Course Title:	Content Area:	Grade Level:	Credit (if applicable)
Grade 3 Mathematics	Math	3	

Course Description:

The big ideas in grade 3 include: developing understanding of multiplication and division and strategies for multiplication and division within 100; developing understanding of fractions, especially unit fractions (fractions with numerator 1); developing understanding of the structure of rectangular arrays and of area; and describing and analyzing two-dimensional shapes.

Aligned Core Resources:	Connection to the *BPS Vision of the Graduate*
Illustrative Math 360	**Collaboration** ● Demonstrates ability to work effectively and respectfully with diverse teams ● Assume shared responsibility for collaborative work and value the individual contributions made by each team member **Communication** ● Articulates thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts ● Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions **Empathy** ● Listening with an open mind to understand others' situations. **Content Mastery** ● Develop and draw from a baseline understanding of knowledge in academic disciplines from our Bristol curriculum **Critical Thinking and Problem Solving** ● Collect, assess and analyze relevant information ● Reason effectively. Identify, define and solve authentic problems and essential questions ● Reflect critically on learning experience, processes and solutions ● Transfer knowledge to other situations
Additional Course Information: ***Knowledge/Skill Dependent courses/prerequisites***	**Link to *Completed Equity Audit***
N/A	Grade 3 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
Operations and Algebraic Thinking								
Represent and solve problems involving multiplication and division.								

3.OA.A.1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*	M							M
3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.				M				
3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	M			M		M		M
3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 =?	M			M				
Understand properties of multiplication and the relationship between multiplication and division.								
3.OA.B.5 Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)	M	M	M	M				
3.OA.B.6 Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.				M				M
Multiply and divide within 100.								
3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.				M				M
Solve problems involving the four operations, and identify and explain patterns in arithmetic.								

3.OA.D.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.			M	M			M	M
3.OA.D.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.	M	M	M	M				
Number and Operations in Base Ten								
Use place value understanding and properties of operations to perform multi-digit arithmetic.								
3.NBT.A.1 Use place value understanding to round whole numbers to the nearest 10 or 100.			A					
3.NBT.A.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.			A					A
3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.				A				
Number and Operations - Fractions								
Develop understanding of fractions as numbers.								
3.NF.A.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a part of size 1/b.					M			M
3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.					M			M
3.NF.A.2.A Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.					M	M		M
3.NF.A.2.B Represent a fraction a/b on a number line diagram by marking off a length 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.					M			M

3.NF.A.3.A Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.					M			M
3.NF.A.3.B Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.					M			M
3.NF.A.3.C Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.					M	M		M
3.NF.A.3.D Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.					M			M
Measurement and Data								
Solve problems involving measurement and estimation.								
3.MD.A.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.						M		
3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).1 Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.						M		
Represent and interpret data.								
3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.	S							S
3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.						S		S

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.								
3.MD.C.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.		M						
3.MD.C.5.A A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.		M						
3.MD.C.5.B A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.		M						
3.MD.C.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).		M						
3.MD.C.7 Relate area to the operations of multiplication and addition.		M		M				
3.MD.C.7.A Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.		M		M				
3.MD.C.7.B Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.		M						M
3.MD.C.7.C Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.				M				
3.MD.C.7.D Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.		M						M
Geometric measurement: recognize perimeter.								
3.MD.D.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters							A	A
Geometry								
Reason with shapes and their attributes.								

3.G.A.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.							S	S
3.G.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.					S			

Unit Links

Unit 1: Introducing Multiplication
Unit 2: Area and Multiplication
Unit 3: Wrapping Up 1,000
Unit 4: Relating Multiplication to Division
Unit 5: Fractions as Numbers
Unit 6: Measuring Length, Time, Liquid Volume and Weight
Unit 7: Two-dimensional Shapes and Perimeter

Unit Title:

Unit 1: Introducing Multiplication

Relevant Standards: Bold indicates priority

3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*

3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?

3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.B.5: Apply properties of operations as strategies to multiply and divide.2 Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)

3.OA.D.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

Essential Question(s):	**Enduring Understanding(s):**
• Why do we collect, organize, represent and analyze data? • What are the different types of multiplication and division problems? • How can we show mathematical situations in word problems?	• We collect, organize, represent, and analyze data in order to answer a question or solve a problem. • The key of a picture graph tells how many items each picture or symbol represents. • A scaled graph (bar graph or line plot) is labeled using equal-sized intervals along the axes. • The scale of a bar graph varies depending on the data set. • Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems. • The order of numbers in multiplication does not change the product. • Numbers can be regrouped in a multiplication problem without changing the product. • In multiplication, one factor can be decomposed into parts; each part is multiplied separately by the other factor, then the results are added. • Identifying and describing generalizations about patterns can help us understand a variety of numerical concepts.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	28 days (20 required lessons, 6 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
3.1 Unit Launch: Family Support Video 3.1 Family Support Materials (all languages)	*Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning*
Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology**

			(beyond core resources):
equal	equal groups	equation	ST Math District - approved online resources
multiplication	expression	factors	
multiply	product	interpret	
array	rows	columns	
variable/ unknown	expression	determine	
Commutative property	Distributive property	Associative property	
fluently	pattern	Bar graph	
picture graph	key	scaled bar graph	
scaled picture graph	Multiplication Symbol	Related Facts	

Opportunities for Interdisciplinary Connections:	**Anticipated Misconceptions:**
Science • Unit 1: bar graphs and using multiplication to calculate force Social Studies • Units 1-3: Gathering data from maps	Although intervals on a bar graph are not in single units, students sometimes count each square as one. To avoid this error, have students include tick marks between each interval. Students should begin each scale with 0. They should think of skip-counting when determining the value of a bar since the scale is not in single units. Students get confused when thinking about the number of groups and the number in each group. They may have trouble identifying this information in a problem situation (which number represents the total number of groups and/or the number of items in each group). Students add the two numbers without thinking about the equal groups that the numbers represent.
Connections to Prior Units:	**Connections to Future Units:**
Grade 2 Unit 1 and Unit 8	Grade 3 Unit 4 Grade 4 Unit 1
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Welcoming Interests & Identities • Optimize relevance, value and authenticity (7.2) • Nurture joy and play (7.3)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Perception • Support multiple ways to perceive information (1.2) **Expression & Communication** • Use multiple tools for construction, composition and creativity (5.2) **Language & Symbols** • Clarify vocabulary, symbols, and language structures (2.1)	

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Goals:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (2-3.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (2-3.4) • **analyze** and **critique** the arguments of others orally and in writing.(2-3.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (2-3.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	**Learning Target & Success Criteria**	**Assessment/ Resources**
Unit 1 Planning Map		
Section A	I can interpret scaled graphs. ☐ Represent data using bar graphs and picture graphs. ☐ Solve one- and two-step comparison problems using addition and subtraction within 20. ☐ Generate questions about the data in scaled bar graphs or picture graphs. ☐ Represent data with scaled picture graphs or scaled bar graphs. ☐ Choose an appropriate scale for a bar graph that represents a given data set. ☐ Solve one-step comparison problems within 100, based on the data presented in scaled bar graphs or scaled picture graphs.	Cool downs Section Checkpoints Practice problems
Section B	I can represent and solve multiplication problems. I can find the unknown number in a multiplication equation. ☐ Represent a situation involving equal groups with a picture or diagram. ☐ Write multiplication expressions to represent situations and diagrams involving equal groups. ☐ Write equations for multiplication situations and diagrams using a symbol for the unknown number. ☐ Solve multiplication problems involving equal groups.	
Section C	I can represent and solve multiplication problems. I can find the unknown number in a multiplication equation.	

	☐ Build and draw arrays and describe them in terms of multiplication. ☐ Interpret arrays as equal groups in each row or column. ☐ Represent multiplication situations with arrays and multiplication expressions. ☐ Use an equation with a symbol for the unknown to represent an array. ☐ Solve multiplication problems involving arrays. ☐ Describe the commutative property of multiplication using arrays.	

Unit Title:
Unit 2: Area and Multiplication
Relevant Standards: Bold indicates priority
3.MD.C.5: Recognize area as an attribute of plane figures and understand concepts of area measurement. **3.MD.C.5.A: A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.** **3.MD.C.5.B: A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.** **3.MD.C.6: Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).** **3.MD.C.7: Relate area to the operations of multiplication and addition.** **3.MD.C.7.a: Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.** **3.MD.C.7.b: Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.** **3.MD.C.7.c: Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.** **3.MD.C.7.d: Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.** **3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*** **3.OA.B.5: Apply properties of operations as strategies to multiply and divide.2 Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)** 3.OA.D.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends. 3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

<table>
<tr><th>Essential Question(s):</th><th>Enduring Understanding(s):</th></tr>
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- What are we measuring when we find area?
- What are the different types of multiplication problems?
- How can we show mathematical situations in word problems?

</td><td>

- Area is an attribute of plane figures that is measured using square units.
- Area is found by covering the inside of a two-dimensional plane figure with square units without gaps or overlap and then counting the number of square units used.
- The area of a rectangle can be found by multiplying the lengths of two adjacent sides of the rectangle.
- The area of a rectangle can be found by being decomposed into two rectangular parts; finding the areas of the two smaller rectangles; and then adding the two smaller areas to find the total area.
- A figure composed of rectangles may be decomposed into rectangles whose areas may be added to find the area of the figure.
- Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems.
- The order of numbers in a multiplication problem does not change the product.
- Numbers can be regrouped in a multiplication problem without changing the product.
- In multiplication, one factor can be decomposed into parts; each part is multiplied separately by the other factor, then the results are added.
- Identifying and describing generalizations about patterns can help us understand a variety of numerical concepts.
- Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic.

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<tr><th>Demonstration of Learning:</th><th>Pacing for Unit</th></tr>
<tr><td>Checkpoints
Cool Downs
Unit Assessments</td><td>20 days (14 required lessons, 4 flex, 2 assessment and reaction)</td></tr>
<tr><th>Family Overview (link below)</th><th>Integration of Technology:</th></tr>
<tr><td>3.2 Unit Launch: Family Support Video
3.2 Family Support Materials (all languages)</td><td>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning.</td></tr>
<tr><th>Unit-specific Vocabulary:</th><th>Aligned Unit Materials, Resources, and Technology (beyond core resources):</th></tr>
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area	square unit	figure

</td><td>ST Math
District - approved online resources</td></tr>
</table>

attribute	square centimeter	square foot
square inch	square meter	side lengths
interpret	tiling	Formula
decompose	Distributive property	equal groups
multiplication	expression	factors
product	interpret	Commutative property
Associative property	place value	hundreds
tens	ones	identify
property	digit	algorithm
sum	difference	addends
Pattern	Identity Property	Strategy

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
Social Studies - Unit 2 Territories and Maps	Students may not completely cover a shape with unit squares but may instead only put squares around the border of the shape. Students may not count all of the squares that cover the shape or may incorrectly count them (for example, double count a corner square). Students may think area is a linear measurement. Pose problem situations that require students to explain why area is measured in square units.
Connections to Prior Units:	**Connections to Future Units:**
Grade 2 Units 3 and 8	Grade 3 Unit 7

Differentiation through *Universal Design for Learning*

UDL Indicator	**Teacher Actions:**
Sustaining Effort & Persistence ● Foster collaboration, interdependence and collective learning (8.3) **Building Knowledge** ● Connect prior knowledge to new learning (3.1) ● Maximize transfer and generalization	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Strategy Development • Anticipate and plan for challenges (6.2)	
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (2-3.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (2-3.4) • **analyze** and **critique** the arguments of others orally and in writing.(2-3.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (2-3.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	**Learning Target & Success Criteria**	**Assessment/ Resources**
Unit 2 Planning Map		
Section A	I can measure the area of rectangles by counting unit squares. ☐ Build shapes with unit squares. ☐ Use unit squares to measure area. ☐ Filled with unit squares without gaps or overlaps ☐ Explain that different rectangles can have the same area. ☐ Describe and represent the area of a rectangle as the total number of unit squares arranged in rows and columns.	Cool downs Section Checkpoints Practice problems
Section B	I can find the area of a rectangle by multiplying the side lengths. ☐ Find the area of rectangles by relating area to multiplication. ☐ Use square inches and square centimeters to measure the area of a rectangle. ☐ Use square feet and square meters to measure the area of a rectangle. ☐ Find the area of rectangles by measuring and multiplying the side lengths. I can represent and solve multiplication problems. ☐ Solve real-world and mathematical problems involving area.	
Section C	I can find the area of a figure composed of rectangles. ☐ Understand that we can find the total area by adding up smaller areas. ☐ Calculate the area of figures made of rectangles using multiplication and addition. ☐ Calculate the area of figures with missing side lengths.	

Unit Title:
Unit 3: Wrapping Up 1,000
Relevant Standards: Bold indicates priority
3.OA.B.5: Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) **3.OA.D.8: Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.** **3.OA.D.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.** 3.NBT.A.1: Use place value understanding to round whole numbers to the nearest 10 or 100. **3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.**

Essential Question(s):	**Enduring Understanding(s):**
• How can understanding place value help us? • How do the properties of operations make computation simpler? • How do we decide what operation to use when solving a real-world problem? • How can we show mathematical situations in word problems?	• Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic. • The unknown in a problem can be represented with a symbol. • Problems may have more than one step needed in order to find a solution. • Rounding can be used to assess the reasonableness of answers. • Identifying and describing generalizations about patterns can help us understand a variety of numerical concepts. • Understanding place value enables us to round numbers and perform computations. • Rounding helps solve problems mentally and assess the reasonableness of an answer. • Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs	Unit Pacing: 27 days (20 required lessons, 5 flex, 2 assessment and reaction)

Unit Assessments

Family Overview (link below)

3.3 Unit Launch: Family Support Video
3.3 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:

parentheses	Associative property	Commutative property
Identity property	Distributive property	round
place value	tens place	hundreds place
ones place	hundreds	tens
ones	variable/ unknown	equation
algorithm	estimate	rounding
addends	sum	pattern
digit	strategy	sum
difference		

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

ST Math
District - approved online resources

Opportunities for Interdisciplinary Connections:

Science - Unit 3
- Monarch Butterfly Population Estimation

Anticipated misconceptions:

Students may think that a symbol used to represent a number once cannot be used to represent another number in a different problem/situation. Presenting students with multiple situations in which they select the symbol and explain what it represents will counter this misconception.

The use of terms like “round up” and “round down” confuses many students. For example, the number 37 would round to 40 or they say it “rounds up”. The digit in the tens place is changed from 3 to 4 (rounds up). This misconception is what causes the problem when applied to rounding down. The number 32 should be rounded (down) to 30, but using the logic mentioned for rounding up, some
students may look at the digit in the tens place and take it to the previous number, resulting in the incorrect value of 20. To remedy this misconception, students need to use a number line to visualize the placement of the number and/or ask questions such as: “What tens

	are 32 between and which one is it closer to?" Developing the understanding of what the answer choices are before rounding can alleviate much of the misconception and confusion related to rounding. 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 place value so they would think 561 – 147 = 426, because they subtract the 7 in 147 from the 1 in 561 instead of regrouping. Students may attend to "key words" in problem situations rather than focusing on the structure of the problem and making sense of the situation.
Connections to Prior Units:	**Connections to Future Units:**
Grade 2 Units 5 and 7	Grade 4 Unit 4
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Building Knowledge • Connect prior knowledge to new learning (3.1) **Expression & Communication** • Build fluencies with graduated support for practice and performance (5.3) **Perception** • Support multiple ways to perceive information (1.2)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (2-3.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (2-3.4) • **analyze** and **critique** the arguments of others orally and in writing.(2-3.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (2-3.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources

Unit 3 Planning Map		
Section A	I can fluently add within 1,000 using a variety of strategies. ☐ Represent numbers to 1,000 in different ways using place value understanding. ☐ Relate base-ten diagrams to written algorithms for addition. ☐ Relate written algorithms to each other using place value understanding. ☐ Add within 1,000 using an algorithm or strategy.	Cool downs Section Checkpoints Practice problems
Section B	I can fluently subtract within 1,000 using a variety of strategies. ☐ Represent numbers to 1,000 in different ways using place value understanding. ☐ Relate base-ten diagrams to written algorithms for subtraction. ☐ Relate written algorithms to each other using place value understanding. ☐ Subtract within 1,000 using an algorithm or strategy.	
Section C	I can round whole numbers to the nearest multiple of 10 and 100. ☐ Identify the closest multiples of 10 and 100 for numbers within 1,000. ☐ Recognize and generalize patterns in the rounding of whole numbers within 1,000.	
Section D	I can represent and solve a variety of word problems. ☐ Estimate answers using strategies including rounding. ☐ Solve two-step word problems using addition and subtraction. ☐ Relate diagrams and equations to two-step word problems. ☐ Represent and solve two-step word problems using equations with a letter standing for the unknown quantity.	

Unit Title:
Unit 4: Relating Multiplication to Division
Relevant Standards: Bold indicates priority
3.OA.A.2: Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. **3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.** **3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?** **3.OA.B.5: Apply properties of operations as strategies to multiply and divide.2 Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)** **3.OA.B.6: Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.** **3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.** **3.OA.D.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.** 3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. 3.NBT.A.3: Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations. 3.MD.C.7.c Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.

Essential Question(s):	**Enduring Understanding(s):**
• What are the different types of multiplication and division problems?	• Division situations include fair sharing (partitive) and repeated subtraction (quotative).

• How is division related to multiplication? • What are some strategies for helping learn multiplication and division facts? • How do we decide what operation to use when solving a real-world problem? • How can we show mathematical situations in word problems?	• Division is related to subtraction, so 56 ÷ 8 can be solved by subtracting 8 until you reach zero or have less than 8 left. • Division is related to multiplication. • The unknown in a problem can be represented with a symbol. • Real-world mathematical situations can be represented using drawings and equations. • Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems. • The unknown in a problem can occur in any position within the equation and must make that equation true. • The order of numbers in multiplication does not change the product. • Numbers can be regrouped in a multiplication problem without changing the product. • In multiplication, one factor can be decomposed into parts; each part is multiplied separately by the other factor, then the results are added. • Understand that the inverse, or opposite of division is multiplication, therefore the answer to 24 ÷ 8 can be found by solving 8 × = 24. • There is an inverse relationship between multiplication and division that can help us learn our multiplication and division facts. (I.e Knowing that 8 x 3 = 24 helps us know the answer to 24 ÷ 8 is 3). • Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic. • Place value understanding and properties of operations can help us to multiply a one-digit number by multiples of 10. • The area of a rectangle can be found by being decomposed into two rectangular parts; finding the areas of the two smaller rectangles; and then adding the two smaller areas to find the total area.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	34 days (21 required lessons, 11 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
3.4 Unit Launch: Family Support Video 3.4 Family Support Materials (all languages)	*Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning*
Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology**

			(beyond core resources):
equation	divide	division sentence	ST Math District - approved online resources
quotient	equal	determine	
array	rows	columns	
factors	product	variable/ unknown	
solve	multiplication	multiplication expression	
multiplication symbol	Commutative property	place value	
hundreds	tens	ones	
Identity property	digit	algorithm	
strategy	sum	difference	
expression	Tiling	describe	
represent	Associative property	Distributive property	
apply	relate	dividend	
divisor	quotient	relationship	
inverse	Addends	related facts	
fluently	multiply	multiple	
place value	area	side lengths	
Square unit	formula	decompose	

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
ELA Unit 3 - Exploring Different Point of Views and Strategies to Solve	Students may not know if the problem represents a subtraction situation or division situation. They also may not reason correctly about the type of division in a given situation. Some division situations give the number of groups and some give the number in each group. The student sees multiplication and division as discrete and separate operations. Ex: Student has reasonable facility with multiplication facts but cannot master

	division facts. He may know that 6 × 7 = 42 but fails to realize that this fact also tells him that 42 ÷ 7 = 6. Students may think that 3 ÷ 15 = 5 and 15 ÷ 3 = 5 are the same equations. The use of models is essential in helping students eliminate this misunderstanding. Students may not know that 5 x 20 is the same amount as 20 x 5. Students may have difficulty seeing that each arrangement can be rotated to show the commutative property. Students think a symbol (? or) is always the place for the answer. This is especially true when the problem is written as 15 ÷ 3 =? or 15 = x 3. Students also think that 3 ÷ 15 = 5 and 15 ÷ 3 = 5 are the same equations. The use of models is essential in helping students eliminate this understanding. Students may not attend to place value when multiplying large numbers. Avoid teaching tricks such as "adding zeros."For true understanding students need to understand and be able to explain the place value reasoning. Stating that you are "adding zeros" teaches many misconceptions. When multiplying 5 x 40, students multiply 5 groups of 4 and get the answer of 20. This may lead to confusion because the product of the single digit number already ends in zero and they fail to notice that it represents 20 tens. Be sure to go back to the place value language. 5 groups of 4 is 20 therefore, 5 groups of 4 tens would be 20 tens. 20 tens is the same as 200.
Connections to Prior Units:	**Connections to Future Units:**
Grade 2 Unit 8 Grade 3 Unit 1	Grade 4 Unit 6
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Welcoming Interests & Identities • Nurture joy and play (7.3) **Expression & Communication** • Build fluencies with graduated support for practice and performance (5.3) • Address biases related to modes of expression and communication (5.4) **Perception** • Support multiple ways to perceive information (1.2) **Language & Symbols** • Clarify vocabulary, symbols, and language structures (2.1)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (2-3.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (2-3.4) • **analyze** and **critique** the arguments of others orally and in writing.(2-3.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (2-3.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 4 Planning Map		
Section A	I can represent and solve division problems. ☐ Interpret and relate drawings and descriptions of division situations. ☐ Understand that a division situation may involve finding an unknown number of groups or objects in each group. ☐ Solve "how many groups?" and "how many in each group?" problems. ☐ Interpret division expressions. ☐ Write division expressions to represent division situations.	Cool downs Section Checkpoints Practice problems
Section B	I can represent and solve multiplication and division problems using properties of operations. ☐ Explain the relationship between multiplication and division equations. ☐ Interpret division equations as multiplication equations with a missing factor. ☐ Represent situations using multiplication and division equations with a symbol for the unknown quantity. ☐ Recognize that I can multiply factors in any order. ☐ Use area diagrams to show the Associative and Distributive properties of multiplication. I can use patterns in multiplication to solve unknown facts. ☐ Identify patterns in the multiplication table and use them to find unknown multiplication facts. ☐ Explain patterns in the multiplication table.	
Section C	I can represent and solve multiplication problems using properties of operations. ☐ Multiply one-digit whole numbers by multiples of 10 using place value strategies. ☐ Multiply within 100, where one factor is a teen number.	

	☐ Multiply within 100, where one factor is greater than 20. I can represent and solve a variety of word problems. ☐ Represent two-step word problems using equations with a letter standing for the unknown quantity. ☐ Solve two-step word problems using the four operations.	
Section D	I can represent and solve division problems using properties of operations. ☐ Solve “how many groups?” and “how many in each group?” problems with larger numbers. ☐ Use base-ten blocks to represent division where the quotient is more than 10. ☐ Divide within 100 using place value strategies. I can represent and solve a variety of word problems. ☐ Represent two-step word problems using equations with a letter standing for the unknown quantity. ☐ Solve two-step word problems using the four operations.	

Unit Title:
Unit 5: Fractions as Numbers
Relevant Standards: Bold indicates priority
3.NF.A.1: Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a part of size 1/b. **3.NF.A.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram.** **3.NF.A.2.A: Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.** **3.NF.A.2.B: Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.** **3.NF.A.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size** **3.NF.A.3.A: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.** **3.NF.A.3.B: Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.** **3.NF.A.3.C: Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.** **3.NF.A.3.D: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.** 3.MD.B.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters. 3.G.A.2: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.

Essential Question(s):	**Enduring Understanding(s):**
• How are the numerator and denominator related in a fraction? • How does the size of equal parts relate to the	• A fraction is a number showing a relationship between the parts and the whole. • Fractional parts have names that tell how many

number of equal parts of a whole? • When is one-half not equal to one-half? • What are equivalent fractions? • What do you have to think about when comparing fractions? • How does partitioning help us reason about shapes?	parts of a size are needed to make the whole (3 parts – thirds; 4 parts – fourths, etc.). • Fractional parts can be described with words and symbols. • Fractions can be represented with visual models such as rectangular area models, arrays, and length models including number lines. • The numerator tells the count of the number of equal parts and the denominator tells the number of equal parts in the whole. • As the number of equal parts of the whole increases, the size of the equal parts decreases and vice versa. • The size of the fractional part is relative to the whole. One-half is not equal to one-half when the whole is a different size (e.g. ½ of a small pizza vs. ½ of a large pizza). • On a number line, the size of the part is measured by the distance from zero to the numbered point. • A unit fraction represents one piece of the equal-sized pieces that make a whole (1/2 , 1/3 , 1/4 , 1/6 , 1/8). • A unit fraction is the building block for fractions just as 1 is the building block for whole numbers. • Equivalent fractions use different sized fractional parts to describe the same amount, e.g., 1/2 = 2/4 . • Two fractions are equivalent (equal) if they are the same size or the same point on a number line. • Two fractions can be compared when the two fractions refer to the same whole. • Comparing two fractions requires thinking about the size of the parts (denominator) and the number of the parts (numerator). • Length measurement data can be generated and used to create a line plot. • The scale of a line plot can be whole numbers or fractions such as halves, or fourths (quarters). • Partitioning a shape into equal parts in more than one way can help us see that equal parts can look different, but have the same area. • When shapes are partitioned into equal areas, the area of each part is the unit fraction of the whole.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	29 days (17 required lessons, 10 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
3.5 Unit Launch: Family Support Video	*Intentionally aligned use of digital tools and resources*

3.5 Family Support Materials (all languages)	*to support acquisition of content, researching, organizing and communicating learning*

Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology (beyond core resources):**

numerator	denominator	fraction
unit fraction	whole	part
partition	unit fraction	number line
interval	partition	distance
units		plot
equivalent	equivalent fraction	whole
whole number	equal	compare
greater than >	less than <	Equal to =
line plot	halves	fourths
quarters	data	area

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Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**

Science - Unit 3
- Climate Zones on Maps - Relate the Zone to the Whole World (Fraction to Whole)

Students may not understand that fractional parts are equal parts. In order to be thirds, for example, there can't just be 3 pieces, there have to be 3 equal pieces. Students may be confused by the idea that the denominator (the bottom number) represents how many equal pieces are in the whole or set and the numerator (the top number) represents how many of those equal pieces you have.

Students may draw lines on a shape to partition it into parts, but those parts may not be equal. Just because a shape has been partitioned into 3 parts it does not mean that those parts represent thirds.

Students may not realize that shapes partitioned into equal parts can look different, but have the same area.

Students only think of fractions as a rectangle or circle partitioned into equal parts rather than as numbers at distinct points on the number line. Students may not understand that you count fractions just like you count whole numbers and that the size of the piece doesn't change as you count them. Therefore, when we could fourths we count 1/4, 2/4, 3/4, 4/4 and so on. The unit

	fraction represents the size of the pieces you are counting. Students try to apply whole number understanding when comparing fractions, for example they think that eighths are larger than fourths because 8 is more than 4. Similarly, students may think that 4/8 is more than 2/4 because 8 is bigger than 4 and 4 is bigger than 2.
Connections to Prior Units:	**Connections to Future Units:**
Grade 2 Units 4, 5, and 6	Grade 4 Units 2, 3 and 4
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Building Knowledge • Highlight and explore patterns, critical features, big ideas and relationships (3.2) • Cultivate multiple ways of knowing and making meaning (3.3) • Maximize transfer and generalization (3.4) **Expression & Communication** • Use multiple tools for construction, composition and creativity (5.2) **Language & Symbols** • Clarify vocabulary, symbols, and language structures (2.1)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (2-3.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (2-3.4) • **analyze** and **critique** the arguments of others orally and in writing.(2-3.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (2-3.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 5 Planning Map		
Section A	I can represent fractions using a variety of models and explain my reasoning. ☐ Name parts of a whole. ☐ Use fractions to describe parts.	

	☐ Understand that a unit fraction describes one of the equal-size parts. ☐ Build non-unit fractions and whole numbers from unit fractions.	Cool downs Section Checkpoints Practice problems
Section B	I can partition and label a number line with even intervals representing fractions. ☐ Equally partition a number line for a given denominator. ☐ Locate fractions on the number line, including fractions greater than 1. ☐ Locate whole numbers on the number line given the location of a fraction. ☐ Write and represent whole numbers as fractions.	
Section C	I can generate and explain equivalent fractions using a variety of models. ☐ Identify equivalent fractions using models or diagrams. ☐ Use diagrams or number lines to show that two fractions are equivalent. ☐ Understand that equivalent fractions refer to the same whole. ☐ Write and represent fractions that are equivalent to whole numbers.	
Section D	I can compare two fractions with the same numerator or denominator and justify my reasoning. ☐ Use diagrams, number lines, or the meaning of the numerator and denominator to compare two fractions. ☐ Use the symbols >, =, or < to compare two fractions.	

Unit Title:
Unit 6: Measuring Length, Time, Liquid Volume and Weight
Relevant Standards: Bold indicates priority
3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. **3.OA.C.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.** 3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. **3.NF.A.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a part of size 1/b.**

3.NF.A.3.c: Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.

3.MD.A.1: Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

3.MD.A.2: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).1 Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

3.MD.B.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.

Essential Question(s):	**Enduring Understanding(s):**
• Why is it useful to know about time? • Why is measurement useful? • What are we measuring when we find liquid volume or mass? • How do we estimate the measurement of an object? • Why do we collect, organize, represent and analyze data?	• Division situations include fair sharing (partitive) and repeated subtraction (quotative). • The unknown in a problem can be represented with a symbol. • Real-world mathematical situations can be represented using drawings and equations. • There is an inverse relationship between multiplication and division that can help us learn our multiplication and division facts. (I.e Knowing that 8 x 3 = 24 helps us know the answer to 24 ÷ 8 is 3). • Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic. • A fraction is a number showing a relationship between the parts and the whole. • Fractional parts have names that tell how many parts of a size are needed to make the whole (3 parts – thirds; 4 parts – fourths, etc.). • Fractional parts can be described with words and symbols • Fractions can be represented with visual models such as rectangular area models, arrays, and length models including number lines. • The numerator tells the count of the number of equal parts and the denominator tells the number of equal parts in the whole. • As the number of equal parts of the whole increases, the size of the equal parts decreases and vice versa. • The size of the fractional part is relative to the whole. One-half is not equal to one-half when the wholes are different sizes (e.g. ½ of a small

<table>
<tr><td></td><td>pizza vs. ½ of a large pizza).
• Equivalent fractions use different sized fractional parts to describe the same amount, e.g., 1/2 = 2/4 .
• Two fractions are equivalent (equal) if they are the same size or the same point on a number line.
• Time is measured in hours and minutes.
• Time can be measured to the nearest minute.
• Elapsed time measures the duration of an event.
• Being able to tell time and find elapsed time is useful for making plans and schedules and determining how long an event lasts.
• Measurement allows us to tell how many standard units of an attribute an item has and solve problems with the quantities.
• Liquid volume and mass tell us how much matter in a three-dimensional space.
• We estimate the measurement of an object by comparing the object to personal referents or easy-to-use “benchmark” units.
• Mass and liquid volume word problems are solved using whole number strategies.
• Length measurement data can be generated and used to create a line plot.
• The scale of a line plot can be whole numbers or fractions such as halves, or fourths (quarters).</td></tr>
<tr><td>Demonstration of Learning:</td><td>Pacing for Unit</td></tr>
<tr><td>Checkpoints
Cool Downs
Unit Assessments</td><td>Sections 6A & 6C: 10 days (8 required lessons + 2 flex)
Section 6B & 6D: 7 days (7 required lessons)</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>3.6 Unit Launch: Family Support Video
3.6 Family Support Materials (all languages)</td><td>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</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>array</td><td>rows</td><td>columns</td></tr>
<tr><td>factors</td><td>product</td><td>variable</td></tr>
<tr><td>solve</td><td>multiplication</td><td>multiplication expression</td></tr>
<tr><td>multiplication symbol</td><td>Commutative property</td><td>numerator</td></tr>
</table></td><td>ST Math
District - approved online resources</td></tr>
</table>

denominator	fraction	equivalent fraction
whole number	equal	number line
related facts	Distributive property	Associative property
fluently	place value	hundreds
tens	ones	Identity property
digit	unit fraction	whole
part	partition	analog clock
digital clock	time interval	start time
end time	elapsed time	number line diagram
hours	minutes	hour hand
minute hand	a.m.	p.m.
capacity	liquid volume	liter (L)
milliliter (mL)	grams (g)	kilograms (kg)
mass	estimate	weight
line plot	halves	fourths
quarters	data	units
intervals	plot	

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
Science - Unit 1 - Ramp Experiment (measuring distance)	Students need to understand that there are 60 minutes in an hour and that all 60 minutes are represented on a clock, not just the multiples of 5. Students may confuse adding and subtracting in base ten with elapsed time, forgetting that there are 60 minutes in one hour, not 100 minutes. When using measurement tools, students may read the mark on a scale that is below a designated number on the scale as if it was the next number. For example, a mark that is one mark below 80 grams may be read as 81 grams. Students realize it is one away from 80, but do not think of it as 79 grams.

	A line plot has data points marked above a number line. Students may incorrectly choose a line plot to display data such as favorite foods or class pets, rather than numerical data. They also may not include numbers in the scale if there is no data for that number. Students must try to keep the "x" marks on a line plot consistently sized and evenly spaced.
Connections to Prior Units:	**Connections to Future Units:**
Grade 2 Units 3 and 6	Grade 4 Unit 5
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Building Knowledge • Connect prior knowledge to new learning (3.1) • Highlight and explore patterns, critical features, big ideas and relationships (3.2) • Maximize transfer and generalization (3.4) **Language & Symbols** • Illustrate through multiple media (2.5) **Interaction** • Optimize access to accessible materials and assistive and accessible technologies and tools (4.2) **Strategy Development** • Anticipate and plan for challenges (6.2)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (2-3.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (2-3.4) • **analyze** and **critique** the arguments of others orally and in writing.(2-3.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (2-3.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	**Learning Target & Success Criteria**	**Assessment/ Resources**
Unit 6 Planning Map		
Section A	I can measure to the nearest half inch and quarter inch. ☐ Measure lengths using a ruler marked with halves or fourths of an inch. ☐ Use equivalent fractions to describe length measurements.	

	I can create line plots to display fractional measurement data and use the information to solve problems. ☐ Analyze line plots that display measurement data in fractions of an inch. ☐ Use the information from a line plot to answer questions. ☐ Create a line plot which includes ☐ a scale marked off in appropriate units to represent the measurement data ☐ labels ☐ a title ☐ X's at the correct spot to show the data	Cool downs Section Checkpoints Practice problems
Section B	I can measure and estimate liquid volumes and weights of objects. ☐ Measure and estimate weights of objects using grams (g) and kilograms (kg). ☐ Understand liquid volume as the amount of space that a liquid takes up. ☐ Measure and estimate liquid volumes of objects using liters (L).	
Section C	I can tell time to the minute. ☐ Read time to the minute on an analog clock. ☐ Write the time shown on an analog clock.	
	I can solve real world problems involving time. ☐ Solve problems involving addition and subtraction of time intervals in minutes. ☐ Find the unknown start time, unknown duration, or unknown end time to solve a problem.	
Section D	I can solve real-world measurement problems using addition, subtraction, multiplication or division. ☐ Interpret representations of situations involving measurements. ☐ Determine information that is needed to solve measurement problems. ☐ Solve one-step word problems involving measurement.	

Unit Title:
Unit 7: Two-dimensional Shapes and Perimeter
Relevant Standards: Bold indicates priority
3.OA.C.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. **3.OA.D.8: Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.**

3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

3.MD.C.7.b: Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

3.MD.D.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

3.G.A.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

Essential Question(s):	**Enduring Understanding(s):**
• How can polygons be described and classified? • What are we measuring when we find perimeter?	• There is an inverse relationship between multiplication and division that can help us learn our multiplication and division facts. (I.e Knowing that 8 x 3 = 24 helps us know the answer to 24 ÷ 8 is 3). • The unknown in a problem can be represented with a symbol. • Problems may have more than one step needed in order to find a solution. • Rounding can be used to assess the reasonableness of answers. • Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic. • The area of a rectangle can be found by multiplying the lengths of two adjacent sides of the rectangle. • Perimeter is found by adding all the outside (exterior) side lengths of a polygon. • An unknown side length of a polygon can be found when given the perimeter and other side lengths or properties of the polygon. • Different rectangles may have the same perimeter but different areas. Different rectangles may have the same area but different perimeters. • Polygons are closed two-dimensional shapes with straight sides. • Polygons can be compared, sorted and classified using attributes, e.g. number of sides.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs	Sections 7C, B, & A: 21 days (12 required lessons, 7 flex and 2 assessment/reflection)

<table>
<tr><td>Unit Assessments</td><td>Section 7D: 3 days (3 required lessons)</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>3.7 Unit Launch: Family Support Video
3.7 Family Support Materials (all languages)</td><td>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</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>product</td><td>factors</td><td>multiplication</td></tr>
<tr><td>related facts</td><td>Commutative property</td><td>Distributive property</td></tr>
<tr><td>Associative property</td><td>fluently</td><td>variable/ unknown</td></tr>
<tr><td>equation</td><td>algorithm</td><td>estimate</td></tr>
<tr><td>rounding</td><td>perimeter</td><td>length</td></tr>
<tr><td>width</td><td>polygon</td><td>side</td></tr>
<tr><td>unit</td><td>inch</td><td>centimeters</td></tr>
<tr><td>feet</td><td>meter</td><td>yard</td></tr>
<tr><td>rhombus</td><td>trapezoid</td><td>rectangle</td></tr>
<tr><td>square</td><td>place value</td><td>hundreds</td></tr>
<tr><td>tens</td><td>ones</td><td>Identity property</td></tr>
<tr><td>digit</td><td>strategy</td><td>sum</td></tr>
<tr><td>difference</td><td>addends</td><td>area</td></tr>
<tr><td>side lengths</td><td>square unit</td><td>square foot</td></tr>
<tr><td>square inch</td><td>square centimeter</td><td>square meter</td></tr>
<tr><td>square yard</td><td>formula</td><td>tiling</td></tr>
<tr><td>attribute</td><td>hexagon</td><td>octagon</td></tr>
<tr><td>pentagon</td><td>polygon</td><td>quadrilateral</td></tr>
<tr><td>triangle</td><td>categorize</td><td>right angle</td></tr>
</table>
</td><td>ST Math
District - approved online resources</td></tr>
</table>

Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
ELA - Unit 3 - Relate Characteristics to Different Attributes of a Shape	Students think that when they are presented with a problem where only two of the side lengths are shown, they add only those numbers to find the perimeter. They may also multiply these two dimensions, finding the area instead of the perimeter. Students do not recognize that perimeter is linear and is measured in units and that area is a measure of space and is measured in square units. Students may not see that shapes can belong to more than one category because of their attributes. For example, students may identify a square as a "non-rectangle" or a "non-rhombus". They do not recognize that a square is a rectangle because it has all of the properties of a rectangle and a rhombus because it has all of the properties of a rhombus.
Connections to Prior Units:	**Connections to Future Units:**
Grade 2 Units 3 and 6	Grade 4 Units 7 and 8
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Building Knowledge • Connect prior knowledge to new learning (3.1) • Highlight and explore patterns, critical features, big ideas, and relationships (3.2) **Language & Symbols** • Clarify vocabulary, symbols, and language structures (2.1) **Welcoming Interests & Identities** • Nurture joy and play (7.3)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (2-3.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (2-3.4) • **analyze** and **critique** the arguments of others orally and in writing.(2-3.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (2-3.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 7 Planning Map		
Section A	I can describe, compare, and sort shapes based on their properties. ☐ Describe attributes of shapes and sort shapes based on their attributes. ☐ Describe and identify rhombuses, rectangles, and squares using their attributes. ☐ Draw examples of quadrilaterals that are not rhombuses, rectangles, or squares. ☐ Explain how shapes can be in more than one category.	Cool downs Section Checkpoints Practice problems
Section B	I can find the perimeter of polygons. ☐ Describe perimeter as the length around a flat shape. ☐ Find the perimeter of two-dimensional shapes given all or some of the side lengths. ☐ Find unknown side lengths given the perimeter of a shape. ☐ Solve problems that involve perimeters of shapes.	
Sections C & D	I can solve problems involving perimeter and area. ☐ Draw or label shapes accurately to help visualize perimeter and area problems. ☐ Use understanding of the difference between perimeter and area of rectangles to solve story problems. ☐ Draw rectangles with the same perimeter and different areas. ☐ Draw rectangles with the same area and different perimeters.	