Course Title:	Content Area:	Grade Level:	Credit (if applicable)
Grade 4 Mathematics	Math	4	

Course Description:

The big ideas in grade 4 include: developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

Aligned Core Resources:	Connection to the *BPS Vision of the Graduate*
Illustrative Math 360	**Content Mastery** • Develop and draw from a baseline understanding of knowledge in academic disciplines from our Bristol curriculum **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. Use communication for a range of purposes **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 4 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									
Use the four operations with whole numbers to solve problems.									
4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.					M				

4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.					M				
4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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
Gain familiarity with factors and multiples.									
4.OA.B.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.	S								
Generate and analyze patterns.									
4.OA.C.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.						A			
Number and Operations in Base Ten									
Generalize place value understanding for multi-digit whole numbers.									
4.NBT.A.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.				M					
4.NBT.A.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.				M					

4.NBT.A.3 Use place value understanding to round multi-digit whole numbers to any place.				M					
Use place value understanding and properties of operations to perform multi-digit arithmetic.									
4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm**.**				M		M			M
4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.						M			M
4.NBT.B.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.						M			M
Number and Operations - Fractions									
Extend understanding of fraction equivalence and ordering.									
4.NF.A.1 Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.		M	M						M
4.NF.A.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.		M							M
Build fractions from unit fractions.									
4.NF.B.3 Understand a fraction a/b with a > 1 as a sum of fractions 1/b.			M		M				M
4.NF.B.3.A Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.			M						
4.NF.B.3.B Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each			M						

decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.									
4.NF.B.3.C Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.			M						
4.NF.B.3.D Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.			M						
4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.			M						M
4.NF.B.4.A Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).			M						
4.NF.B.4.B Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)			M						
4.NF.B.4.C Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?			M						
Understand decimal notation for fractions and compare decimal fractions.									
4.NF.C.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.2 For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.			M	M					
4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.				M					

4.NF.C.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.				M					
Measurement and Data									
Solve problems involving measurement and conversion of measurements.									
4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...					S				
4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.					S	S		S	
4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.					S	S		S	
Represent and interpret data.									
4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.			S						
Geometric measurement: understand concepts of angle and measure angles.									
4.MD.C.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:							A		

4.MD.C.5.A An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.							A		
4.MD.C.5.B An angle that turns through n one-degree angles is said to have an angle measure of n degrees.							A		
4.MD.C.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.							A		
4.MD.C.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.							A	A	
Geometry									
Draw and identify lines and angles, and classify shapes by properties of their lines and angles.									
4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.							A	A	
4.G.A.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.								A	
4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.								A	

Unit Links

Unit 1: Factors and Multiples
Unit 2: Fraction Equivalence and Comparison
Unit 3: Extending Operations to Fractions
Unit 4: From Hundredths to Hundred Thousands
Unit 5: Multiplicative Comparison and Measurement

Unit 6: Multiplying and Dividing Multi-Digit Numbers
Unit 7: Angles and Angle Measurement
Unit 8: Properties of Two-Dimensional Shapes

Unit Title:

Unit 1: Factors and Multiples

Relevant Standards: Bold indicates priority

4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.
4.OA.B.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors.

Essential Question(s):	**Enduring Understanding(s):**
• How can we show mathematical situations in word problems? • How do we decide what operation to use when solving a real-world problem? • Why do we decompose whole numbers into factor pairs?	• We can show mathematical situations in word problems using numbers, symbols, and operations signs, or by making tables or drawings. • Recognizing how a real-world situation fits into a common operation category helps to solve the problem. • Estimation strategies, including rounding, can be used to determine the reasonableness of answers. • An unknown can be in any position of a multiplicative comparison problem.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	Unit Pacing: 13 days (6 required lessons, 5 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
Family Support Video Unit 1 Family Support Materials Unit 1 (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):**
operations, equations, estimation unknown, multi-step, reasonableness	ST Math District - approved online resources

quantity		
factor	product	multiples
odd	even	prime
composite		

Opportunities for Interdisciplinary Connections:	**Anticipated conceptions:**
Connections to Grade 4 Science NGSS Connection: 4-ESS2-1 (Earth's Systems) • Using factors to analyze patterns in rock formations • Finding multiples in natural cycles and weather patterns • Applying number patterns to understand geological time scales	Students believe a multi-step problem is completed/solved after completing a single step. When listing multiples of numbers, students may not list the number itself. Emphasize that the smallest multiple is the number itself. Some students may think that larger numbers have more factors. Having students share all factor pairs and how they found them will clear up this idea.
Connections to Prior Units:	**Connections to Future Units:**
Grade 3 Unit 1	Grade 4 Unit 6
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Representation - Building Knowledge • Connect prior knowledge to new learning (3.1) • Highlight and explore patterns, critical features, big ideas and relationships. (3.2) **Representation - Language and Symbols** • Clarify vocabulary**,** symbols and language structures (2.1) **Engagement - Sustaining Effort and Persistence** • Foster belonging and community (8.1)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning 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. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze and critique** the arguments of others orally and in writing. (4-5.6)	See Illustrative Math Teachers Guide for identified lesson "Goals"

• **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 1 Planning Map		
Section A	I can find all factor pairs for a whole number between 1 and 100. ☐ Find side lengths of different rectangles with a given area. ☐ Understand that each side length of a rectangle is a factor of its area. ☐ Explain why a number between 1-100 is prime or composite. I can determine if a whole number between 1 and 100 is a multiple of a particular one digit number. ☐ Find areas of different rectangles with a given side length. ☐ Understand that the area of a rectangle is a multiple of each of its side lengths.	Cool downs Section Checkpoints Practice problems
Section B	I can solve real-world problems involving all four operations. ☐ Apply understanding of factors, multiples, and prime and composite numbers to solve problems.	

Unit Title:

Unit 2: Fraction Equivalence and Comparison

Relevant Standards: Bold indicates priority

4.NF.A.1: Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
4.NF.A.2: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Essential Question(s):	**Enduring Understanding(s):**
• What are equivalent fractions? • When can we compare fractions? • What are some strategies we can use to compare fractions?	• 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. • Multiplying the numerator and the denominator by the same number will result in an equivalent fraction. • There is a multiplicative relationship between the number of equal parts in a whole and the size of the parts. • 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).
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	Unit Pacing: 23 days (16 required lessons, 5 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
Family Support Video Unit 2 Family Support Materials Unit 2 (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):**
fractions, unit fractions, equivalent fraction model, numerator, denominator	ST Math District - approved online resources

fraction bars	whole	part
partition	distance	interval
number line	greater than >	less than <
equal to =	comparison	

Opportunities for Interdisciplinary Connections:	**Anticipated conceptions:**
Grade 4 Science: Unit 3: • Comparing energy levels using fraction models • Understanding partial energy transfers • Representing energy conservation using equivalent fractions	When representing fractions on a number line: -Students may think that the right side of the number line only represents 1 whole. -Students might count tick marks instead of equal spaces between numbers. -Students may not partition number lines equally creating incorrect representations. Students think that when generating equivalent fractions they only need to multiply or divide either the numerator or denominator. For example, when determining an equivalent amount of sixths for 1/2 students might multiply the denominator by 3 to • get 1/6 , instead of multiplying ½ by 3/3. 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 3, Unit 5	Grade 5 Unit 6

Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement - Welcoming Interests and Identities • Optimize choice and autonomy (7.1) **Representation - Perception** • Support multiple ways to perceive information (1.2) **Representation - Building Knowledge** • Connect prior knowledge to new learning (3.1) • Highlight and explore patterns, critical features, big ideas and relationships (3.2)	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…	See Illustrative Math Teachers Guide for identified

• **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze and critique** the arguments of others orally and in writing. (4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	lesson "Goals"

Lesson Sequence	**Learning Target & Success Criteria**	**Assessment/ Resources**
Unit 2 Planning Map		
Section A	I can represent fractions using a variety of models and explain my reasoning. ☐ Use diagrams to represent fractions. ☐ Compare fractions with the same numerator or the same denominator using physical or visual representations. ☐ Identify equivalent fractions using a visual representation or on a number line. ☐ Locate fractions on the number line and compare their size to ½ and to 1.	Cool downs Section Checkpoints Practice problems
Section B	I can generate equivalent fractions and justify my reasoning. ☐ Generate equivalent fractions using a model or number line. ☐ Given a pair of equivalent fractions, explain why they are equivalent. ☐ Generate equivalent fractions numerically, by using multiples or factors of the numerator and denominator.	
Section C	I can compare two fractions and justify my reasoning. ☐ Compare fractions using diagrams, number lines, or the meaning of the numerator and denominator. ☐ Compare two fractions using equivalent fractions with a common denominator. ☐ Solve fraction comparison problems in and out of context.	

Unit Title:
Unit 3: Extending Operations to Fractions
Relevant Standards: Bold indicates priority
4.NF.A.1: Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. **4.NF.A.2: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that**

comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
4.NF.B.3 : Understand a fraction a/b with a > 1 as a sum of fractions 1/b.
4.NF.B.3.a: Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
4.NF.B.3.b: Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.
4.NF.B.3.c: Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
4.NF.B.3.d: Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
4.NF.B.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
4.NF.B.4.a: Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).
4.NF.B.4.b: Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)
4.NF.B.4.c: Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?
4.NF.C.5: Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.
4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.

Essential Question(s):	**Enduring Understanding(s):**
• What does it mean to multiply a fraction by a whole number? • What strategies can help us multiply a whole number by a fraction? • When can we add or subtract fractions and decimals? • What strategies can help us add and subtract fractions? • Why do we decompose fractions? • Why do we collect, organize, represent and analyze data?	• Multiplying a fraction by a whole number means adding that fraction to itself multiple times. • The idea of the numerator as a multiplier can be used when a fraction is being multiplied by a whole number, e.g., Just as 5/8 = 5× 1/8 , 5 groups of 3/8 equals 5 × 3/8 = (5×3)× 1/8 which equals 15/8 . • Arrays, number lines, fraction strips, or sets can be used to find the solution to multiplying a whole number by a fraction. • Fractions can be added and subtracted when the wholes are the same size. • Mixed numbers can be written as fractions, e.g., 14/3 = 4 2/3 , and can be added or subtracted in this form. • Fractions with the same denominators can be added and subtracted using visual models, properties of operations, and relationships of addition and subtraction of whole numbers. • We decompose fractions into sums or products of fractions to make computation easier or to simplify expressions. • Any fraction with a denominator of 10 can be

<table>
<tr><td></td><td>renamed as a fraction with a denominator of 100 using equivalent fractions.
• Data can be organized and represented in a picture graph, a bar graph, or a line plot.
• Information presented in a graph can be used to solve problems involving the data in the graph.</td></tr>
<tr><td>Demonstration of Learning:</td><td>Pacing for Unit</td></tr>
<tr><td>Checkpoints
Cool Downs
Unit Assessments</td><td>Unit Pacing: 25 days (18 required lessons, 5 flex, 2 assessment and reaction)</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>Family Support Video Unit 3
Family Support Materials Unit 3 (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>fraction</td><td>unit fraction</td><td>equivalent</td></tr>
<tr><td>fraction model</td><td>numerator</td><td>denominator</td></tr>
<tr><td>fraction bars</td><td>whole</td><td>part</td></tr>
<tr><td>partition</td><td>distance</td><td>interval</td></tr>
<tr><td>number line</td><td>equal</td><td>decompose</td></tr>
<tr><td>ordering</td><td>mixed number</td><td>multiple</td></tr>
<tr><td>whole number</td><td>multiple</td><td>equivalent fraction</td></tr>
<tr><td>line plot</td><td>interpret</td><td>data</td></tr>
<tr><td>numerator</td><td>denominator</td><td></td></tr>
</table>
</td><td>ST Math
District - approved online resources</td></tr>
<tr><td>Opportunities for Interdisciplinary Connections:</td><td>Anticipated conceptions:</td></tr>
<tr><td>Grade 4 Science: Unit 1:
• Apply fraction concepts when analyzing data from weather patterns

Grade 4 Science: Unit 3:
• Converting between energy units using fraction operations
• Calculating partial energy transfers in systems
• Solving problems involving fractional</td><td>Students think that it does not matter which model to use when finding the sum or difference of fractions. They may represent one fraction with a rectangle and the other fraction with a circle. They need to know that the models need to represent the same whole.

Students may mistakenly choose to display non-numerical data in a line plot, for example “Favorite Pizza Toppings”. When making a line plot, students might not remember to include every number within the</td></tr>
</table>

measurements in experiments	range of data.
Connections to Prior Units:	**Connections to Future Units:**
Grade 3, Unit 1 Grade 3, Unit 5	Grade 5, Unit 2 Grade 5, Unit 3 Grade 5, Unit 5 Grade 5, Unit 6
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement - Welcoming Interests and Identities • Optimize choice and autonomy (tools used for exploration and production) (7.1) **Representation - Perception** • Support multiple ways to perceive information (1.2) **Representation - Building Knowledge** • Connect prior knowledge to new learning (3.1) • Highlight and explore patterns, critical features, big ideas and relationships (3.2)	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. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze and critique** the arguments of others orally and in writing. (4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	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 represent and solve fraction multiplication problems involving a fraction and a whole number. ☐ Interpret and relate descriptions, drawings, and expressions that represent situations involving equal groups of fractions. ☐ Interpret diagrams and expressions that represent multiplication of a whole number and a unit fraction. ☐ Use diagrams and expressions to represent and find the product of a whole number and a unit fraction. ☐ Evaluate multiplication expressions and recognize that	

	$n \times \frac{1}{b} = \frac{n}{b}$. ☐ Recognize that $n \times \frac{a}{b} = \frac{n \times a}{b}$ ☐ Use diagrams to represent and evaluate the product of a whole number and a non-unit fraction. ☐ Write equivalent expressions for the multiplication of a fraction by a whole number and explain or show that the expressions are equivalent. ☐ Represent and solve problems involving multiplication of a fraction by a whole number. I can decompose a fraction in more than one way. ☐ Recognize that a fraction can be decomposed into a sum of fractions with the same denominator. ☐ Write equations to represent fraction decomposition. ☐ Decompose fractions greater than 1 into a sum of a whole number and a fraction less than 1. ☐ Reason about addition of fractions with the same denominator using a number line	Cool downs Section Checkpoints Practice problems
Section B	I can add and subtract fractions and mixed numbers with like denominators. ☐ Reason about addition and subtraction of fractions with the same denominator using a number line. ☐ Subtract fractions and mixed numbers by decomposing numbers and reasoning about equivalence. I can decompose a fraction in more than one way. ☐ Recognize that a fraction can be decomposed into a sum of fractions with the same denominator. ☐ Write equations to represent fraction decomposition. ☐ Decompose fractions greater than 1 into a sum of a whole number and a fraction less than 1. ☐ Subtract a fraction from a whole number by decomposing the whole number and reasoning about equivalence. I can create line plots to display fractional measurement data and use the information to solve problems. ☐ Analyze and interpret fractional measurement data on line plots. ☐ Organize measurement data in fractions of a unit $(\frac{1}{8}, \frac{1}{4}, \frac{1}{2})$ onto line plots. ☐ Use information on line plots to solve problems involving addition and subtraction of fractions and mixed numbers.	
Section C	I can add and subtract fractions and mixed numbers with like denominators. ☐ Use equivalence to reason about addition and subtraction problems. ☐ Use equivalent fractions to add tenths and hundredths, up to a sum of 1.	

	☐ Use equivalent fractions to add tenths and hundredths, where the sum is greater than 1. ☐ Find the sum of three or more tenths and hundredths, using the commutative and associative properties strategically. ☐ Interpret and solve problems that involve the addition, subtraction, and multiplication of fractions. ☐ Use addition, subtraction, and multiplication of fractions to model and solve a design problem.	

Unit Title:
Unit 4: From Hundredths to Hundred Thousands
Relevant Standards: Bold indicates priority
4.NF.C.5: Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.2 For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100. **4.NF.C.6: Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.** **4.NF.C.7: Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.** **4.NBT.A.1: Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.** **4.NBT.A.2: Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.** **4.NBT.A.3: Use place value understanding to round multi-digit whole numbers to any place.** **4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.**

Essential Question(s):	**Enduring Understanding(s):**
• How is our number system organized? • How can understanding place value help us? • What are equivalent fractions and decimals? • How do the properties of operations make computation simpler? • How do we decide what operation to use when solving a real-world problem?	• Our number system is a base-ten system. A given place value is ten times greater than the value of the place to its right (500 is ten times greater than 50). • The place value system of whole numbers can be expanded to represent numbers less than 1. • Understanding place value enables us to represent, compare order and round numbers and perform computations. • A number can be written as a fraction, e.g., 17/100, or as a decimal, e.g., 0.17. • Decimals can only be compared when the decimals being compared refer to the same whole. • Decimals written as tenths or hundredths can be compared using equivalent fraction. • Numbers can be expressed in standard form, word form, and expanded form. • Rounding helps us solve problems mentally and assess the reasonableness of an answer. • Properties of operations allow us to reorder, decompose and/or compose numbers in order to make computation simpler. • There are different algorithms based on place-value understanding that can be used to add or subtract numbers. • The operation you choose to solve a problem depends on what you are trying to find and how the quantities in the problem relate to each other.

<table>
<tr><th>Demonstration of Learning:</th><th>Pacing for Unit</th></tr>
<tr><td>Checkpoints
Cool Downs
Unit Assessments</td><td>Unit Pacing: 33 days (22 required lessons, 9 flex, 2 assessment and reaction)</td></tr>
<tr><th>Family Overview (link below)</th><th>Integration of Technology:</th></tr>
<tr><td>Family Support Video Unit 4
Family Support Materials Unit 4 (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>
<tr><td>
<table>
<tr><td>fraction</td><td>whole number</td><td>multiple</td></tr>
<tr><td>equivalent fraction</td><td>numerator</td><td>denominator</td></tr>
<tr><td>decimal</td><td>decimal notation</td><td>number line</td></tr>
<tr><td>tenths</td><td>hundredths</td><td>comparison</td></tr>
<tr><td>greater than ></td><td>less than <</td><td>equal to =</td></tr>
<tr><td>multi-digit</td><td>place value</td><td>ones</td></tr>
<tr><td>tens</td><td>hundreds</td><td>thousands</td></tr>
<tr><td>ten thousands</td><td>hundred thousands</td><td>millions</td></tr>
<tr><td>multiplication</td><td>digit</td><td>expanded form</td></tr>
<tr><td>written form</td><td>word form</td><td>parentheses</td></tr>
<tr><td>round</td><td>add</td><td>subtract</td></tr>
<tr><td>sum</td><td>difference</td><td>standard algorithm</td></tr>
</table>
</td><td>ST Math
District - approved online resources</td></tr>
<tr><th>Opportunities for Interdisciplinary Connections:</th><th>Anticipated conceptions:</th></tr>
<tr><td>Grade 4 Science: Unit 1:
Use decimal notation to record precise measurements of rainfall and erosion
Create and interpret graphs of weather data using decimals
Working with large numbers in geological contexts.</td><td>Students use whole number thinking when working with decimals. For example, students may think that the more digits after the decimal point, the greater the value, i.e. 0.25 is greater than 0.3.

Students may have conceptions about writing numerals from verbal descriptions. Numbers like one thousand do not cause a problem; however a number like one thousand two may cause problems for students. Many</td></tr>
</table>

	students will understand the 1000 and the 2 but then instead of placing the 2 in the one's place, students will write the numbers as they hear them, 10002 (ten thousand two). Students often assume that the first digit of a multi-digit number indicates the magnitude of a number. The assumption is made that 954 is greater than 1002 because students are focusing on the first digit instead of the number as a whole. Students need to be aware of the greatest place value. 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 decomposing and creating a new unit.
Connections to Prior Units:	**Connections to Future Units:**
Grade 2 Unit 5 Grade 3, Unit 3 Grade 3, Unit 5	Grade 5, Unit 5
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement - Welcoming Interests and Identities • Optimize choice and autonomy (tools used for exploration and production) (7.1) **Representation - Perception** • Support multiple ways to perceive information (1.2) **Representation - Building Knowledge** • Connect prior knowledge to new learning (3.1) • Highlight and explore patterns, critical features, big ideas and relationships (3.2)	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. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze and critique** the arguments of others orally and in writing. (4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson	Learning Target & Success Criteria	Assessment/ Resources

Sequence		
Unit 4 Planning Map		
Section A	I can read, write, and represent decimals through hundredths. ☐ Make sense of tenths and hundredths in decimal notation using unit square grids. ☐ Read and write decimals in standard form. ☐ Read and write decimal numbers in expanded form. I can compare two decimals through hundredths. ☐ Reason about and compare the size of decimals to hundredths using decimal squares and number lines. ☐ Compare and order decimals to hundredths by reasoning about their size. ☐ Compare and order fractions to the hundredths by reasoning about their size.	Cool downs Section Checkpoints Practice problems
Section B	I can explain the patterns found in place value. ☐ Describe that the value of a digit in one place represents ten times what it represents in the place to its right. ☐ Write equations to show that each place in a multi-digit number is ten times the value of the place to its immediate right. ☐ Describe the relative magnitude of multi-digit whole numbers within 1,000,000 using a number line and place value understanding. I can read, write, and represent numbers to 1,000,000. ☐ Develop a sense of the relative magnitude of 1,000,000. ☐ Recognize one-million as 10 groups of 100,000. ☐ Represent, read, and write multi-digit whole numbers within 1,000,000, including in expanded form.	
Section C	I can compare two multi-digit numbers using the symbols <, >, =. ☐ Compare 2 multi-digit whole numbers within 1,000,000 using place value reasoning. ☐ Compare and order multi-digit whole numbers within 1,000,000. I can round numbers to any place. ☐ Identify the closest multiples of 1,000, 10,000, and 100,000 to a given whole number. ☐ Round multi-digit whole numbers to the nearest 1,000, 10,000, and 100,000. ☐ Describe how rounding can help or hinder problem-solving. ☐ Round multi-digit whole numbers within 1,000,000 to solve problems.	
Section D	I can add and subtract multi-digit whole numbers using the standard algorithm. ☐ Interpret and solve problems that involve finding sums and differences of multi-digit whole numbers.	

Unit Title:
Unit 5: Multiplicative Comparison and Measurement
Relevant Standards: Bold indicates priority
4.OA.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. **4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.** **4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.** **4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.** **4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.** **4.NF.B.3: Understand a fraction a/b with a > 1 as a sum of fractions 1/b.** **4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.** 4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two- column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ... 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. 4.MD.B.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Essential Question(s):	**Enduring Understanding(s):**
• How can we use multiplication to compare quantities? • How do we convert units of time or measure?	• Comparisons can be additive or multiplicative depending on the mathematical situation. • In multiplicative comparisons, the relationship between quantities is described in terms of how many times larger one is than the other • Larger units can be expressed in terms of smaller units. • The number of units used to measure an object will depend on the size of the unit of measure. • The larger the unit, the smaller the measurement reads; the smaller the unit, the larger the measurement reads. • Metric units are related by powers of ten. • We convert units of time or measure by

	understanding how the units are related to each other (e.g. one foot is 12 times as much as one inch).
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	Unit Pacing: 24 days (17 required lessons, 5 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
Family Support Video Unit 5 Family Support Materials Unit 5 (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):**

multiplication	multiplicative comparison	times as many
additive	diagram	expression
equation	unknown	symbol
division	reasoning	statement
one-step problem	two-step problem	multiple
quantity	value	convert
measurement	unit	Metric system
kilometer	meter	centimeter
millimeter	gram	kilogram
milliliter	liter	table
interval	decimal notation	perimeter
area	adjacent	strategy
line diagrams	hours	minutes
elapsed time	liquid volume	mass

ST Math
District - approved online resources

Opportunities for Interdisciplinary Connections:	**Anticipated conceptions:**
Grade 4 Science: Unit 3: • Use measurement and multiplicative	Students may confuse multiplicative comparison with additive comparison.

comparison to analyze energy transfer in experiments • Apply fraction concepts when measuring and recording energy data • Create line plots to display energy measurements • Using multiplication to analyze force and motion data	Students may focus on key words which can be misleading. Consider: There were 4 jackets left on the playground on Monday and 5 jackets left on the playground on Tuesday. How many jackets were left on the playground? "Left" in this problem does not mean subtract. Many problems do not have any key words. For example, How many legs do 7 elephants have?, does not have a key word. However, students should be able to solve the problem by thinking and drawing a picture or building a model. The most important strategy, when solving a problem, is to make sense of the problem's context and actions. Key words encourage students to ignore meaning and look for a formula. Mathematics is about meaning (Van de Walle, 2012). When converting from a larger unit of measure to a smaller unit, students may divide rather than multiply. Students need to understand that you need more of the smaller units.
Connections to Prior Units:	**Connections to Future Units:**
Grade 3, Unit 1 Grade 3, Unit 6	Grade 5, Unit 3 Grade 5, Unit 5 Grade 5, Unit 6
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement - Welcoming Interests & Identities • Optimizing choice and autonomy (7.1) **Engagement - Sustaining Effort** • Foster collaboration, interdependence and collective learning (8.3) **Representation - Building Knowledge** • Connect prior knowledge to new learning (3.1)	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. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze and critique** the arguments of others	See Illustrative Math Teachers Guide for identified lesson "Goals"

orally and in writing. (4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 5 Planning Map		
Section A	I can analyze, describe, represent, and solve multiplicative comparison situations. ☐ Interpret different representations of multiplicative comparison (situations, diagrams, and equations). ☐ Represent and solve multiplicative comparison problems, including those involving unknown factors. ☐ Represent and solve multiplicative comparison problems with larger numbers. ☐ Write, represent, and solve multiplicative comparison problems involving "10 times as many." ☐ Solve multi-step problems that involve multiplicative comparison and measurement with whole numbers and fractions. ☐ Use multiplicative comparison and unit conversion to solve multi-step problems about weight and capacity (in pounds, ounces, gallons, quarts, and cups). ☐ Use multiplicative comparison and unit conversion to solve multi-step problems about length (in yards, feet, inches).	Cool downs Section Checkpoints Practice problems
Section B	I can use the relationship between units to make conversions from larger units to smaller units within a given system of measurement. ☐ Express meters in terms of centimeters. ☐ Understand the relative size of meters and centimeters. ☐ Describe the multiplicative relationship between kilometers and meters. ☐ Express kilometers in terms of meters. ☐ Describe the multiplicative relationships between liters and milliliters, and kilograms and grams. ☐ Express liters in terms of milliliters, and kilograms in terms of grams. ☐ Describe the multiplicative relationship between pounds and ounces. ☐ Express pounds in terms of ounces. ☐ Describe the multiplicative relationships between units of time. ☐ Express hours in terms of minutes and seconds. I can solve measurement word problems using the four operations. ☐ Solve multi-step problems involving measurement conversions. ☐ Multiply or divide to solve one- and two-step problems involving multiplicative comparison. ☐ Solve multi-step problems that involve multiplicative comparison and measurement with whole numbers.	

Section C	I can use the relationship between units to make conversions from larger units to smaller units within a given system of measurement. ☐ Describe the multiplicative relationships between customary units of capacity. I can solve real-world problems involving all four operations. ☐ Explain strategies for solving multi-step problems about units of weight and capacity. ☐ Explain strategies for solving multi-step problems about units of length. ☐ Determine the perimeter and the side lengths of rectangles. ☐ Use multiplication to compare the perimeters of rectangles. ☐ Explain strategies for solving problems involving perimeter that include multiplicative comparison and addition and subtraction of fractions. ☐ Solve problems involving the perimeter of rectangles using multiplicative comparison. ☐ Solve problems involving perimeter using multiplicative comparison and addition or subtraction of fractions (including mixed numbers)	

Unit Title:	
Unit 6: Multiplying and Dividing Multi-Digit Numbers	
Relevant Standards: Bold indicates priority	
4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. **4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.** 4.OA.B.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. 4.OA.C.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.= **4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.** **4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.** **4.NBT.B.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.**	
Essential Question(s):	**Enduring Understanding(s):**

<table>
<tr><td>

- Why do we analyze patterns?
- How can understanding place value help us?
- How do the properties of operations make computation simpler?
- How are multiplication and division related?
- How do we decide what operation to use when solving a real-world problem?

</td><td>

- Analyzing patterns helps us make predictions, identify trends, and form rules to solve problems.
- Understanding place value enables us to represent, compare order and round numbers and perform computations.
- Properties of operations allow us to reorder, decompose and/or compose numbers in order to make computation simpler.
- There is a relationship between multiplication and division. Multiplication involves putting equal groups together, while division involves breaking groups apart or sharing equally.
- The operation you choose to solve a problem depends on what you are trying to find and how the quantities in the problem relate to each other.

</td></tr>
<tr><td>Demonstration of Learning:</td><td>Pacing for Unit</td></tr>
<tr><td>Checkpoints
Cool Downs
Unit Assessments</td><td>Unit Pacing: 32 days (25 required lessons, 5 flex, 2 assessment and reaction)</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>Family Support Video Unit 6
Family Support Materials Unit 6 (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>

multiplication equation	multiplication comparison	operations
equation	expression	estimation
rounding	dividend	divisor
quotient	partial quotient	remainder
unknown quantity	multistep	reasonableness
factor	product	multiple
number pattern	shape pattern	generate
identify	features	rule

</td><td>ST Math
District - approved online resources</td></tr>
<tr><td>Opportunities for Interdisciplinary Connections:</td><td>Anticipated conceptions:</td></tr>
</table>

Grade 4 Science: Unit 1: • Calculating with large numbers in geological timescales • Solving problems involving rock layer formation rates • Working with measurements in earth science investigations	Students have difficulty estimating a two-step problem. Students do not always solve all of the steps needed for a multistep problem. Students may not be able to identify which part of the equation is unknown in order to represent it as a variable. Students often do not understand why they need to regroup and just subtract the smaller digit from the larger one. Emphasize place value and the meaning of each of the digits. When converting from a larger unit of measure to a smaller unit, students may divide rather than multiply. Students need to understand that you need more of the smaller units. Students may assume all patterns have the same rule due to limited exposure. When working with multiplication and division, students often do not think about the importance of place value. They treat each digit in the factor or dividend separately without looking at the value of the entire number. Encourage students to explore different strategies and consider the relationship between multiplication and division. Estimating by using multiplication prior to dividing, helps students see what a reasonable quotient will be. When interpreting remainders, some students do not attend to the context of the situation.
Connections to Prior Units:	**Connections to Future Units:**
Grade 3, Unit 4 Grade 4, Unit 1	Grade 5, Unit 4 Grade 5, Unit 5 Grade 5, Unit 7
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Action & Expression - Expression & Communication • Use multiple tools for construction, composition and creativity (5.2) **Representation - Building Knowledge** • Connect prior knowledge to new learning (3.1) **Action and Expression - Expression & Communication** • Build fluencies with graduated support for practice and performance (5.3)	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. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze and critique** the arguments of others orally and in writing. (4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	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 generate a number or shape pattern that follows a given rule. ☐ Analyze and describe number and shape patterns. ☐ Analyze, describe, and generate patterns that follow a given rule. ☐ Analyze patterns represented visually and numerically. ☐ Use numbers, words, and the idea of factors and multiples to describe and extend patterns in the features of rectangles. ☐ Analyze and describe patterns in numbers that follow a rule. ☐ Use understanding of place value and operations to explain and extend patterns of numbers.	Cool downs Section Checkpoints Practice problems
Section B	I can represent and solve multi-digit multiplication problems. ☐ Multiply multi-digit numbers using strategies based on place value and the properties of operations. ☐ Multiply multi-digit whole numbers by one-digit numbers using an algorithm that uses partial products. ☐ Identify similarities and differences between algorithms that use partial-products and the standard algorithm for multiplication.	
Section C	I can represent and solve multi-digit division problems. ☐ Understand that a division situation may involve equal groups, factors and multiples, or area of rectangles. ☐ Divide multi-digit numbers using base-ten blocks and diagrams. ☐ Find whole-number quotients using partial quotients. ☐ Interpret the result and remainder of division in situations.	
Section D	I can solve real-world problems involving all four operations. ☐ Solve multi-step problems involving measurement conversions, perimeter, and area. ☐ Assess the reasonableness of responses.	

Unit Title:

Unit 7: Angles and Angle Measurement

Relevant Standards: Bold indicates priority

4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.
4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4.NBT.B.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4.MD.C.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.
4.MD.C.5.A An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
4.MD.C.5.B An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
4.MD.C.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
4.MD.C.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Essential Question(s):	**Enduring Understanding(s):**
• How do points, lines, and rays help us describe and understand the world around us? • How are angles measured? • What does the measure of an angle tell us?	• Points, lines, and rays are basic building blocks in geometry that help us describe shapes and understand how objects are positioned in space. • A point is a location in space; it has no length, width, or height. • A line is a continuous straight path that extends indefinitely in two opposite directions. • A line segment is a continuous straight path between two points. • A ray is a continuous straight path that extends indefinitely in one direction from one point. • Angles are formed when two rays share a common endpoint; the common endpoint of the rays is called a vertex. • Angles are measured in degrees using a protractor. • There are 360 degrees in a circle. One degree is 1/360 of a circle. • The measure of or number of degrees in an angle tells us how far one ray (side) of the angle is rotated from the other. • Angles can be decomposed into unit angles. (n degrees is *n* one degree angles.)
Demonstration of Learning:	**Pacing for Unit**
Checkpoints	Unit Pacing: 20 days (15 required lessons, 3 flex, 2

<table>
<tr><td>Cool Downs
Unit Assessments</td><td>assessment and reaction)</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>Family Support Video Unit 7
Family Support Materials Unit 7 (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>angle</td><td>degree</td><td>ray</td></tr>
<tr><td>circle</td><td>endpoint</td><td>geometric shape</td></tr>
<tr><td>measure</td><td>protractor</td><td>additive</td></tr>
<tr><td>sum</td><td>decompose</td><td>equation</td></tr>
<tr><td>symbol</td><td>unknown angle</td><td>point</td></tr>
<tr><td>vertex</td><td>line</td><td>line segment</td></tr>
<tr><td>intersecting lines</td><td>perpendicular lines</td><td>parallel lines</td></tr>
<tr><td>acute angle</td><td>obtuse angle</td><td>straight angle</td></tr>
<tr><td>right angle</td><td>two-dimensional figures</td><td></td></tr>
</table>
</td><td>ST Math
District - approved online resources</td></tr>
<tr><td>Opportunities for Interdisciplinary Connections:</td><td>Anticipated conceptions:</td></tr>
<tr><td>Grade 4 Science: Unit 3:
Study wave patterns using angle measurements.
Analyze wave amplitude using measurement and comparison.
Use geometric concepts to understand wave reflection.</td><td>Students believe a wide angle with short sides has a smaller measurement than a narrow angle with long sides because they focus on the length of the rays rather than the spread of the rays.

Students are unsure of which numbers to use when measuring angles using a protractor.

Students believe that if they do not see a pair of lines intersect, those lines are parallel.

Students may not recognize angles larger than 180° as angles.</td></tr>
<tr><td>Connections to Prior Units:</td><td>Connections to Future Units:</td></tr>
<tr><td>Grade 3, Unit 7</td><td>Grade 5, Unit 7</td></tr>
<tr><td colspan="2">Differentiation through Universal Design for Learning</td></tr>
</table>

UDL Indicator	Teacher Actions:
Representation - Language and Symbols • Clarify vocabulary, symbols, and language structures (2.1) **Action and Expression - Expression & Communication** • Use multiple tools for construction, composition and creativity (5.2)	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. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze and critique** the arguments of others orally and in writing. (4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	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 draw and identify points, lines, rays, segments, angles, and parallel and intersecting lines in geometric figures. ☐ Draw points, lines, and line segments, and identify them in geometric figures. ☐ Draw and identify parallel and intersecting lines. ☐ Identify angles in two-dimensional figures.	
Section B	I can measure and draw angles using degrees. ☐ Recognize angles as geometric figures that are formed wherever two rays share a common endpoint. ☐ Understand that the measure of a full rotation of a ray at a fixed point is 360 degrees. ☐ Use benchmark angle measurements (such as 90°, 180°, 270°, 360°) to reason about and estimate the size of angles in degrees. ☐ Recognize that 1 degree is a measurement of a 1/360 turn through a full circle. ☐ Use a protractor to measure or draw angles of given measurements. I can draw and identify perpendicular lines or rays. ☐ Identify and draw perpendicular lines.	

Section C	I can draw and identify acute, obtuse, right, and straight angles in two-dimensional figures. ☐ Identify acute, obtuse, right and straight angles in two-dimensional figures. I can solve problems involving unknown angles. ☐ Compose and decompose angles to determine their measurements. ☐ Reason about angle measurements within a circle. ☐ Represent angle relationships and solve for unknown angle measurements.	

Unit Title:	
Unit 8: Properties of Two-Dimensional Shapes	
Relevant Standards: Bold indicates priority	
4.G.A.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. 4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. 4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.	
Essential Question(s):	**Enduring Understanding(s):**
• How can polygons be compared, sorted and classified? • Why is symmetry important?	• Polygons can be compared, sorted and classified using attributes and relationships, such as number of sides, types of angles, and parallel and perpendicular sides. • Symmetry is used to describe and analyze figures and has many applications in the real world.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	Unit Pacing: 11 days (7 required lessons, 2 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
Family Support Video Unit 8 Family Support Materials Unit 8 (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):**
right angle | acute angle | obtuse angle	ST Math District - approved online resources

two-dimensional figures	perpendicular lines	parallel lines
classify	equilateral triangle	scalene triangle
isosceles triangle	acute triangle	obtuse triangle
right triangle	line of symmetry	symmetry
perimeter	area	formula
length	width	square units

Opportunities for Interdisciplinary Connections:	**Anticipated conceptions:**
Grade 4 Science: Unit 3: • Designing and testing prototype shapes • Using geometric properties in engineering solutions • Applying symmetry and pattern concepts to design challenges	Students think that when describing geometric shapes and placing them in subcategories, the last category is the only classification that can be used. Students may misclassify a shape due to its orientation. For example, students may classify a square tipped on its side as a rhombus. Students believe a wide angle with short sides may seem smaller than a narrow angle with long sides. Students can compare two angles by tracing one and placing it over the other. Students will then realize that the length of the sides does not determine whether one angle is larger or smaller than another angle. The measure of the angle does not change.
Connections to Prior Units:	**Connections to Future Units:**
Grade 3, Unit 7	Grade 5, Unit 7
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Representation - Language and Symbols • Clarify vocabulary, symbols, and language structures (2.1) **Action and Expression - Expression & Communication** • Use multiple tools for construction, composition and creativity (5.2)	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	See Illustrative Math Teachers Guide for identified lesson "Goals"

exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze and critique** the arguments of others orally and in writing. (4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 8 Planning Map		
Section A	I can classify two-dimensional figures based on their attributes. ☐ Analyze the attributes of two-dimensional shapes and categorize the shapes in a way that makes sense to them. ☐ .Classify triangles based on their side lengths and size of their angles. ☐ Classify quadrilaterals based on the length of their sides, the size of their angles, and presence of parallel sides. I can identify and draw lines of symmetry in two-dimensional figures ☐ Describe lines of symmetry for two-dimensional figures and identify figures with line symmetry. ☐ Identify figures with line symmetry and draw lines of symmetry on two-dimensional figures.	
Section B	I can use my understanding of geometry to solve problems. ☐ Find the perimeter of two-dimensional shapes using their properties. ☐ Find the unknown side lengths of two-dimensional shapes using their attributes. ☐ Solve problems involving symmetry, side lengths, and perimeter of two-dimensional figures.	