3rd GRADE MATH CURRICULUM

A farmer picked some apples. Some of the apples are packed into boxes and some are not.

From the list, choose 4 numbers that would make sense together in this situation. Write your choices in the table. Be ready to explain how your numbers make sense together.

400	300	240	12
350	290	230	10
340	280	170	5

total number of apples	number of apples not in boxes	number of boxes	number of apples in each box



Grade Level(s): 3rd Grade

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(Curriculum content aligns with the CT State Model Math Curriculum and is based on the Illustrative Math program used in grades K-9)

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.

Year At A Glance			
Unit Title	**Overarching Essential Question**	**Overarching Enduring Understanding**	**Vision of A Learner "I Can" Statements**
Introducing Multiplication	How will modeling with equal groups help us in understanding multiplication situations?	Real world situations involving equal groups and area can be represented with multiplication equations and models.	TCC4(3-5); CCE1(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); DE4(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Area and Multiplication	How does the area of a rectangle relate to multiplication?	The area of a rectangle can be found by multiplying the lengths of two adjacent sides of the rectangle.	TCC4(3-5); CCE1(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); DE4(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Wrapping Up Addition and Subtraction within 1000	How can I represent numbers in different ways?	We can use algorithms, a set of steps that works every time as long as the steps are carried out correctly, to solve problems and represent numbers in different ways	TCC4(3-5); CCE1(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); DE4(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Relating Multiplication to Division	How can we use multiplication to solve division problems?	Multiplication and division are related operations and there is an inverse relationship between them.	TCC4(3-5); CCE1(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); DE4(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Fractions as Numbers	What do fractions represent?	Fractions represent quantities where a whole is divided into equal-sized parts using models, manipulatives, words, and/or number lines.	TCC4(3-5); CCE1(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); DE4(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Measuring Length, Time, Liquid, Volume, and Weight	How do we use data represented in bar graphs and picture graphs to make sense of the world around us?	Information can be represented in bar graph and picture graph form to help us solve math problems.	TCC4(3-5); CCE1(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); DE4(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Two-Dimensional Shapes and Perimeter	How are area and perimeter similar and different?	Perimeter and area are both related to the measures of the sides of the	TCC4(3-5); CCE1(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); DE4(3-5);

		figure. Perimeter is measured in linear units and area is measured in square units.	TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Putting it All Together	How can we utilize our learning to develop strategies that get us ready to practice and apply our math skills?	We can create our own strategies for math warm-ups that will help us prepare for lessons by using our prior knowledge.	TCC4(3-5); CCE1(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); DE4(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)

Unit 1 - Introducing Multiplication

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.
- 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.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.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.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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.

- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Real world situations involving equal groups and area can be represented with multiplication equations and models. • Information can be represented in bar graph and picture graph form. These graphs can be used to help us solve one- and two-step math problems.	• How will modeling with equal groups help us in understanding multiplication situations? • How do we use data represented in picture graphs to make sense of the world around us?
Students will know...	**Students will be able to...**
• Multiplication is repeated addition. • The product is the result of multiplication. • Factors are the numbers being multiplied together. • For whole numbers A and B, the product A × B is represented by A groups with B objects in each group. • An array is an arrangement of objects into rows with an equal number of objects in each row and into columns with an equal number in each column. • The commutative property of multiplication can be described using an array	• Interpret picture graphs and bar graphs to generate questions (orally and in writing) about the data. • Represent data using bar graphs and picture graphs. • Solve one- and two-step problems using addition and subtraction within 20. • Interpret scaled picture graphs to generate questions (orally and in writing) about the data. • Represent data using scaled picture graphs. • Represent data using scaled bar graphsChoose an appropriate scale for a bar graph that represents a given data set. • Solve one-step "how many more" and "how many fewer" problems within 100, based on the data presented in scaled bar graphs. • Solve one- and two-step "how many more" and "how many fewer" problems within 100, based on the data presented in scaled bar graphs. • Write equations for multiplication situations and diagrams using a symbol for the unknown number.

	• Solve multiplication problems. • Build arrays with physical objects and describe them in terms of multiplication. • Represent an array situation with an equation with a symbol for the unknown number. • Solve multiplication problems involving arrays.

Key Vocabulary: category, chart, compare, data, equal groups, how many more/less, key, labels, model scale (of graph), multiplication, multiply, survey, symbol, tally marks, title, array, bar graph, commutative property, equation, factor, graph, picture graph, product, scaled bar graph, scaled picture graph

Assessment Evidence

Performance Tasks: Students choose a scale for a scaled bar graph and make the graph. Students read a scaled bar graph and answer questions about the data. Students write multiplication expressions to represent the number of dots in different images. Students demonstrate their understanding of equal groups situations. Students interpret an array situation with an unknown number of columns as a multiplication equation and then solve the equation.	**Other Evidence:** Various checkpoints throughout the unit for the following: • Represent data using a picture graph and a bar graph. • Interpret scaled picture and bar graphs. • Solve one- and two-step story problems using addition and subtraction. • Understand multiplication in terms of equal groups. • Represent and solve multiplication problems involving equal groups. • Represent and solve multiplication problems involving arrays.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.

- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

    - **Students represent and solve multiplication problems through the context of picture and bar graphs that represent categorical data.**

In this unit, students interpret and represent data on scaled picture graphs and scaled bar graphs. Then, they learn the concept of multiplication.

This is the first of four units that focus on multiplication. In this unit, students explore scaled picture graphs and bar graphs as an entry point for learning about equal-size groups and multiplication.

In grade 2, students analyzed picture graphs in which one picture represented one object and bar graphs that were scaled by single units. Here, students encounter picture graphs in which each picture represents more than one object and bar graphs that were scaled by 2 or 5 units. The idea that one picture can represent multiple objects helps to introduce the idea of equal-size groups.

Students learn that multiplication can mean finding the total number of objects in a groups of b objects each, and can be represented by a x b . They then relate the idea of equal groups and the expression a x b to the rows and columns of an array. In working with arrays, students begin to notice the commutative property of multiplication.

In all cases, students make sense of the meaning of multiplication expressions before finding their value, and before writing equations that relate two factors and a product.

Later in the unit, students see situations in which the total number of objects is known but either the number of groups or the size of each group is not known. Problems with a missing factor offer students a preview to division.

Throughout the unit, provide access to connecting cubes or counters, as students may choose to use them to represent and solve problems.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 2 - Area and Multiplication

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.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.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.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.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.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.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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.

- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Everyday objects have a variety of attributes, each of which can be measured in many ways. • The area of a rectangle can be found by multiplying the lengths of two adjacent sides of the rectangle.	• How does measurement relate to the attributes of objects? • How does the area of a rectangle relate to multiplication?
Students will know...	**Students will be able to...**
• Addition problem solving strategies. • Area is additive • There is a relationship between area and multiplication. • 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 overlaps, and then counting the number of square units used. • The process of finding area shifts from tiling and counting, to the multiplication of side lengths. • 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.	• Recognize areas as an attribute of plane figures and understand concepts of area measurement. • Measure areas by counting unit squares (square cm, square m, square in., square ft., and improvised units). • Explore and develop the conceptual understanding of “a unit square” with area “one square unit.” • Use tiling (without gaps or overlaps) to find the area of a rectangle by counting unit squares. • Use appropriate units (square cm, square m, square in, square ft, and improvised units). • Discover by tiling that the area is the same as would be by multiplying the side lengths; use whole number side lengths. • Explore finding the area of a rectangle by decomposing into two rectangular parts; finding the areas of the two smaller rectangles; and then adding to find the total area (a and b + c is the sum of a × b and a × c (distributive property)). • Explore and explain decomposing a figure composed of rectangles into non overlapping rectangles in order to find the area of the figure by adding areas of rectangles.

Key Vocabulary: attribute; decomposing; gap; nonstandard units; overlap; unit; array; linear; plane figure; rectangle; side length; square; centimeter; square feet; square inch; square meter; square unit; tiling

Assessment Evidence

Performance Tasks:
Students identify rectangles of a given area. Students find the area of an irregularly shaped figure on a square grid. Students are given the area of a rectangle. Using the definition of area, they identify possible side lengths of the rectangle. Students use a given rectangle, tiled by square units, to explain the relationship between multiplication and area and then to reason about a case of the distributive property. Students find the area of a figure composed of rectangles with no grid. Measurements are provided, allowing students to find area using a variety of strategies. Students find the area of a composite shape and relate it to the number of unit squares it takes to cover a space.

Other Evidence:
Various checkpoints throughout the unit for the following:

- Describe area as the number of unit squares that cover a plane figure without gaps and overlaps.
- Measure the area of rectangles by counting unit squares.
- Explain why the area of a rectangle can be determined by multiplying the side lengths.
- Solve problems involving the area of rectangles.
- Find the area of figures composed of rectangles.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

    - **Students learn about area concepts and relate area to multiplication and to addition**.

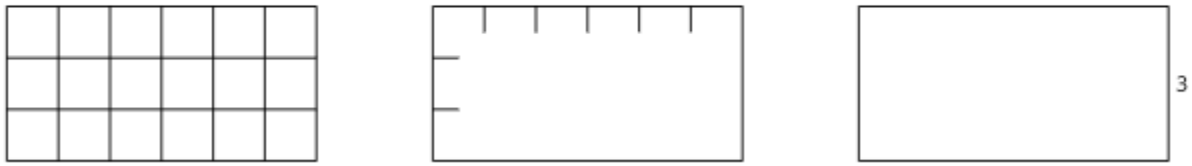
In this unit, students encounter the concept of area, relate the area of rectangles to multiplication, and solve problems involving area.

In grade 2, students explored attributes of shapes, such as number of sides, number of vertices, and length of sides. They measured and compared lengths (including side lengths of shapes).

In this unit, students make sense of another attribute of shapes: a measure of how much a shape covers. They begin informally, by comparing two shapes and deciding which one covers more space. Later, they compare more precisely by tiling shapes with pattern blocks and square tiles. Students learn that the area of a flat figure is the number of square units that cover it without gaps or overlaps.

Students then focus on the area of rectangles. They notice that a rectangle tiled with squares forms an array, with the rows and columns as equal-size groups. This observation allows them to connect the area of rectangles to multiplication—as a product of the number of rows and number of squares per row.
To transition from counting to multiplying side lengths, students reason about area using increasingly more abstract representations. They begin with tiled or gridded rectangles, move to partially gridded rectangles or those with marked sides, and end with rectangles labeled with their side lengths.

$$6 \times 3 = 18$$



Students also learn some standard units of area—square inches, square centimeters, square feet, and square meters—and solve real-world problems involving area of rectangles.

Later in the unit, students find the area and missing side lengths of figures composed of non-overlapping rectangles. This work includes cases with two non-overlapping rectangles sharing one side of the same length, which lays the groundwork for understanding the distributive property of multiplication in a later unit.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 3 - Wrapping Up Addition and Subtraction within 1000

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.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.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.NBT.A.1: Use place value understanding to round whole numbers to the nearest 10 or 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.
- 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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.

- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• We can use algorithms, a set of steps that works every time as long as the steps are carried out correctly, to solve problems and represent numbers in different ways • There are different ways to solve math problems and still get the correct answer. Choosing the strategy that works best for you after learning all of the strategies is an example of adapting and adjusting.	• How can I represent numbers in different ways? • What strategy works best for me?
Students will know... • Number line diagrams can be used to help think about the multiple of 10 or 100 to which a given number is closest. • When we find the nearest multiple of 10 or 100, we are rounding “to the nearest ten” or rounding “to the nearest hundred.” • A subtraction algorithm that uses expanded form allows us to see how the hundreds and tens are decomposed into smaller units.	**Students will be able to...** • Fluently add within 1,000 using algorithms based on place value and properties of operations. • Use place value understanding to compose and decompose numbers. • Fluently subtract within 1,000 using algorithms based on place value, properties of operations, and the relationship between addition and subtraction. • Round whole numbers to the nearest multiple of 10 and 100. • Assess the reasonableness of answers. • Solve two-step word problems using addition, subtraction, and multiplication. • Analyze tape diagrams that could represent the relationships in given situations and write corresponding equations to represent them.

Key Vocabulary: algorithm, analyze, tape diagram, round, place value, the nearest 10, the nearest 100, fluency, properties of operations, addition, subtraction, multiplication, addend, sum, compose, decompose, unknown, number line diagram, closest

Assessment Evidence	
Performance Tasks: Students examine statements about the numbers in the addition table. Students find sums with no approach suggested. Students perform subtraction within 1,000 and explain their strategy with equations. Students find the sums and differences within 1,000 with no reasoning required. Students round numbers to the nearest ten and hundred. Students select equations that represent the solution to a two-step problem. Students estimate a sum and difference and then calculate both.	**Other Evidence:** Various checkpoints throughout the unit for the following: ● Fluently add within 1,000 using algorithms based on place value and properties of operations. ● Use place value understanding to compose and decompose numbers. ● Fluently subtract within 1,000 using algorithms based on place value, properties of operations, and the relationship between addition and subtraction. ● Round whole numbers to the nearest multiple of 10 and 100. ● Assess the reasonableness of answers. ● Solve two-step word problems using addition, subtraction, and multiplication.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
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- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

    - **Students use place value understanding to round whole numbers and add and subtract within 1,000. They also represent and solve two-step word problems using addition, subtraction, and multiplication and assess the reasonableness of answers.**

In this unit, students work toward the goal of fluently adding and subtracting within 1,000. They use mental math strategies developed in grade 2 and learn algorithms based on place value.
In grade 2, students added and subtracted within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction. When students combine hundreds, tens, and ones, they use place value understanding. When they decompose numbers to add or subtract, they rely on the commutative and associative properties. When students count up to subtract, they use the relationship between addition and subtraction.
To move toward fluency, students learn a few different algorithms that work with any numbers and are generalizable to larger numbers and decimals. Students work with a variety of algorithms, starting with those that show expanded form, and moving toward algorithms that are more streamlined and closer to the standard algorithm.

$$\begin{array}{r} 300 + 30 + 7 \\ +\ 200 + 30 + 6 \\ \hline 500 + 60 + 13 \end{array}$$

$$\begin{array}{r} 60 \quad 13 \\ 500 + \cancel{70} + \cancel{3} \\ -\ 200 + 30 + 6 \\ \hline 300 + 30 + 7 \end{array}$$

Students explore various algorithms but are not required to use a specific one. They should, however, move from strategy-based work of grade 2 to algorithm-based work to set the stage for using the standard algorithm in grade 4. If students begin the unit with knowledge of the standard algorithm, it is still important for them to make sense of the place-value basis of the algorithm.
Understanding of place value also comes into play as students round numbers to the nearest multiple of 10 and 100. Students do not need to know a formal definition of “multiples” until grade 4. At this point, it is enough to recognize that a multiple of 10 is a number called out when counting by 10, or the total in a whole-number of tens (such as 8 tens). Likewise, a multiple of 100 is a number called out when counting by 100, or the total in a whole-number of hundreds (such as 6 hundreds). Students use rounding to estimate answers to two-step problems and determine if answers are reasonable.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 4 - Relating Multiplication to Division

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.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.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.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.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.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.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.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 = ?

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.

- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Multiplication and division are related operations and there is an inverse relationship between them. • Multiplication is simply repeated addition and division is simply repeated subtraction. • Modeling multiplication and division problems based upon their problem-solving structure can help in finding solutions.	• How can we use multiplication to solve division problems? • How can modeling multiplication and division problems help in finding their solutions?
Students will know...	**Students will be able to...**
• Multiplication and division facts • Multiplication is repeated addition • The product is the result of multiplication • Factors are the numbers being multiplied together • For whole numbers A and B, the product A × B is represented by A groups with B objects in each group • There are two major division situations: fair sharing (group size unknown) and repeated subtraction (number of groups unknown) • The dividend divided by the divisor is the quotient	• Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities • Use drawings and equations with a symbol for the unknown number to represent the problem • Determine the unknown whole number in a multiplication and division equation relating three whole numbers • Apply properties of operations as strategies to multiply and divide • Understand division as an unknown-factor problem

• There is a relationship between multiplication and division • Real-world mathematical situations can be represented using drawings and equations • An unknown can be in any position of a mathematical situation • The order of numbers in multiplication does not change the product because multiplication is commutative • 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	• Fluently multiply and divide within 100, using various strategies • Build on repeated addition models and rectangular arrays • Explore the commutative aspect of multiplication by building arrays and then area models • Interpret the "×" symbol as meaning equal groups of objects (multiplication) • Interpret the "÷" symbol as meaning partitioning the total into equal groups or an equal number in each group (division) • Explain the relationship between multiplication and division • Model and solve multiplication and division in real-world situations • Interpret a word problem using models to illustrate • 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 • Apply the conceptual understanding of properties to multiplication and division. • Use strategies to multiply and divide within 100 (without remainders). • Explain why some strategies may be more efficient than others.
Key Vocabulary: decomposing, divide, equal, equation, expression, grams, multiple, operation, array, commutative property, distributive property, Dividend, divisor, fact family/related facts, factor, inverse operation, multiplication, multiply, product, quotient, remainder, zero property	
Assessment Evidence	
Performance Tasks: Students demonstrate fluency for multiplication facts within 100. Students match a division equation with situations. Students match a situation with multiplication and division equations.Students solve a division problem. Students use what they know about multiplication and the distributive property or they may draw a diagram to show fluency with division within 100. Students evaluate multiplication expressions. Students find multiple solutions to a two-step problem using subtraction and division.	**Other Evidence:** Various checkpoints throughout the unit for the following: • Represent and solve "how many groups?" and "how many in each group?" problems. • Understand division as a missing-factor problem. • Use properties of operations to develop fluency with single-digit multiplication facts, and their related division facts. • Use properties of operations and place value understanding to develop strategies to multiply within 100 and to multiply one-digit numbers by a multiple of 10.

	• Use properties of operations, place value understanding, and the relationship between multiplication and division to divide within 100.

Learning Plan

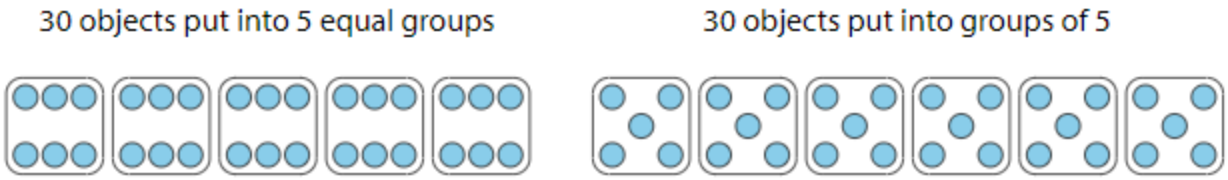
- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

    - **Students learn about and use the relationship between multiplication and division, place value understanding, and the properties of operations to multiply and divide whole numbers within 100. They also represent and solve two-step word problems using the four operations.**

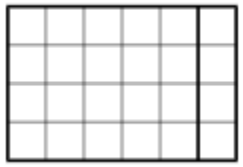
This unit introduces students to the concept of division and its relationship to multiplication.

Previously, students learned that multiplication can be understood in terms of equal-size groups. The expression 5 x 2 can represent the total number of objects when there are 5 groups of 2 objects, or when there are 2 groups of 5 objects.

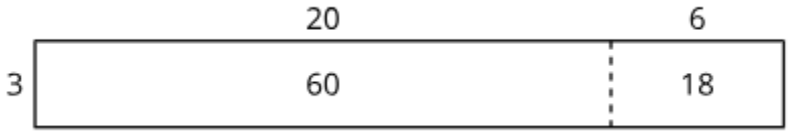
Here, students make sense of division also in terms of equal-size groups. For instance, the expression 30 ÷ 5 can represent putting 30 objects into 5 equal groups, or putting 30 objects into groups of 5. They see that, in general, dividing can mean finding the size of each group, or finding the number of equal groups.



Students use the relationship between multiplication and division to develop fluency with single-digit multiplication and division facts. They continue to reason about products of two numbers in terms of the area of rectangles whose side lengths represent the factors, decomposing side lengths and applying properties of operations along the way.



As they multiply numbers greater than 10, students see that it is helpful to decompose the two-digit factor into tens and ones and distribute the multiplication. For instance, to find the value of 26 x 3 , they can decompose the 26 into 20 and 6, and then multiply each by 3.



Toward the end of the unit, students solve two-step problems that involve all four operations. In some situations, they work with expressions that use parentheses to indicate which operation is completed first (for example: 276 + (45 ÷ 5) =).

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 5 - Fractions as Numbers

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.
- 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 parts of size 1/b.
- 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.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.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.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.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.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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.

- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Fractions represent quantities where a whole is divided into equal-sized parts using models, manipulatives, words, and/or number lines. • Fractions can be used as a tool to understand and model quantities and relationships. • Two fractions can be compared when the two fractions refer to the same whole.	• What do fractions represent? • When can fractions be compared?
Students will know...	**Students will be able to...**
• A fraction is a number showing a relationship between the parts and the whole. • The size of the fractional part is relative to the size of the whole. • Fractions are composed of unit fractions. • 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.	• Represent a whole using unit fractions. • Use the term numerator to indicate the number of parts and denominator to represent the total number of parts a whole is partitioned into. • Represent a fraction as the composition of unit fractions. • Divide a number line diagram into equal segments and label the appropriate fractional parts. • Identify if a whole is divided into equal parts. • Describe fractional parts using words. • Describe fractional parts using symbols.

• 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, ¼, 1/6, 1/8) • A unit fraction is the building block for fractions just as 1 is the building block for whole numbers. • A whole can be divided into any number of parts and recombined to make a whole. • When a fraction is written symbolically, there is a top number and a bottom number. • The bottom number (the denominator) describes how many equal parts the whole is divided into. • The top number (the numerator) describes how many of that size part there are. • A whole number can be expressed as a fraction • A fraction can be greater than one whole • A quantity greater than one can be represented with a mixed number • When comparing fractions with the same denominator, the fraction with the greater numerator is greater because more unit fractions are needed to make up the part. • When comparing unit fractions with different denominators, the fraction with the larger denominator is smaller because it takes more equal sized pieces to make the whole. • When comparing fractions, if the numerators are the same, then compare the denominators. • When comparing fractions, if the denominators are the same, then compare the numerators. • The symbols >, =, and < are used with fractions just as they are used with whole numbers.	• Count up fractional parts to build the understanding of unit fractions combining to make a whole. • Within a context, identify what the denominator describes. • Within a context, identify what the numerator describes. • Explore the representation of fractions on a number line diagram • Rename a point on a number line with an equivalent name for a whole, mixed number, or fraction. • Include examples of wholes and fractions greater than 1. • Explore and explain that given pairs of length models (fraction strips), fractions with denominators of either 2, 4, and 8 or 3 and 6, both models can have pieces of the same size. • Explore and explain which fraction is larger, given pairs of length models (fraction strips) of fractions with denominators of either 2, 4, and 8 or 3 and 6 and a fraction for each model.
Key Vocabulary: comparison, equal parts, equal, equivalence, equivalent, greater than, justify, less than, reasonable, denominator, eighth, equal, distance (intervals), fourth, fraction, half, line plot, linear measurement (using a unit fraction to show distance), number line, numerator, part – part - whole, partition, sixth, third, unit fraction	

Assessment Evidence	
Performance Tasks: Students shade a fraction of a rectangle. Students locate numbers in the form of fractions on the number line. Students identify equivalent ways of expressing a fraction. Students identify a fraction that is equivalent to a whole number expressed as a fraction. Students write two fractions that are equivalent to a fraction given. Students examine a false claim about writing a whole number as a fraction. Students decide if fraction comparison statements are correct. Students locate different numbers on a number line.	**Other Evidence:** Various checkpoints throughout the unit for the following: ● Understand that fractions are built from unit fractions such that a fraction a/b is the quantity formed by a parts of size $1/b$. ● Understand that unit fractions are formed by partitioning shapes into equal parts. ● Understand a fraction as a number and represent fractions on the number line. ● Explain equivalence of fractions in special cases and express whole numbers as fractions and fractions as whole numbers. ● Compare two fractions with the same numerator or denominator, record the results with the symbols >, =, or <, and justify the conclusions.

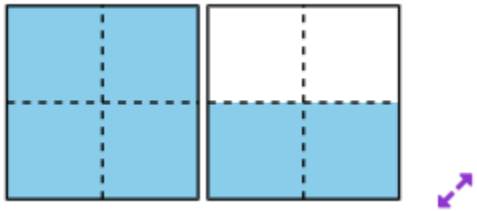
Learning Plan

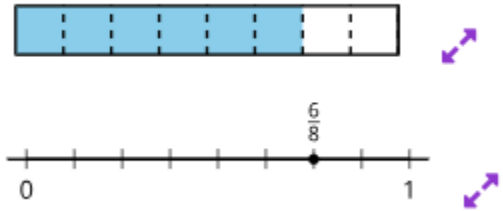
- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

    - **Students develop an understanding of fractions as numbers and of fraction equivalence by representing fractions on diagrams and number lines, generating equivalent fractions, and comparing fractions.**

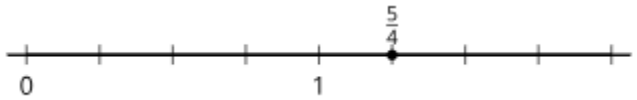
In this unit, students make sense of fractions as numbers, using various diagrams to represent and reason about fractions, compare their size, and relate them to whole numbers. The denominators of the fractions explored here are limited to 2, 3, 4, 6, and 8.

In grade 2, students partitioned circles and rectangles into equal parts and used the language “halves,” “thirds,” and “fourths.” Students begin this unit in a similar way, by reasoning about the size of shaded parts in shapes. Next, they create fraction strips by folding strips of paper into equal parts and later represent the strips as tape diagrams.

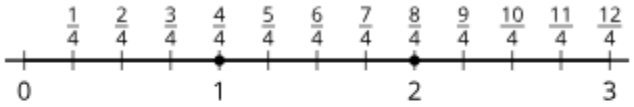




Using fraction strips and tape diagrams to represent fractions prepare students to think about fractions more abstractly: as lengths and locations on the number line. This work builds on students’ prior experience with representing whole numbers on the number line.
In each representation, students take care to identify 1 whole. This helps them reason about the size of the parts and whether a fraction is less or greater than 1. (Fractions greater than 1 are not treated as special cases.)



Students then use these representations to learn about equivalent fractions and to compare fractions.
They see that fractions are equivalent if they are the same size or at the same location on the number line, and that some fractions are the same size as whole numbers.



$$3 = \frac{12}{4}$$

Later in the unit, students compare fractions with the same denominator and those with the same numerator. They recognize that as the numerator gets larger, more parts are being counted, and as the denominator gets larger, the size of each part in a whole gets smaller.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 6 - Measuring Length, Time, Liquid, Volume, and Weight

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.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.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.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). 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.NBT.A.2:
- 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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.

- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Information can be represented in bar graph and picture graph form to help us solve math problems. • Metric measurement units are related to place value concepts/multiples of 10.	• How do we use data represented in bar graphs and picture graphs to make sense of the world around us? • How does metric measurement connect to multiples of 10?
Students will know...	**Students will be able to...**
• Metric measurements units for liquid volume and weight. • Time is measured in hours and minutes. • Time can be measured to the nearest minute. • Elapsed time measures the duration of an event. • Mass is measured in grams. • Liquid volume is measured in liters. • Mass and liquid volume word problems are solved using whole number strategies. • Data can be organized and represented in a picture graph, a bar graph, or a line plot. • 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. • Length measurement data can be generated and used to create a line plot. • The scale of a line plot can be whole numbers, halves, or quarters. • Symbols used in picture graphs and line plots should be consistently spaced and sized for visual accuracy. • Information presented in a graph can be used to solve problems involving the data in the graph.	• Tell and write time to the nearest minute. • Solve word problems involving elapsed time. • Use a number line or clocks to model elapsed time and record calculations. • Draw and label a picture graph and bar graph to represent a data set (including the scale, title, categories, etc.). • Generate measurement data by measuring lengths to the ¼ and ½ inch. • Using models and drawings, measure and estimate liquid volumes (liters) and mass (grams); use appropriate units. • Explore and explain the use of operations to solve one-step, real-world word problems involving masses or volumes given in the same units; use drawings or equations as appropriate. • Determine an appropriate scale for a given set of data. • Explore and record data in a scaled picture graph with several categories. • Interpret data to solve two-step problems (how many more/ how many less problems) using information displayed in a graph. • Use rulers marked with halves and fourths of an inch to gather measurement data. • Explore and record measurement data by creating a line plot, where the horizontal scale is marked off in appropriate units of whole numbers, halves, or quarters.

Key Vocabulary: Compare, data, estimate, graph, interval, liquid volume, mass, measure, metric, standard units, time intervals, Bar Graph, category title labels, Degree, grams (g), hour, kilograms (kg), line plot, liters (L), minute, Picture graph, scale (of graph), scaled bar graph, scaled picture graph, tally marks chart, time

Assessment Evidence

Performance Tasks:
Students measure the length of a rectangle with a ruler marked in quarter inches. Students choose objects that weigh about 1 kilogram. Students read the time from a clock and then solve an addition problem which goes to the next hour. Students create a line plot for measurements given in fractions. Students read the volume of liquid in two different containers and then compare them. Students subtract within 1,000 to answer a question about weights. Students use multiplication and division to solve problems about liquid volume. Students may make drawings, write expressions or equations, or reason with words to solve these problems.

Other Evidence:
Various checkpoints throughout the unit for the following:

- Measure lengths using rulers marked with halves and fourths of an inch to generate data for making a line plot.
- Measure and estimate weights and liquid volumes of objects.
- Solve problems involving addition and subtraction of time intervals in minutes.
- Tell time to the minute.
- Solve problems involving the four operations and measurement contexts.

Learning Plan

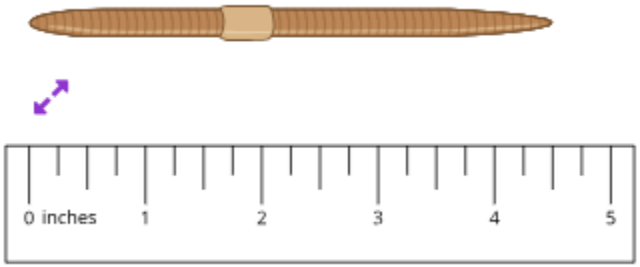
- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

- **Students generate and represent length measurement data in halves and fourths of an inch on line plots. They learn about and estimate relative units of measure including weight, liquid volume, and time, and use the four operations to solve problems involving measurement.**

In this unit, students measure length, weight, liquid volume, and time. They begin with a study of length measurement, building on their recent work with fractions.

In grade 2, students measured lengths using informal and formal units to the nearest whole number. They plotted length data on line plots. Here, students explore length measurements in halves and fourths of an inch. They use a ruler to collect measurements and then display the data on line plots, learning about mixed numbers and revisiting equivalent fractions along the way.

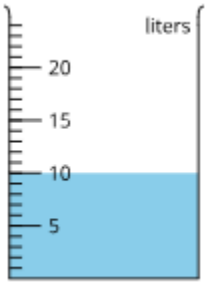
Kiran says that the worm is $4\frac{2}{4}$ inches long.
Jada says that the worm is $4\frac{1}{2}$ inches long.
Use the ruler to explain how both of their measurements are correct.



Next, students learn about standard units for measuring weight (kilograms and grams) and liquid volume (liters). To build a sense of weights such as 1 gram or 1 kilogram, students hold common objects such as paper clips and bottles of water.

To gain familiarity with liters, they fill a container with water by the liter and estimate the volume of everyday containers such as pots, tubs, and buckets. They then use the scale on measurement tools to measure and represent liquid volume.





From there, students move on to measure time. In grade 2, they told and wrote time to the nearest 5 minutes. Now, they tell time to the minute, using the relationship between the hour hand and the minute hand to make sense of times such as 3:57 p.m.

In the final section of the unit, students make sense of and solve problems related to all three measurements. The work here allows students to continue to develop their fluency with addition and subtraction within 1,000 and understanding of properties of operations. It also prompts them to use the relationship between multiplication and division to solve problems.
Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 7 - Two-Dimensional Shapes and Perimeter

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.
- 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.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.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.MD.D.8:
- 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.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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- DE4(3-5): I can recognize when my peers need support and respectfully include everyone in all environments throughout the day.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.

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- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

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Understandings: Students will understand that...

- Perimeter and area are both related to the measures of the sides of the figure. Perimeter is measured in linear units and area is measured in square units.

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Essential Questions:

- How are area and perimeter similar and different?

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Students will know...

- Perimeter is found by adding all the outside (exterior) side lengths of a polygon.
- An unknown side length of a polygon can be computed 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.

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Students will be able to...

- 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.
- Explore finding the perimeter of polygons with given side lengths.
- Explore and explain finding an unknown side length, e.g., find an unknown side length given the perimeter and all but one side length; find an unknown side length given the perimeter of a square; find an unknown side length given a figure composed of two rectangles with some side lengths given, etc.
- Explore and explain finding the perimeter of a polygon based on its properties, e. g., given the side length 6 cm, find the perimeter of the square.
- Construct rectangles that have the same perimeters but different areas.
- Construct rectangles that have the same area but different perimeters.
- Solve real-world and mathematical problems involving perimeters of polygons
- Relate area to the operations of multiplication and addition.

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	• 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.

Key Vocabulary: attribute, decomposing, gap, nonstandard units, overlap, perimeter, unit, array, linear, plane figure, polygon, quadrilateral, rectangle, side length, square centimeter, square feet, square inch, square meter, square unit, tiling, unknown, two-dimensional

Assessment Evidence

Performance Tasks:
Students identify common and distinguishing properties of two quadrilaterals belonging to different categories. Students decide if a shape on a grid is a rhombus, rectangle, or square. Students find the perimeter of a rectangle. Students find the perimeter of a polygon with all side lengths provided. Students use the properties of quadrilaterals to decide if they have enough information to determine the perimeter or area of a shape. Students find rectangles with the same area and different perimeter. Students find rectangles with a specified perimeter and different areas in context.

Other Evidence:
Various checkpoints throughout the unit for the following:

- Reason about shapes and their attributes.
- Find the perimeter of two-dimensional shapes, including when all or some side lengths are given.
- Find the perimeter of polygons, including when all or some side lengths are given.
- Solve problems involving perimeter and area, in and out of context.
- Apply geometric understanding to solve problems.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
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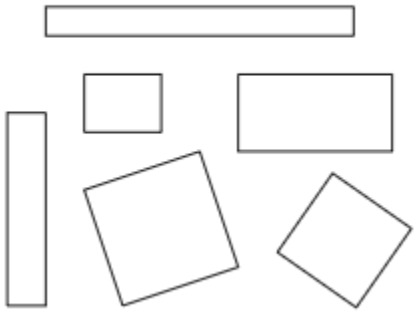
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

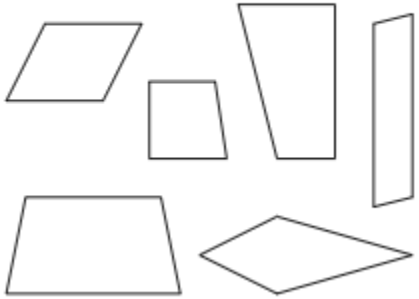
- **Students reason about shapes and their attributes, with a focus on quadrilaterals. They solve problems involving the perimeter and area of shapes.**

In this unit, students reason about attributes of two-dimensional shapes and learn about perimeter.
Students began to describe, compare, and sort two-dimensional shapes in earlier grades. Here, they continue to do so and to develop language that is increasingly more precise to describe and categorize shapes. Students learn to classify broader categories of shapes (quadrilaterals and triangles) into more specific sub-categories based on their attributes. For instance, they study examples and non-examples of rhombuses, rectangles, and squares, and come to recognize their specific attributes.

These are rectangles.

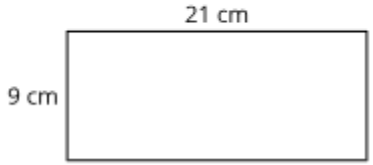


These are not rectangles.



Students also expand their knowledge about attributes that can be measured.
Previously, they learned the meaning of area and found the area of rectangles and figures composed of rectangles. In this unit, students learn the meaning of perimeter and find the perimeter of shapes. They consider geometric attributes of shapes (such as opposite sides having the same length) that can help them find perimeter.

Find the perimeter of this rectangle.



As the lessons progress, they consider situations that involve perimeter, and then those that involve both perimeter and area. These lessons aim to distinguish the two attributes (which are commonly confused) and reinforce that perimeter measures length or distance (in length units) and area measures the amount of space covered by a shape (in square units). At the end of the unit, students solve problems in a variety of contexts. They apply what they learn about geometric attributes of shapes, perimeter, and area, to design a park, a West African wax print pattern, and a robot. They then solve problems within the context of their design.
Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 8 - Putting it All Together

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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 parts 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.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
- 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.
- 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.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.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.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.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.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.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.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.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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
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- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• We can create our own strategies for math warm-ups that will help us prepare for lessons by using our prior knowledge.	• How can we utilize our learning to develop strategies that get us ready to practice and apply our math skills?
Students will know...	**Students will be able to...**
• Key ideas about fractions: what fractions mean, whole numbers as fractions, and fraction comparisons • A scaled bar graph can be used to represent a data set with several categories • 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.	• Estimate fractions represented in diagrams and on number lines • Record the results of comparisons with the symbols >, =, or <. • Represent fractions on a number line • Apply understanding of area and perimeter to solve problems about design • Solve problems about the cost of finishing a room in a tiny house • Collect categorical data to create 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.

	• Interpret representations of the relationship between multiplication and division • Represent the relationship between multiplication and division. • Apply understanding of equal groups to create a Notice and Wonder activity • Apply understanding of equal groups and multiplication to create a How Many Do You See activity • Apply understanding of measuring objects to the nearest half and fourth of an inch to create an Estimation Exploration activity • Apply understanding of addition and subtraction within 1,000 to create a Number Talk activity
Key Vocabulary: interpret, represent, apply, notice and wonder, how many do you see, nearest, estimate, Estimation Exploration, Number Talk, number line, perimeter, area, scaled bar graphs, categorical data, comparisons, symbols	
Assessment Evidence	
Performance Tasks: Students identify different expressions for the area of a rectangle, including both multiplication expressions and an addition expression. Students find the area of a composite rectangular shape. Students calculate a time from a context and then identify the time on a clock. Students write an equation to represent an equal groups situation. Students describe situations that are represented by a multiplication equation and a division equation each with an unknown. Students write a multiplication and a division equation using a ? for the unknown to represent an equal groups situation. They may solve using any method. Students solve a two-step arithmetic problem within 1,000. Students choose different representations of a point on a number line. Students identify diagrams that show $2/3$. Students locate different fractions on the number line.Students explain why an even number multiplied by 5 is a number whose last digit is 0. Students compare fractions using <, >, and =. Students find products and quotients within 100. Students find multiple pairs of numbers they can multiply to get a given number within 100. Students make sums and differences out of digits which they find using a spinner. Students represent two situations with division equations.	**Other Evidence:** Various checkpoints throughout the unit for the following: • Understand a fraction as a number and represent fractions on the number line. • Apply concepts of measurement and data to solve problems. • Develop fluency with single-digit multiplication facts and their related division facts. • Review the major work of the grade by creating and designing instructional routines.

Students choose plants for a garden. They first answer some specific questions that give them familiarity with the context and then design their own garden. There are many choices students may make for their gardens but the restrictions mean that they need to use one of the plants that only takes up a fraction of a foot of space. They will need to think carefully about where to place each plant so that it has enough distance on all sides.	

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
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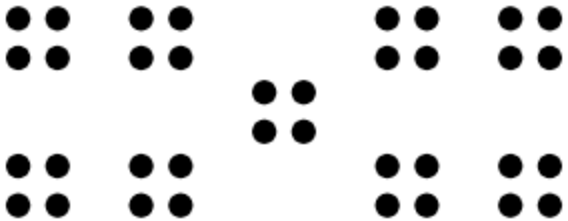
- AA4(3-5): I can be open to other ideas to grow my thinking.

- Students consolidate and solidify their understanding of various concepts and skills related to major work of the grade. They also continue to work toward fluency goals of the grade.

In this unit, students revisit major work and fluency goals of the grade, applying their learning from the year.
In section A, students reinforce what they learned about fractions, their size, and their location on the number line. In section B, students deepen their understanding of perimeter, area, and scaled graphs by solving problems about measurement and data. Two of the lessons invite students to design a tiny house that meet certain conditions and calculate the cost for furnishing it.
Section C enables students to work toward multiplication and division fluency goals through games. In the final section, students review major work of the grade as they create activities in the format of the warm-up routines they have encountered throughout the year (Notice and Wonder, Estimation Exploration, Number Talk, and How Many Do You See?).

How many do you see? How do you see them?



The concepts and skills strengthened in this unit prepare students for major work in grade 4: comparing, adding, and subtracting fractions, multiplying and dividing within 1,000, and using the standard algorithm to add and subtract multi-digit numbers within 1 million.
The sections in this unit are standalone sections, not required to be completed in order. Within each section, many lessons can also be completed independently of the ones preceding them. The goal is to offer ample opportunities for students to integrate the knowledge they have gained and to practice skills related to the expected fluencies of the grade.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits