non-scaled copies. They calculate scale factors and draw scaled copies of figures.

Next, students study scale drawings. They see that the principles and strategies that they used to reason about scaled copies of figures can also be used with scale drawings. They use scale drawings to calculate actual lengths and areas, and they create scale drawings.

In the next two sections, students learn about dilations as a new transformation that creates scaled copies. They connect dilations to earlier work with rigid transformations as they explain why two figures are similar by describing a sequence of translations, reflections, rotations, and dilations that take one figure to the other. They discover that angle measures in similar figures are preserved, which can be used to justify that two triangles are similar if they share two (or three) angle measures. Students also find that the quotients of corresponding side lengths in similar figures are equal. This along with the fact that side lengths in similar figures are all multiplied by the same scale factor allows students to calculate unknown lengths in similar figures.

In the following section, students use the similarity of slope triangles to understand why any two distinct points on a line determine the same slope. Using these same properties of similar triangles, students practice writing equations for a given line, though students are not expected at this time to write equations in the form $y=mx+b$.

In this unit, several lesson plans suggest that each student have access to a geometry toolkit. Each toolkit contains tracing paper, graph paper, colored pencils, scissors, ruler, protractor, and an index card to use as a straightedge or to mark right angles, giving students opportunities to develop their abilities to select appropriate tools and use them strategically to solve problems. Note that even students in a digitally enhanced classroom should have access to such tools; apps and simulations should be considered additions to their toolkits, not replacements for physical tools.

Lesson Sequence	**Learning Target(s)**	**Success Criteria/Assessment**

Section A Scaled Copies (Lessons 1-3)	**Learning Target #1:** Determine whether a figure is a scaled copy of another figure, by examining corresponding side lengths and angle measures. **Learning Target #2** Draw a scaled copy of a figure using a given scale factor.	**Lesson 1 What Are Scaled Copies?** ● I can describe some characteristics of a scaled copy. ● I can tell whether or not a figure is a scaled copy of another figure **Lesson 2 Scale Factors and Making Scaled Copies** ● I can describe what the scale factor has to do with a figure and its scaled copy. ● I can draw a scaled copy of a figure using a given scale factor. ● I know what operation to use on the side lengths of a figure to produce a scaled copy. **Lesson 3 Scaled Relationships** ● I can describe the effect on a scaled copy when I use a scale facto that is greater than 1, less than 1, or equal to 1. ● I can explain how the scale factor that takes Figure A to its copy Figure B is related to the scale factor that takes Figure B to Figure ● I can use corresponding distances and corresponding angles to t whether one figure is a scaled copy of another.
Checkpoint A	***Responding to Student Thinking*** ● **Problem 1:** More Chances: Students will have more opportunities to develop this understanding in la lessons. There is no need to slow down or add additional work to review this concept at this time. ● **Problem 2:** Points to Emphasize: If most students struggle with creating a scaled copy of a figure, revisit the characteristics of scaled copies when opportunities arise over the next several lessons. F example, invite multiple students to share their thinking about how to create a scale drawing in thes activities: ○ Accelerated 7, Unit 2, Lesson 5, Activity 2 Two Maps of Utah ○ Accelerated 7, Unit 2, Lesson 6, Activity 2 A New Drawing of the Playground	
Section B Scale Drawings (Lessons 4-7)	**Learning Target #3** Create a scale drawing given the actual measurements of the object or given another scale drawing at a different scale. **Learning Target #4** Explain how to use scales and scale drawings to calculate actual distances and areas.	**Lesson 4 Scale Drawings** ● I can explain what a scale drawing is, and I can explain what its sca means. ● I can use actual distances and a scale to find scaled distances. ● I can use a scale drawing and its scale to find actual distances. **Lesson 5 Creating Scale Drawings** ● I can determine the scale of a scale drawing when I know lengths the drawing and corresponding actual lengths. ● I know how different scales affect the lengths in the scale drawin ● When I know the actual measurements, I can create a scale drawi at a given scale. **Lesson 6 Changing Scales in Scale Drawings** ● Given a scale drawing, I can create another scale drawing that sh the same thing at a different scale. ● I can use a scale drawing to find actual areas. **Lesson 7 Units in Scale Drawings** ● I can use scales without units to find scaled distances or actual distances.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of calculating actual lengths and areas from a scale drawing. If students struggle with this, make time to examine rela work in the section referred to here. The Course Guide provides additional ideas for revisiting earlier wo ○ Accelerated 7, Unit 2, Section B Scale Drawings	
Section C Dilations (Lessons 7-11)	**Learning Target #5** Create a dilation of a figure given a scale factor and center of dilation. **Learning Target #6** Describe a figure on a coordinate grid and its image under a dilation, using coordinates to refer to points. **Learning Target #7** Identify the center, scale factor, and image of a dilation.	**Lesson 8 Projecting and Scaling** ● I can decide if one rectangle is a scaled copy of another rectangle **Lesson 9 Dilations** ● I can apply a dilation to a polygon using a ruler. ● I can apply dilations to figures on a circular grid when the center o dilation is the center of the grid. **Lesson 10 Dilations on a Square Grid** ● I can apply dilations to figures on a square grid. **Lesson 11 More Dilations** ● I can apply dilations to polygons on a rectangular grid if I know the coordinates of the vertices and of the center of dilation.

Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with finding the center of dilation, revisit how describe dilations when showing that two figures are similar. For example, in the activity referred to here emphasize the location of the center of the dilation. ○ Accelerated 7, Unit 2, Lesson 12, Activity 1 Similarity Transformations ● **Problem 2:** Points to Emphasize: If most students struggle with drawing a dilation on the coordinate pla revisit how to do this before starting the activity referred to here. ○ Accelerated 7, Unit 2, Lesson 17, Activity 1 Dilations and Slope Triangles	
Section D Similarity (Lessons 12-16)	**Learning Target #8** Calculate unknown side lengths in similar triangles using the ratios of side lengths within the triangles and the scale factor between similar triangles. **Learning Target #9** Justify that two triangles are similar by finding a sequence of transformations that takes one triangle to the other or by checking that two pairs of corresponding angles are congruent.	**Lesson 12 Similarity** ● I can use angle measures and side lengths to conclude that two polygons are not similar. ● I can use a sequence of transformations to explain why two figure are similar. **Lesson 13 Similar Triangles** ● I know how to decide if two triangles are similar just by looking at their angle measures. **Lesson 14 Side Length Quotients in Similar Triangles** ● I can decide if two triangles are similar by looking at quotients of lengths of corresponding sides. ● I can find missing side lengths in a pair of similar triangles using quotients of side lengths.
Checkpoint D	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with explaining why two figures are similar, before starting the activity referred to here, emphasize the different ways to show similarity. ○ Accelerated 7, Unit 2, Lesson 15, Activity 1 Similar Triangles on the Same Line ● **Problem 2:** More chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section E Slope (Lessons 17-18)	**Learning Target #10** Comprehend the term "slope" to mean a number that tells how steep a line is. **Learning Target #11** Create an equation relating the quotient of the vertical and horizontal side lengths of a slope triangle to the slope of a line and use it to justify whether a point (x,y) is on the line by verifying that the values of x and y satisfy the equation.	**Lesson 15 Meet Slope** ● I can draw a line on a grid with a given slope. ● I can find the slope of a line on a grid. **Lesson 16 Writing Equations for Lines** ● I can decide whether a point is on a line by finding quotients of horizontal and vertical distances. **Lesson 17 Using Equations for Lines** ● I can find an equation for a line and use it to decide which points a on that line.
Checkpoint E	***Responding to Student Thinking*** ● **Problem 1:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons. ● **Problem 2:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section F Let's Put it To Work (Lesson 19)	**No new learning targets**	**Lesson 18 Draw It to Scale** ● I can create a scale drawing of my classroom. ● When given requirements on drawing size, I can choose an appropriate scale to represent an actual object. **Lesson 19 The Shadow Knows** ● I can model a real-world context with similar triangles to find the height of an unknown object
End of Unit Assessment ● Combine mid unit and EOU ○ Mid Unit: 1,2,3,5 ○ EOU: 1,3,4,7		

Unit Title:

Unit 8: Linear Relationships (G7 ACC U5)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	8.EE.B	Lesson 15	8.EE.C.8, 8.EE.C.8.a
Lesson 2	8.EE.b, 8.EE.B.5	Lesson 16	8.EE.C.8
Lesson 3	8.EE.b, 8.EE.B.5	Lesson 17	8.EE.C.8, 8.EE.C.8.b, 8.EE.C.8.c
Lesson 4	8.EE.B	Lesson 18	8.SP.A.1
Lesson 5	8.EE.b, 8.EE.B.5	Lesson 19	8.SP.A.1, 8.SP.A.3
Lesson 6	8.EE.b, 8.EE.B.6	Lesson 20	8.SP.A.1, 8.SP.A.2
Lesson 7	8.EE.B	Lesson 21	8.SP.A.1, 8.SP.A.2
Lesson 8	8.EE.B	Lesson 22	8.SP.A.1, 8.SP.A.2, 8.SP.A.3
Lesson 9	8.EE.b, 8.EE.B.5	Lesson 23	8.SP.A.1, 8.SP.A.2, 8.SP.A.3
Lesson 10	8.EE.b, 8.EE.B.6	Lesson 24	8.SP.A.4
Lesson 11	8.EE.b	Lesson 25	8.SP.A.4
Lesson 12	8.EE.C	Lesson 26	8.EE.B.6, 8.EE.C.8.a
Lesson 13	8.EE.C.8	Lesson 27	8.EE.C.8.c
Lesson 14	8.EE.C.8, 8.EE.C.8.a, 8.EE.C.8.b	Lesson 28	8.SP.A

Essential Question(s):

- What defines a linear relationship and how does it differ from a proportional one?
- How do the slope and y-intercept of a line communicate the story of a real-world situation?
- How can different mathematical representations (tables, equations, graphs) be used to analyze and predict data?
- What does the intersection of two lines represent in a system of equations?

Enduring Understanding(s):

- A linear relationship is characterized by a constant rate of change between two quantities. While all proportional relationships are linear, a linear relationship is only proportional if its graph passes through the origin (0, 0)
- In a linear context, the slope represents the rate of change (how much the dependent variable changes for every unit increase in the independent variable), and the y-intercept represents the initial or starting value
- Linear relationships can be modeled using equations in forms like $y=mx+b$ or $Ax+By=C$. These models allow for the prediction of unknown values and help determine if specific coordinate pairs represent valid solutions to a given constraint
- A system of equations models two or more relationships happening at once; the point where the lines intersect is the unique solution that satisfies both relationships simultaneously. Systems may also have no solution (parallel lines) or infinitely many solutions (identical lines)

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 3)
CFA 2: Checkpoint B (after lesson 7)
CFA 3: Checkpoint C (after lesson 12)
MoU: Assessment A (after lesson 12)
CFA 4: Checkpoint D (after lesson 17)
EoU: Assessment A (after lesson 17)
*omit questions 6&7 (data), added 3 questions from a previous version of the assessment

Pacing for Unit

25 Days

Lesson Modifications:

- 10 flex days: Based on student need, consider:
  - Optional lessons: 6 (Lessons 10, 24, 25, 26, 27, and 28)
  - Omit Lessons 1-2 (proportional relationships)
  - Omit Lesson 4 (intro to linear relationships)
  - Omit Lessons 18-25 (data)
- 4 days for review/assessment

Family Overview

https://accessim.org/6-8-accelerated/accelerated-7/unit

Integration of Technology:

- Desmos Online Graphing Calculator

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- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
Acc7.5.1	represent scale label	constant of proportionality
Acc7.5.2	rate of change equation	
Acc7.5.4	linear relationship constant rate rate of change	slope
Acc7.5.5	vertical intercept y-intercept	
Acc7.5.6	initial (value or amount)	constant rate
Acc7.5.7	relate	
Acc7.5.8	horizontal intercept x-intercept	
Acc7.5.9		rate of change vertical intercept y-intercept
Acc7.5.10	constraint	horizontal line vertical line
Acc7.5.11	solution to an equation with two variables variable combination set of solutions	
Acc7.5.13	ordered pair	
Acc7.5.14	system of equations solution to a system of equations	
Acc7.5.15	substitution	no solution (only) one solution infinitely many solutions
Acc7.5.15	algebraically	
Acc7.5.17		system of equations substitution
Acc7.5.18	scatter plot	
Acc7.5.18	attribute input output	numerical data
Acc7.5.20	outlier predict overpredict underpredict linear model	
Acc7.5.21	positive association negative association	
Acc7.5.22	linear association non-linear association no association	

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 5.6 Rising Water Levels
- 5.7 Increased Savings, Translating a Line
- 5.8 Stand Clear of Closing Doors, Please, Travel Habits in July
- 5.14 Passing on the Trail, Stacks of Cups
- 5.15 Matching Graphs to Systems, Different Types of Systems
- 5.18 Weight and Fuel Efficiency
- 5.20 Battery Life, The Agony of the Feet
- 5.21 Fitting Lines

Provide access as needed throughout the unit:

- Colored pencils
- Dried linguine pasta (We specified linguine since it is flatter and less likely to roll around than spaghetti.)
- Geometry toolkits
- Graduated cylinders
- Graph paper
- Math Community Chart
- Scissors
- Stopwatches
- StraightedgesTeacher's collection of objects
- Tools for creating a visual display
- Water

Lesson	Materials to Gather	Materials to Copy
2	• Straightedges: Activity 2, Activity 3	• Proportional Relationship Cards (1 copy for every 4 students): Activity 1 • Graphing Proportional Relationships Cards (1 copy for every 2 students): Activity 4
3	• Math Community Chart: Activity 1 • Tools for creating a visual display: Activity 1	
4	• Graph paper: Activity 1 • Straightedges: Activity 1, Activity 2	
5		• Slopes, Vertical Intercepts, and Graphs Cards (1 copy for every 2 students): Activity 1
6	• Graduated cylinders: Activity 1 • Straightedges: Activity 1 • Teacher's collection of objects: Activity 1 • Water: Activity 1	
7	• Geometry toolkits: Warm-up	• Translating a Line Cards (1 copy for

	fitted line	
Acc7.5.23	cluster	positive association negative association linear association
Acc7.5.24	segmented bar graph relative frequency two-way (frequency) table	
Acc7.5.28		scatter plot outlier cluster

		every 2 students): Activity 2
8	• Straightedges: Activity 1	
9	• Straightedges: Activity 3	• Making Designs Cards (1 copy for every 2 students): Activity 3
10	• Straightedges: Activity 1, Activity 2	
11	• Colored pencils: Activity 2 • Graph paper: Activity 2 • Straightedges: Activity 2	
12		• I'll Take an X Please Cards (1 copy for every 2 students): Activity 2
13	• Straightedges: Lesson	
14	• Straightedges: Activity 1, Activity 2	
15	• Scissors: Activity 2 • Straightedges: Activity 2	• Different Types of Systems Handout (1 copy for every 2 students): Activity 2
17		• Racing and Play Tickets Cards (1 copy for every 4 students): Activity 1
18		• Tables and Their Scatter Plots Handout (1 copy for every 2 students): Activity 2
21	• Dried linguine pasta: Activity 1 • Straightedges: Activity 1	
22		
23	• Dried linguine pasta: Activity 2 • Straightedges: Activity 2	• Scatterplot City Cards (1 copy for each student): Activity 1
24		• Matching Representations Cards (1 copy for every 2 students): Activity 1
25	• Colored pencils: Activity 2 • Straightedges: Activity 2	
27	• Tools for creating a visual display: Activity 1	
28	• Stopwatches: Warm-up	

Opportunities for Interdisciplinary Connections:

Biology: Linear models compare the growth rates of different plants over

Anticipated misconceptions:

Steepness vs. Slope: Students may judge a line's steepness visually without checking the scale of the axes

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:

Essential prior concepts to engage with this unit:

- Ratios and proportional relationships (Grade 6)
- Unit rates and the constant of proportionality (Grade 6, Unit 2)
- Interpreting graphs and tables (Grade 6)
- Plotting points and reading coordinates (Grade 5–6
- Finding distances on coordinate planes (Grade 5–6)
- The coordinate plane as a representation of relationships (Grade 6)
- Solving linear equations (Grade 7 Unit 3–4)
- Writing equations in various forms (write a linear equation given a point and slope or given two points)
- Understanding negative slopes (6ACC Unit 7)
- Operations on rational numbers
- Recognizing patterns in tables & graphs (6ACC Unit 5)
- Estimating and predicting using trends

Relevant Unit(s)/Lesson(s) to Review:

- Spiral review of proportional relationships (using Unit 2 or Grade 6 content), solving equations (Units 3–4), and coordinate graphing (Grade 5–6) into early lessons.
- Students often need multiple exposures to slope concepts before grasping rate of change, especially when negative numbers are involved.

Connections to Future Units:

Advances understanding of lines for use in scatter plots and fitted lines to analyze numerical data. Lays foundation for functions in Unit 9

Differentiation through *Universal Design for Learning*

Engagement:

- Provide an opportunity for students to self-assess their confidence that their description matches a chosen line (Lesson 26, Activity 1 Launch)
  LT5: Interpret the slope and intercept of the graph of a line in context

Representation:

- Maintain a display of vocabulary and diagrams for width, length, perimeter, and intercept (Lesson 10, Activity 2 Launch)
  LT7: Determine pairs of values that satisfy or do not satisfy a linear relationship

Action & Expression:

- Use sticky notes for working memory support during Math Talks (Lesson 9, Warm-up Launch)
  LT6: Create multiple representations of a linear relationship

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR5: Co-Craft Questions (Lessons 1, 4, 15, 19)
- MLR6: Three Reads (Lessons 2, 3, 5, 13, 14)
- MLR8: Discussion Supports (Lessons 2, 5, 7, 9, 11, 16, 17, 23, 26, 27)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as representing, interpreting, and explaining. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sensemaking and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Represent

- Situations involving proportional relationships (Lesson 1).
- Constants of proportionality in different ways (Lesson 2).
- Linear relationships using graphs, tables, equations, and verbal descriptions (Lesson 4).
- Situations using negative slopes and slopes of zero (Lesson 8).
- Slope using expressions (Lesson 9).
- Situations by graphing lines and writing equations (Lesson 11).
- Situations involving systems of linear equations. (Lessons 13, 14, and 16).
- Data in organized ways (Lesson 18).
- Data using two-way tables, bar graphs, and segmented bar graphs (Lessons 24 and 25).
- Data using scatter plots (Lesson 28).

Interpret

- Situations involving proportional relationships (Lesson 1).
- Slopes and intercepts of linear graphs (Lesson 2).
- Situations using negative slopes and slopes of zero (Lesson 9).
- Situations involving systems of linear equations (Lessons 13 and 14).
- Tables and scatter plots of bivariate data (Lesson 19).
- Tables, scatter plots, equations, and situations involving bivariate data (Lesson 20).
- Situations involving linear relationships (Lesson 26).

Explain

- How to graph proportional relationships (Lesson 2).
- How to use a graph to determine information about a linear situation (Lessons 4 and 5).
- How to graph linear relationships (Lesson 9).
- How to estimate using available data (Lesson 18).
- How to use tables and scatter plots to make estimates and predictions (Lesson 19).
- The meaning of slope for a situation (Lesson 20).
- How to use lines to show associations, identify outliers, and answer questions (Lesson 23).
- How to answer questions about systems of equations (Lesson 27).

Sentence Frames and Stems

Section A

- The relationship between _____ and _____ is proportional because ...
- The equation _____ represents this proportional relationship because ...
- To create a graph of a proportional relationship, first I _____, then I ...
- I can substitute the value _____ into the equation _____ to find the value of _____.

Section B

- The graphs of the lines with equations _____ and _____ are/aren't parallel. I know because in the equations ...
- The slope of the line is _____ because ...
- The slope in this situation is _____ and represents _____.
- The y-intercept of the line is _____ and represents _____.
- The equation _____ represents this situation because ...

Section C

- I used _____ to represent the linear relationship between _____ and _____ because ...
- The slope in this situation is _____ and represents _____.
- To draw a line with a slope _____ and the point _____ on the line, first I _____, then I ...
- The equation _____ describes the line because ...
- The points ... are solutions to the equation _____ because ...
- The pair of values _____ do/do not satisfy the equation _____ because ...

Section D

- The system of equations has _____ solution(s). I know this because ...
- The solution to the system of equations is _____ because ...
- This situation can be represented by the system of equations _____ because ...
- To solve the system of equations, first I _____, then I ...

Section E

- Each point on the scatter plot represents _____ and _____.
- The data in this scatter plot represent ...
- I can locate a specific data point on a scatter plot by ...
- The association between _____ and _____ is _____ because ...
- The outlier in the data set is _____ because ...
- The linear equation _____ would be a good fit for this data because ...
- If the _____ increases by 1 _____ , the model predicts that _____ increases/decreases by _____ .
- To draw a line that best fits the data, first I _____, then I ...

Section F
- Using the data shown in the _____, I can determine that ...
- To find the missing values in the table, first I _____, then I ...
- The percentage of _____ that _____ is _____ because ...
- I created a _____ to show the association between _____ and _____ is _____.

Section G
- The equation _____ represents this situation because ...
- The account starts at _____ and increases/decreases by _____ per _____.
- This situation can be represented by the system of equations _____ because ...
- To solve the system of equations, first I _____, then I ...
- The solution to the system of equations is _____ because ...
- Comparing Time 1 to Time 2, there is a _____ association because ...
- The _____ was most helpful to determine if there was an association because ...

Unit Outline

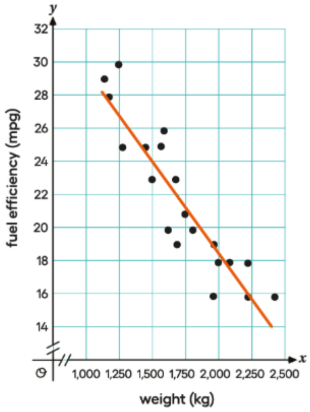
This unit introduces students to nonproportional linear relationships by building on earlier work around similarity and slope. Then students solve systems of linear equations using graphic and algebraic methods. Students advance their understanding of lines by examining slopes in the context of data. Lastly, they use scatter plots and fitted lines to analyze numerical data.

The unit begins by revisiting different representations of proportional relationships. Students create graphs, tables, and equations in order to interpret the constant of proportionality as the rate of change of one variable with respect to the other.

Next, students analyze a relationship that is linear but not proportional. They see that the rate of change has a numerical value that is the same as the slope of the line that represents the relationship. Students also view the graph of a line in the coordinate plane as the vertical translation of a proportional relationship.

Then students consider situations represented by linear relationships with negative rates of change. They establish a way to compute the slope of a line from any two distinct points on the line.

Next students examine systems of equations graphically and find solutions algebraically. They build on their understanding that the line representing an equation with 2 variables is made up of coordinate pairs that make the equation true. They find that the intersection of 2 lines is the point that makes both equations for the system true. Students also recognize when systems have no solution or infinite solutions based on the graphs and the slope and intercept.



Then students are introduced to scatter plots and are reminded how to interpret points on a graph using a context. They look more closely at associations in data by informally drawing lines that model the general trend of the data. They also classify associations as positive, negative, linear, and non-linear by looking at the shape of the data in a scatter plot.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Proportional Relationships (Lessons 1-3)	**Learning Target #1:** Create an equation and a graph to represent proportional relationships, including an appropriate scale and axes. **Learning Target #2** Interpret multiple representations of a proportional relationship in context.	**Lesson 1 Understanding Proportional Relationships** • I can graph a proportional relationship from a story. • I can use the constant of proportionality to compare the pace of different animals. **Lesson 2 Representing Proportional Relationships** • I can scale and label coordinate axes in order to graph a proportio relationship. • I can tell when two graphs are of the same proportional relationsh even if the scales are different. **Lesson 3 Comparing Proportional Relationships** • I can compare proportional relationships represented in different ways.
Checkpoint A	***Responding to Student Thinking*** • **Problem 1 & 2:** More Chances: Students will have more opportunities to develop this understanding later lessons. There is no need to slow down or add additional work to review this concept at this tim	
Section B Linear Equations in One Variable (Lessons 4-7)	**Learning Target #3** Create and compare graphs that represent linear relationships with the same rate of change but different initial values.	**Lesson 4 Introduction to Linear Relationships** • I can find the rate of change of a linear relationship by figuring ou the slope of the line representing the relationship. **Lesson 5 More Linear Relationships** • I can interpret the vertical intercept of a graph of a real-world situation.

	Learning Target #4 Create an equation that represents a linear relationship. **Learning Target #5** Interpret the slope and intercept of the graph of a line in context.	● I can match graphs to the real-world situations they represent by identifying the slope and the vertical intercept. **Lesson 6 Representations of Linear Relationships** ● I can use patterns to write a linear equation to represent a situati ● I can write an equation for the relationship between the total volu in a graduated cylinder and the number of objects added to the graduated cylinder. **Lesson 7 Translating to** ● I can explain where to find the slope and vertical intercept in both equation and its graph. ● I can write equations of lines using .
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with interpreting the slope of a line in contex revisit the concept of rate of change. For example, in the section referred to here, discuss the similarity between graphing and interpreting negative rates of change and positive rates of change. ○ Accelerated 7, Unit 5, Section C Finding Slopes and Linear Equations	
Section C Finding Slopes (Lessons 8-12)	**Learning Target #6** Create multiple representations of a linear relationship, including a graph, equation, and table. **Learning Target #7** Determine pairs of values that satisfy or do not satisfy a linear relationship using an equation or graph. **Learning Target #8** Interpret the slope of a non-increasing line in context.	**Lesson 8 Slopes Don't Have to Be Positive** ● I can create a graph of a situation that has a negative slope. ● I can determine if a situation or a graph has a slope that is positiv negative, or zero and explain how I know. **Lesson 9 Calculating Slope** ● I can calculate positive and negative slopes given two points on t line. **Lesson 10 Equations of All Kinds of Lines** ● I can write equations of lines that have a positive or a negative slo ● I can write equations of vertical and horizontal lines. **Lesson 11 Solutions to Linear Equations** ● I know that the graph of an equation is a visual representation of the solutions to the equation. ● I understand what the solution to an equation in two variables is. **Lesson 12 More Solutions to Linear Equations** ● I can find solutions to linear equations given either the - or -value start from.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of interpreting slope in context. If most students struggle, make time to revisit related work in the section referred to here. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 7, Unit 5, Section B Representing Linear Relationships ● **Problem 2:** Points to Emphasize: If most students struggle with determining whether or not a pair of values satisfies a linear relationship, revisit the concept of what it means to be a solution to an equation For example, in the activity referred to here, emphasize how to check that the coordinates of the point intersection of two lines satisfies the equations of both lines. ○ Accelerated 7, Unit 5, Section B Representing Linear Relationships	
Mid-Unit Assessment		
Section D Systems of Linear Equations (Lessons 13-17)	**Learning Target #9** Categorize systems of equations, including systems with infinitely many or no solutions, and calculate the solution for a system using a variety of strategies. **Learning Target #10** Comprehend that solving a system of equations means finding values of the variables that make both equations true at the same time. **Learning Target #11** Create a system of equations that represents a situation and interpret the solution in context.	**Lesson 13 On Both of the Lines** ● I can use graphs to find an ordered pair that two real-world situations have in common. **Lesson 14 Systems of Equations** ● I can explain the solution to a system of equations in a real-world context. ● I can explain what a system of equations is. ● I can make graphs to find an ordered pair that two real-world situations have in common. **Lesson 15 Solving Systems of Equations** ● I can graph a system of equations. ● I can solve systems of equations using algebra. **Lesson 16 Solving More Systems** ● I can use the structure of equations to help me figure out how ma solutions a system of equations has. **Lesson 17 Writing Systems of Equations** ● I can write a system of equations from a real-world situation.

Checkpoint D	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: If students struggle to classify the number of solutions for a system, make tim for students to revisit what a solution for a system means for each equation, in any situation given, and graphically. For example, revisit the situation with bug passing. Ask students to write a system for the situation and to interpret the intersection point in all 3 ways. Then, ask students what it might look like i the bugs never passed or were together the entire time. ○ Accelerated 7, Unit 5, Lesson 13, Activity 1 Bugs Passing in the Night ● **Problem 2:** Points to Emphasize: If students struggle to write a system of equations to represent a situation, move more slowly through the practice problems and activities related to the idea. For examp in this activity, ask students to identify the variables and constants involved and then to combine them i an equation for each person in the scenarios: ○ Accelerated 7, Unit 5, Lesson 27, Activity 1 Cycling, Fundraising, Working, and ____?	
Section E Does This Predict That? (Lessons 18-23)	**Learning Target #12** Create a scatter plot from a table of data, and describe the trend of the data. **Learning Target #13** Describe the relationship between two variables using a line fit to data on a scatter plot. **Learning Target #14** Interpret features of data on a scatter plot, including linear and non-linear association, outliers, slope of a linear model, and clustering.	**Lesson 18 Organizing Data** ● I can organize data to see patterns more clearly. **Lesson 19 What a Point in a Scatter Plot Means** ● I can describe the meaning of a point in a scatter plot in context. **Lesson 20 Fitting a Line to Data** ● I can pick out outliers on a scatter plot. ● I can use a model to predict values for data. **Lesson 21 Describing Trends in Scatter Plots** ● I can draw a line to fit data in a scatter plot. ● I can say whether data in a scatter plot has a positive or negative association (or neither). **Lesson 22 The Slope of a Fitted Line** ● I can use the slope of a line fit to data in a scatter plot to say how t variables are connected in real-world situations. **Lesson 23 Observing More Patterns in Scatter Plots** ● I can pick out clusters in data from a scatter plot. ● I can use a scatter plot to decide if two variables have a linear association.
Checkpoint E	***Responding to Student Thinking*** ● **Problem 1:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons. ● **Problem 2:** Press Pause: By this point in the unit, there should be some student mastery of slope an its meaning. If students struggle, make time to revisit related work in the referenced lesson. See the Course Guide for ideas to help students re-engage with earlier work. For example, revisit contexts fr linear situations throughout this course and ask students to determine the slope and interpret its meaning. ○ Accelerated 7, Unit 5, Lesson 22 The Slope of a Fitted Line ● **Problem 3:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section F Associations in Categorical Data (Lesson 24-25	**Learning Target #15** Calculate relative frequencies, and describe associations between variables using a relative frequency table. **Learning Target #16** Create a two-way table and a segmented bar graph that represent relative frequencies, and interpret the frequencies in context.	**Lesson 24 Looking for Associations** ● I can identify the same data represented in a bar graph, a segmen bar graph, and a two-way table. ● I can use a two-way frequency table or relative frequency table t find associations among variables. **Lesson 25 Using Data Displays to Find Associations** ● I can create relative frequency tables, bar graphs, and segmente bar graphs from frequency tables to find associations among variables.
Checkpoint F	***Responding to Student Thinking*** **Problem 1:** More Chances: Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.	
Section G Let's Put it To Work (Lesson 26-28)	**No new learning targets**	**Lesson 26 Using Linear Relations to Solve Problems** ● I can write linear equations to reason about real-world situations. **Lesson 27 Solving Problems with Systems of Equations** ● I can use a system of equations to represent a real-world situatio and answer questions about the situation. **Lesson 28 Gone in 30 Seconds**

		- I can collect data and analyze it for associations using scatter plot two-way tables, and segmented bar graphs
End of Unit Assessment		

Unit Title:

Unit 9: Functions and Volume (G7 ACC U6)

Relevant Standards: Bold indicates priority

Lesson	Standards	Lesson	Standards
Lesson 1	8.F.A.1	Lesson 13	7.G.B.6
Lesson 2	8.F.A.1	Lesson 14	7.G.B, 7.G.B.6, 7.RP.A
Lesson 3	8.F.a, 8.F.A.1	Lesson 15	8.G.C.9
Lesson 4	8.F.A.1, 8.F.A.3, 8.F.B.5	Lesson 16	8.G.C.9
Lesson 5	8.F.B.4, 8.F.B.5	Lesson 17	8.F.A.1, 8.F.A.3, 8.F.b
Lesson 6	8.F.A.2, 8.F.A.3	Lesson 18	8.F.A.3, 8.F.b, 8.G.C.9, 8.G.C, 8.G.C.9
Lesson 7	8.F.A.2, 8.F.A.3, 8.F.B.4	Lesson 19	8.G.C, 8.G.C.9
Lesson 8	7.G.A.3, 8.F.B.4, 8.F.B.5	Lesson 20	8.G.C, 8.G.C.9
Lesson 9	7.G.B.6	Lesson 21	8.G.C.9
Lesson 10	7.G.A.3, 7.G.B.6	Lesson 22	7.G.A.2, 7.G.B.6
Lesson 11	8.G.C.9	Lesson 23	8.F.a, 8.G.C.9
Lesson 12	8.G.C.9		

Essential Question(s):

- What is a mathematical function, and how is it represented in different ways?
- How are the volume formulas for cylinders, cones, and spheres related?
- How does changing dimensions affect the volume of a three-dimensional object?

Enduring Understanding(s):

- A function is a relationship where each input determines exactly one output; it can be represented by a rule, a table, a graph, or an equation
- The volumes of cylinders, cones, and spheres with the same radius and height follow a 3:1:2 ratio; for example, a cone's volume is exactly ⅓ of a cylinder with the same dimensions
- Volume is a function of a solid's dimensions; while scaling height results in a proportional change in volume, scaling the radius results in a non-proportional change because the radius is squared or cubed in the volume formula

Demonstration of Learning:

CFA 1: Checkpoint A (after lesson 7)
MoU: Assessment A (after lesson 7)
CFA 2: Checkpoint B (after lesson 14)
CFA 3: Checkpoint C (after lesson 21)
EoU: Assessment A (after lesson 21)

Pacing for Unit

17 days

Lesson Modifications:

- Covering Lessons 1-21
- Combine Lessons 1&2, 3&4
- Omit Lesson 5 (optional)
- Optional lessons: 5 (Lessons 14, 17, 18, 22, and 23)
- 4 days for review/assessment
- 3 flex days

Family Overview

https://accessim.org/6-8-accelerated/accelerated-7/unit-6?a=family

Integration of Technology:

- Desmos Online Graphing Calculator
- Pear Assessment (Edulastic)
- iM v.360 Digital Applets (see below)

Unit-specific Vocabulary:

	New Terminology	
Lesson	receptive	productive
Acc7.6.1	input output	
Acc7.6.2	function	input output depends on
Acc7.6.3	independent variable	

Aligned Unit Materials, Resources, and Technology

Digital Applets

- 6.1 Guess My Rule
- 6.5 Sketching a Story about a Boy and a Bike
- 6.6 Comparing Volumes
- 6.7 Shadows
- 6.8 Drawing cross Sections
- 6.9 Finding Volume with Cubes, Can You Find Volume?
- 6.18 Playing with Cones

Provide access as needed throughout the unit:

	dependent variable radius	
Acc7.6.4	prediction	
Acc7.6.6	volume cube	
Acc7.6.7	functional relationship linear function mathematical model	function prediction
Acc7.6.8	cross section base (of a prism or pyramid) vertex (of a pyramid) face	prism pyramid perpendicular
Acc7.6.9		volume cross section base (of a prism or pyramid)
Acc7.6.11	cylinder three-dimensional base (of a cylinder or cone) approximation for π	radius
Acc7.6.12	dimension	base (of a cylinder or cone) cylinder
Acc7.6.13		surface area face
Acc7.6.16		cone
Acc7.6.19	hemisphere	
Acc7.6.20		sphere
Acc7.6.21	spherical	
Acc7.6.22	approximate range	

- Colored pencils
- Compasses
- Fruits or vegetables
- Geometry toolkits
- Knife
- Math Community Chart
- Paint
- Rulers marked with centimeters
- Snap cubes
- Spherical objects
- Straightedges
- Tools for creating a visual display

Lesson	Materials to Gather	Materials to Copy
1		Guess My Rule Cards (1 copy for every 4 students): Activity 2
5	Tools for creating a visual display: Activity 3	
6	Math Community Chart: Lesson	
8	• Fruits or vegetables: Activity 2 • Knife: Activity 2 • Paint: Activity 2	Cross Sections Cards (1 copy for every 3 students): Activity 3
9	• Snap cubes: Activity 2 • Rulers marked with centimeters: Activity 3	• Finding Volume with Cubes Handout (1 copy for every 6 students): Activity 2 • Can You Find the Volume Cutouts (1 copy for every 18 students): Activity 3
11	Colored pencils: Activity 3	
13		Multifaceted Cutouts (1 copy for every 30 students): Activity 1, Activity 2
14		Surface Area or Volume Cards (1 copy for every 2 students): Activity 4
19	Spherical objects: Activity 3	
21	• Tools for creating a visual display: Lesson • Math Community Chart: Activity 3	Unknown Dimensions Cards (1 copy for every 4 students): Activity 3
22	• Compasses: Activity 2 • Geometry toolkits: Activity 2, Activity 3 • Rulers marked with centimeters: Activity 2, Activity 3	
23	Straightedges: Activity 3	

Opportunities for Interdisciplinary Connections:

Physical Science: Students collect data to determine how the height of water is a function of volume when filling graduated cylinders

Anticipated misconceptions:

Dividing by Zero: Students may struggle to understand why a function has "no output" when a rule requires division by zero

See teacher's guide for specific misconceptions aligned to each lesson.

Connections to Prior Units:	**Connections to Future Units:**
Essential prior concepts to engage with this unit: • Variables representing quantities (Grade 6–7 Units 3–5) • Relationships between quantities (Grade 6, Unit 5 preview; Grade 7 Unit 5) • Tables, graphs, and equations as representations (Grade 6–7 Unit 5) • Measuring lengths with tools (Grades K–5) • Perimeter and area formulas (Grades 3–5) • Area of rectangles, triangles (Grades 3–6) • Recognizing 2D and 3D shapes (Grades K–5) • Understanding nets and surface area (Grade 6, Accelerated 6) • Volume of rectangular prisms (Grade 6, Accelerated 6) Understanding cylinders, cones, circles (Grade 7) • Multiplying with fractions and decimals (Grades 5–6, Accelerated 6) • Visualizing how 3D figures are built from 2D cross-sections (Grade 7 Unit 1, informally in earlier grades) **Relevant Unit(s)/Lesson(s) to Review:** • Start with the volume of rectangular prisms, this is foundational. Then review area formulas for circles since cylinder and cone volumes depend on this. • If students lack fluency with fraction and decimal operations, spend time on this before the unit; otherwise, arithmetic errors will mask conceptual understanding. • Visual 3D geometry work (naming shapes, recognizing cylinders vs. cones vs. spheres) should also be automatic.	Prepares students to study nonlinear relationships and how volume changes as dimensions increase

Differentiation through *Universal Design for Learning*

Engagement:

- Differentiate by having students complete only two lines of a table at a time before assessing comprehension (Lesson 16, Activity 2 Launch)
  LT6: Calculate the value of one dimension of a cone

Representation:

- Use color coding to highlight connections between temperatures for different cities that occurred at the same time (Lesson 6, Activity 1 Launch)
  LT3: Interpret multiple representations of functions

Action & Expression:

- Invite students to verbalize their strategy for completing a table quietly to themselves or a partner (Lesson 23, Activity 1 Launch)
  LT1: Comprehend the structure of a function

Supporting Multilingual Learners

Math Language Routines

The Illustrative Mathematics curriculum incorporates eight Mathematical Language Routines (MLRs) that support English Language Learners:

MLR1: *Stronger and Clearer Each Time* - Students revise and refine their mathematical language through multiple drafts
MLR2: *Collect and Display* - Students capture and organize language in visual displays
MLR3: *Clarify, Critique, Correct* - Students analyze mathematical writing/talk
MLR4: *Information Gap* - Students share information to solve problems
MLR5: *Co-Craft Questions* - Students create and improve questions
MLR6: *Three Reads* - Students analyze complex mathematical text
MLR7: *Compare and Connect* - Students connect different mathematical representations
MLR8: *Discussion Supports* - Students participate in mathematical discussions

In this unit:

- MLR2: Collect and Display (Lessons 2, 6, 8, 13)
- MLR1: Stronger and Clearer Each Time (Lessons 2, 9, 12, 17, 23)
- MLR7: Compare and Connect (Lessons 1, 5, 10, 13, 14, 20)

Progression of Disciplinary Language

In this unit, teachers can anticipate students using language for mathematical purposes, such as comparing, explaining, and describing. Throughout the unit, students will benefit from routines designed to grow robust disciplinary language, both for their own sense-making and for building shared understanding with peers. Teachers can formatively assess how students are using language in these ways, particularly when students are using language to:

Describe

- Movements of figures (Lessons 1 and 2).
- Observations about transforming parallel lines (Lesson 8).
- Transformations using corresponding points, line segments, and angles (Lesson 9).
- Observations about angle measurements (Lesson 14).
- Transformations found in tessellations and in designs with rotational symmetry (Lesson 18).

Generalize

- About categories for movement (Lesson 2).
- About rotating line segments 180° (Lesson 7).
- About the relationship between vertical angles (Lesson 8).
- About transformations and congruence (Lesson 11).
- About corresponding segments and length (Lesson 11).
- About alternate interior angles (Lesson 12).
- About the sum of angles in a triangle (Lesson 14).
- About categories for unique triangles (Lesson 16).

Justify

- Whether or not rigid transformations could produce an image (Lesson 6).
- Whether or not shapes are congruent (Lesson 10).
- Whether or not polygons are congruent (Lesson 11).
- Whether or not triangles can be created from given angle measurements (Lesson 13).
- Whether or not measurements determine unique triangles (Lesson 17).

Sentence Frames and Stems

Section A

- The rule between the input and the output of the function is _____ because …
- If the input of the function is _____, then the output must be _____ because the rule is …
- The equation _____ represents a function because …
- The output of the function when the input is _____ is _____ because …
- To draw the graph of a function that represents _____, first I _____, then I …
- The graph represents a function because …
- In the piecewise function, the rate of change from _____ to _____ is _____.
- The rate of change from _____ to _____ means _____.
- From _____ to _____ on the graph, _____ increases/decreases, which means …
- The linear equation _____ can model the function because …

Section B

- The shape of the cross section is _____ because…
- The base area of the prism is _____ and the height is _____, so the volume of the prism is _____. I calculated it by …
- Figure _____ is/is not a prism because …
- The surface area of the prism is _____ . I calculated it by …
- In this situation, I need to find _____ (e.g. volume, base, surface area) because …
- I know the volume of the cylinder/cone is _____, and the radius of the base is _____, so the height must be _____ because …
- The volume of the cylinder is _____ because …
- The volume of the cone is _____ because …
- As the radius of the base increases by _____, the volume of the cylinder/cone increases by _____ because …

Section C

- I know the volume of the cylinder/cone is _____, and the radius of the base is _____, so the height must be _____ because …
- The volume of the cylinder is _____ because …
- The volume of the cone is _____ because …
- As the radius of the base increases by _____, the volume of the cylinder/cone increases by _____ because …
- When the radius of the _____ is changed by _____, the volume …
- The volume of the hemisphere is _____ because …
- The volume of the sphere is _____ because …

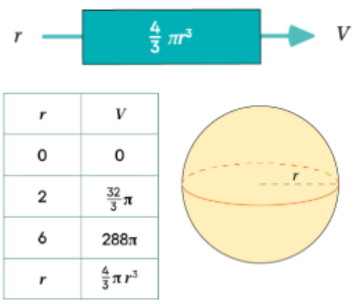
Section D

- The area of the triangle is _____.
- I chose this triangle because …
- The volume/surface area of my prism is _____.

- The volume of a sphere with radius _____ is _____ the volume of a sphere with radius _____ because …
- The _____ can hold the highest volume of water because …

Unit Outline

In this unit, students are formally introduced to the concept of a function as a relationship between "inputs" and "outputs" in which each allowable input determines exactly one output. Due to the ordering of units in IM 6–8 Math Accelerated v.360, students may have been exposed informally to function terminology earlier in this course.



r	V
0	0
2	$\frac{32}{3}\pi$
6	288π
r	$\frac{4}{3}\pi r^3$

First, students work with relationships that are familiar from previous grades or units (perimeter formulas, proportional relationships, linear relationships), expressing them as functions. They study the different ways functions can be represented, making connections between the representations and interpreting what they mean in context. The use of function notation is left for a future course.

Next, students analyze and describe cross-sections of prisms, pyramids, and polyhedra. They understand and use the formula for the volume of a right rectangular prism and solve problems involving area, surface area, and volume. Students should have access to their geometry toolkits so that they have an opportunity to select and use appropriate tools strategically.

Students build on their knowledge of the formula for the volume of a right rectangular prism, learning formulas for volumes of cylinders, cones, and spheres. Students express functional relationships described by these formulas as equations, focusing on situations involving proportional relationships. They use these relationships to reason about how the volume of a figure changes as one of its dimensions changes, transforming algebraic expressions to get the information they need. In future courses, students will continue this thinking as they study nonlinear relationships and question how, for example, the volume of a sphere changes as the radius increases.

Lesson Sequence	Learning Target(s)	Success Criteria/Assessment
Section A Representing and Interpreting Functions (Lessons 1-7)	**Learning Target #1:** Comprehend the structure of a function as having one and only one output for each allowable input. **Learning Target #2** Draw the graph of a function that represents a context, and explain which quantity is a function of which. **Learning Target #3** Interpret multiple representations of functions, including graphs, tables, and equations, and explain how to find information in each type of representation.	**Lesson 1 Inputs and Outputs** • I can write rules when I know input-output pairs. • I know how an input-output diagram represents a rule. **Lesson 2 Introduction to Functions** • I know that a function is a rule with exactly one output for each allowable input. • I know that if a rule has exactly one output for each allowable inpu then the output depends on the input. **Lesson 3 Equations for Functions** • I can find the output of a function when I know the input. • I can name the independent and dependent variables for a given function and represent the function with an equation. **Lesson 4 Graphs of Functions** • I can explain the story told by the graph of a function. • I can use a graph of a function to find the output for a given input and to find the input(s) for a given output. **Lesson 5 Even More Graphs of Functions** • I can draw the graph of a function that represents a real-world situation. **Lesson 6 Connecting Representations of Functions** • I can compare inputs and outputs of functions that are represent in different ways. **Lesson 7 Linear Functions and Models** • I can decide when a linear function is a good model for data and when it is not. • I can explain in my own words how the graph of a linear function relates to its rate of change and initial value. • I can use data points to model a linear function.
Checkpoint A	***Responding to Student Thinking*** • **Problem 1 & 2:** More Chances: Students will have more opportunities to develop this understanding later lessons. There is no need to slow down or add additional work to review this concept at this tim • **Problem 3:** Points to Emphasize: If most students struggle with drawing a graph of a function that represents a context, focus on this connection as opportunities arise. For example, in the practice problem referenced here, invite students to share their stories for each graph with a partner. ○ Accelerated 7, Unit 6, Lesson 9, Practice Problem 5	
Section B	**Learning Target #4**	**Lesson 8 Slicing Solids**

Prisms and Cylinders (Lessons 8-14)	Calculate the surface area and volume of a prism. **Learning Target #5** Calculate the volume of a cylinder.	● I can explain that when a three-dimensional figure is sliced it crea a face that is two dimensional. ● I can picture different cross-sections of prisms and pyramids **Lesson 9 Volume of Right Prisms** ● I can explain why the volume of a prism can be found by multiplyi the area of the base by the height of the prism. **Lesson 10 Decomposing Bases for Area** ● I can calculate the volume of a prism with a complicated base by decomposing the base into quadrilaterals or triangles. **Lesson 11 The Volume of a Cylinder** ● I can find the volume of a cylinder in mathematical and real-world situations. ● I know the formula for the volume of a cylinder. **Lesson 12 Finding Cylinder Dimensions** ● I can find missing information about a cylinder if I know its volum and some other information. **Lesson 13 Surface Area of Right Prisms** ● I can decide whether I need to find the surface area or the volum when solving a problem about a real-world situation. ● I can picture the net of a prism to help me calculate its surface ar **Lesson 14 Applying Volume and Surface Area** ● I can solve problems involving the volume and surface area of children's play structures.
Checkpoint B	***Responding to Student Thinking*** ● **Problem 1:** Press Pause: By this point in the unit, there should be some student mastery of finding surfa area and volume of prisms. If most students struggle, make time to revisit related work in the lesson referred to here. See the Course Guide for ideas to help students re-engage with earlier work. ○ Accelerated 7, Unit 6, Lesson 13 Surface Area of Right Prisms ● **Problem 2:** Points to Emphasize: If most students struggle with using the formula for volume of a cylind revisit this skill throughout the next section. For example, during the Activity Synthesis of the activity referred to here, invite 1–3 students to share how they calculated the volume of the cylinder. ○ Accelerated 7, Unit 6, Lesson 19, Activity 2 Estimating Hemispheres	
Section C Cones and Spheres (Lessons 15-21)	**Learning Target #6** Calculate the value of one dimension of a cone, and explain the reasoning. **Learning Target #7** Calculate the volume of a cone or sphere. **Learning Target #8** Solve problems involving cones, cylinders, and spheres.	**Lesson 15 The Volume of a Cone** ● I can find the volume of a cone in mathematical and real-world situations. ● I know the formula for the volume of a cone. **Lesson 16 Finding Cone Dimensions** ● I can find missing information about a cone if I know its volume ar some other information. **Lesson 17 Scaling One Dimension** ● I can create a graph of the relationship between volume and heig for all cylinders and cones with a fixed radius. ● I can explain in my own words why changing the height by a scale factor changes the volume by the same scale factor. **Lesson 18 Scaling Two Dimensions** ● I can create a graph representing the relationship between volum and radius for all cones (or cylinders) with a fixed height. ● I can explain in my own words why changing the radius by a scale factor changes the volume by the scale factor squared. **Lesson 19 Estimating a Hemisphere** ● I can estimate the volume of a hemisphere by calculating the volu of a shape I know is larger and the volume of a shape I know is smaller. **Lesson 20 The Volume of a Sphere** ● **I can find the volume of a sphere when I know the radius.** **Lesson 21 Cylinders, Cones, and Spheres** ● I can find the radius of a sphere if I know its volume. ● I can solve mathematical and real-world problems about the volu of cylinders, cones, and spheres.
Checkpoint C	***Responding to Student Thinking*** ● **Problem 1:** Points to Emphasize: If most students struggle with calculating the radius of the cone, focus this type of solving as opportunities arise. For example, in the Warm-up referred to here, invite students calculate the radius of the cone if the volume was 9π or 72π ($r=3$ or $r=6$).	

	○ Accelerated 7, Unit 6, Lesson 19, Warm-up Notice and Wonder: Two Shapes ● **Problem 2:** Press Pause: If most students struggle with using the formula for volume, make time to do some or all of this optional lesson: ○ Accelerated 7, Unit 6, Lesson 23 Volume as a Function of … ● **Problem 3:** Press Pause: If most students struggle with using formulas to order the four shapes by volu make time to do some or all of the optional lesson referred to here: ○ Accelerated 7, Unit 6, Lesson 23 Volume as a Function of ...	
Section D Let's Put it To Work (Lesson 19)	**No new learning targets**	**Lesson 22 Building Prisms** ● I can build a triangular prism from scratch. **Lesson 23 Volume as a Function of . . .** ● I can compare functions about volume represented in different ways.
End of Unit Assessment		