Bristol Public Schools

Office of Teaching & Learning

Department	Mathematics
Department Philosophy	*Students learn by doing math, solving problems in mathematical and real-world contexts, and constructing arguments using precise language.* The Bristol mathematics curricula embeds this *learn-by-doing* philosophy by focusing on high expectations for all students and providing students with opportunities that build conceptual understanding, computational and procedural fluency, and problem solving through the use of a variety of strategies, tools, and technologies. The mathematics curriculum is responsive to the individual needs of students, while providing a structure tied to the Common Core State Standards in Connecticut. The *learn-by-doing* philosophy develops mathematically literate and productive students who can effectively and efficiently apply mathematics in their lives to make informed decisions about the world around them by doing math. To be mathematically literate, one must understand major mathematics concepts, possess computational facility, and have the ability to apply these understandings to situations in daily life. Making connections between mathematics and other disciplines is key to the appropriate application of mathematics skills and concepts to solve problems. The ability to read, discuss, and write within the discipline of mathematics is an integral skill that supports mathematical understanding, reasoning and communication. The opportunity to think critically and creatively to solve problems is important to deepen mathematical knowledge and foster innovation. A rich hands-on mathematical experience is essential to provide the foundational knowledge and skills that prepare students to be mathematically literate, productive citizens.
Course	Grade 3 Mathematics
Grade Level	Grade 3
Pre-requisites	Grade 2

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

District Learning Expectations and Standards	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	**Unit 7**	**Unit 8** (optional)
Operations and Algebraic Thinking								
Represent and solve problems involving multiplication and division.								
3.OA.A.1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*	M							M
3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.				M				
3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	M			M		M		M
3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 =?	M			M				
Understand properties of multiplication and the relationship between multiplication and division.								
3.OA.B.5 Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40	M	M	M	M				

and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)								
3.OA.B.6 Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.				M				M
Multiply and divide within 100.								
3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.				M				M
Solve problems involving the four operations, and identify and explain patterns in arithmetic.								
3.OA.D.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.			M	M			M	M
3.OA.D.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.	M	M	M	M				
Number and Operations in Base Ten								
Use place value understanding and properties of operations to perform multi-digit arithmetic.								
3.NBT.A.1 Use place value understanding to round whole numbers to the nearest 10 or 100.			A					

3.NBT.A.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.			A					A
3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.				A				
Number and Operations - Fractions								
Develop understanding of fractions as numbers.								
3.NF.A.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a part of size 1/b.					M			M
3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.					M			M
3.NF.A.2.A Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.					M	M		M
3.NF.A.2.B Represent a fraction a/b on a number line diagram by marking off a length 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.					M			M
3.NF.A.3.A Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.					M			M
3.NF.A.3.B Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.					M			M
3.NF.A.3.C Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express					M	M		M

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

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

3.MD.D.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters							A	A
Geometry								
Reason with shapes and their attributes.								
3.G.A.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.							S	S
3.G.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.					S			

UNIT 1: INTRODUCING MULTIPLICATION
Illustrative Mathematics Unit Focus: Students represent and solve multiplication problems through the context of picture and bar graphs that represent categorical data. **Essential Questions:** Why do we collect, organize, represent and analyze data? What are the different types of multiplication and division problems? How can we show mathematical situations in word problems? **Unit Pacing: 28 days (20 required lessons, 6 flex, 2 assessment and reaction)**

UNWRAPPED STANDARDS

Grade Level Standard	Standard Progression	Concepts (Big Ideas/ Understandings)	Academic Vocabulary (Standard Based)
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.*	In Grade 2, students found the total number of objects using rectangular arrays, such as a 5 x 5, and wrote equations to represent the sum. This strategy is a foundation for multiplication because students should make a connection between repeated addition and multiplication. Students need to experience problem-solving involving equal groups (whole unknown or size of group is unknown) and multiplicative comparison (unknown product, group size unknown or number of groups unknown) as shown in Table 2 of the Common Core State Standards for Mathematics, page 89.	Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems.	Equal Equal groups Multiplication Expression Factors Multiply Product Interpret
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.	Students use mathematicals tools, such as sets of counters to represent situations involving equal groups or arrays. They should represent the model used as a drawing or equation to find the solution. Relating Equal Group situations to arrays, and indicating rows or columns within arrays, can help students see that a corner object in an array (or a corner square in an area model) is not double counted: at a given time, it is counted as part of a	Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems.	Array Rows Columns Factors Product Variable/Unknown Multiplication Expression Multiplication symbol

	row or as a part of a column, but not both. Problems in terms of “rows” and “columns,” e.g., “The apples in the grocery window are in 3 rows and 6 columns,” are difficult because of the distinction between the number of things in a row and the number of rows. There are 3 rows but the number of columns (6) tells how many are in each row. There are 6 columns, but the number of rows (3) tells how many are in each column. Students do need to be able to use and understand these words, but this understanding can grow over time while students also learn and use the language in other multiplication and division situations.		
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 = ?	Students can use known multiplication facts to determine the unknown fact in a multiplication or division problem. Have them write a multiplication or division equation and the related multiplication or division equation. For example, to determine the unknown of the related multiplication fact of 3 × 9 = 27. They should ask themselves questions such as, “How many 3s are in 27?” or “3 times what number is 27?” Have them justify their thinking with models or drawings.	Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems.	Factors Product Multiplication Equation Expression Multiplication symbol Variable/Unknown Determine
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.	Patterns make multiplication by some numbers easier to learn than multiplication by others, so approaches may teach multiplications and divisions in various orders depending on what numbers are seen as or are supported to be easiest. All of the understandings of multiplication and division situations, of the levels of representation and solving, and of patterns need to culminate by the end of Grade 3 in fluent multiplying and dividing of all single-digit numbers and 10. Organizing practice so that it focuses most heavily on understood, but not yet fluent, products and unknown factors can speed up learning. To achieve this by the end of Grade 3, students must begin working toward fluency for the easy numbers as early as possible.	Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems.	Product Factors Multiplication Related facts Commutative Property Distributive Property Associative Property Fluently

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.)	Students need to apply properties of operations (commutative, associative and distributive) as strategies to multiply and divide. Applying the concept involved is more important than students knowing the name of the property. Understanding the commutative property of multiplication is developed through the use of models as basic multiplication facts are learned. For example, the result of multiplying 3 x 5 (15) is the same as the result of multiplying 5 x 3 (15). To find the product of three numbers, students can use what they know about the product of two of the factors and multiply this by the third factor. For example, to multiply 5 x 7 x 2, students know that 5 x 2 is 10. Then, they can use mental math to find the product of 10 x 7 (70). Allow students to use their own strategies and share with the class when applying the associative property of multiplication. Splitting arrays can help students understand the distributive property. They can use a known fact to learn other facts that may cause difficulty. For example, students can split a 6 x 9 array into 6 groups of 5 and 6 groups of 4; then, add the sums of the groups. In the array situations, the roles of the factors do not differ. One factor tells the number of rows in the array, and the other factor tells the number of columns in the situation. However, rows and columns depend on the orientation of the array. If an array is rotated 90º, the rows become columns and the columns become rows. This is useful for seeing the commutative property for multiplication in rectangular arrays and areas.	The order of numbers in multiplication does not change the product. Numbers can be regrouped in a multiplication problem without changing the product. In multiplication, one factor can be decomposed into parts; each part is multiplied separately by the other factor, then the results are added.	Commutative property Associative property 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	In second grade, students determine whether a number up to 20 is odd or even, skip count by 5s, 10s, or 100s. In third grade, students use these skills to identify arithmetic patterns and explain them using properties of operations. They can explore patterns by determining likenesses,	Identifying and describing generalizations about patterns can help us understand a variety of numerical concepts.	Pattern Commutative Property Associative Property Distributive Property

number can be decomposed into two equal addends.	differences and changes. Students use patterns in addition and multiplication tables.		
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.	Students now draw picture graphs in which each picture represents more than one object, and they draw bar graphs in which the height of a given bar in tick marks must be multiplied by the scale factor in order to yield the number of objects in the given category. These developments connect with the emphasis on multiplication in this grade.	We collect, organize, represent, and analyze data in order to answer a question or solve a problem. The key of a picture graph tells how many items each picture or symbol represents. A scaled graph (bar graph or line plot) is labeled using equal-sized intervals along the axes. The scale of a bar graph varies depending on the data set.	Bar graph Picture graph Key Scaled bar graph Scaled picture graph Interpret

UNIT 1: INTRODUCING MULTIPLICATION

Why do we collect, organize, represent and analyze data?
What are the different types of multiplication and division problems?
How can we show mathematical situations in word problems?

CCSS Standards #	Learning Targets	Summative Assessment Strategy	Lesson Progression and Connection to Math Practices	Common Learning Experiences and Assessments
Section A: Interpret and Represent Data Sets on Scaled Graphs				
3.MD.B.3	I can interpret scaled graphs.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students interpret and draw picture graphs and bar graphs to represent a data set. Students build on the work done in grade 2 to create scaled picture and bar graphs where each picture or square represents more than one object. They work with familiar number scales of 2, 5, and 10.	**Mandatory Lessons/Activities:** iM Lessons 1, 2, 3, 4, 5, 6, 7, 8
Pacing:	8 days		**Math Practices:** SMP 1, 3, 4, 6, 7	**Assessments:** Cool-downs 3, 7, 8

				Checkpoint A
Section B: From Graphs to Multiplication				
3.OA.A.1 3.OA.A.3 3.OA.A.4 3.OA.C.7 3.OA.D.9	I can represent and solve multiplication problems. I can find the unknown number in a multiplication equation.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students build on their work with scaled picture graphs and bar graphs to understand multiplication as equal groups of objects. Students represent multiplication situations using equal groups drawings and tape diagrams that show groups. Students relate these representations to numerical expressions and interpret expressions such as 4 x 2 to mean “4 groups of 2.” Finally, students represent multiplication situations using equations, and find unknown factors and products. Although students do not formally use division language, they use unknown factor situations and equations to begin to grapple with the relationship between multiplication and division.	**Mandatory Lessons/Activities:** iM Lessons 9, 10, 11, 12, 13, 14, 15
Pacing:	7 days		**Math Practices:** SMP 1, 2, 3, 4, 5, 6, 8	**Assessments:** Cool-downs 12, 14, 15 Checkpoint B
Section C: Represent Multiplication with Arrays and the Commutative Property				
3.MD.B.3 3.OA.A.1 3.OA.A.3 3.OA.B.5	I can represent and solve multiplication problems.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students connect their work with equal group representations in the previous section to arrays, a representation that was introduced in grade 2. Students look for equal groups in the array and see that the rows and columns of arrays show equal groups. Students solve multiplication problems in context and are encouraged to use a representation that makes sense to them. Students write equations to represent arrays, including equations with an unknown. At the end of the section, they use the structure of the array to make sense of the commutative property of multiplication.	**Mandatory Lessons/Activities:** iM Lessons 16, 17, 18, 19, 20

Pacing:	6 days		Math Practices: SMP 1, 2, 3, 4, 5, 6, 8	Assessments: Cool-downs 18 and 19 Checkpoint C

ADDITIONAL CONSIDERATIONS			
COMMON MISCONCEPTIONS	**PRIOR KNOWLEDGE NEEDED TO MASTER STANDARDS FOR THIS UNIT**	**ADVANCED STANDARDS FOR STUDENTS WHO HAVE DEMONSTRATED PRIOR MASTERY**	**OPPORTUNITIES FOR STUDENT-DIRECTED LEARNING WITHIN THE UNIT**
Although intervals on a bar graph are not in single units, students sometimes count each square as one. To avoid this error, have students include tick marks between each interval. Students should begin each scale with 0. They should think of skip-counting when determining the value of a bar since the scale is not in single units. Students get confused when thinking about the number of groups and the number in each group. They may have trouble identifying this information in a problem situation (which number represents the total number of groups and/or the number of items in each group). Students add the two numbers without thinking about the equal groups that the numbers represent.	3.OA.A.1: 2.OA.C.3, 2.OA.C.4 3.OA.A.3: 3.OA.A.1 3.OA.C.7: 3.OA.A.3 3.OA.D.9: 2.OA.C.3, 2.NBT.A.2 3.MD.B.3: 2.MD.D.10	Choose from iM leveled centers and exploration problems to differentiate for students who are ready.	iM Centers District-approved online resources

RESOURCES
Kendall Hunt Flourish Blackline masters and materials from Teacher Resource Pack Chart paper, sticky notes, connecting cubes/color tiles/counters, markers, poster paper

UNIT 2: AREA AND MULTIPLICATION			
Illustrative Mathematics Unit Focus: Students learn about area concepts and relate area to multiplication and to addition. **Essential Questions:** What are we measuring when we find area? What are the different types of multiplication problems? How can we show mathematical situations in word problems? **Unit Pacing: 20 days (14 required lessons, 4 flex, 2 assessment and reaction)**			
UNWRAPPED STANDARDS			
Grade Level Standard	**Standard Progression**	**Concepts (Big Ideas/ Understandings)**	**Academic Vocabulary (Standard Based)**
3.MD.C.5: Recognize area as an attribute of plane figures and understand concepts of area measurement.	Students need to learn to conceptualize area as the amount of two dimensional space in a bounded region and to measure it by choosing a unit of area, often a square. A two-dimensional geometric figure that is covered by a certain number of squares without gaps or overlaps can be said to have an area of that number of square units. Students can cover rectangular shapes with tiles and count the number of units (tiles) to begin developing the idea that area is a measure of covering. Area describes the size of an object that is two-dimensional. The formulas should not be introduced before students discover the meaning of area.	Area is an attribute of plane figures that is measured using square units.	Area Square unit Figure Attribute
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.		Area is an attribute of plane figures that is measured using square units.	
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.		Area is an attribute of plane figures that is measured using square units. Area is found by covering the inside of a two-dimensional plane figure with square units without gaps or overlap and then counting the number of square units used.	

3.MD.C.6: Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	Students need to develop the meaning for computing the area of a rectangle. Students can lay out unit squares and count how many square units it takes to completely cover the rectangle without overlaps or gaps. A connection needs to be made between the number of squares it takes to cover the rectangle and the dimensions of the rectangle. Ask questions such as: • What does the length of a rectangle describe about the squares covering it? • What does the width of a rectangle describe about the squares covering it?	Area is an attribute of plane figures that is measured using square units. Area is found by covering the inside of a two-dimensional plane figure with square units without gaps or overlap and then counting the number of square units used.	Area Square unit Square centimeter Square foot Square inch Square meter
3.MD.C.7: Relate area to the operations of multiplication and addition.	Students can be taught to multiply length measurements to find the area of a rectangular region. But, in order to make sense of these quantities, they first learn to interpret measurement of rectangular regions as a multiplicative relationship of the number of square units in a row and the number of rows. Students learn to understand and explain that the area of a rectangular region of, for example, 12 length-units by 5 length-units can be found either by multiplying 12 x 5 or by adding two products, e.g., 10 x 5 and 2 x 5, illustrating the distributive property.	The area of a rectangle can be found by multiplying the lengths of two adjacent sides of the rectangle.	Area Side lengths Square unit Formula Tiling
3.MD.C.7.a: Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.	The concept of multiplication can be related to the area of rectangles using arrays. Students need to discover that the length of one dimension of a rectangle tells how many squares are in each row of an array and the length of the other dimension of the rectangle tells how many squares are in each column. Ask questions about the dimensions if students do not make these discoveries. For example: • How do the squares covering a rectangle compare to an array? • How is multiplication used to count the number of objects in an array?		
3.MD.C.7.b: Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.			

3.MD.C.7.c: Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning. 3.MD.C.7.d: Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	Students should also make the connection of the area of a rectangle to the area model used to represent multiplication. This connection justifies the formula for the area of a rectangle. Provide students with the area of a rectangle (i.e., 42 square inches) and have them determine possible lengths and widths of the rectangle. Expect different lengths and widths such as, 6 inches by 7 inches or 3 inches by 14 inches.	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.	Area Side lengths Square unit Formula Decompose Distributive Property Tiling
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.*	In Grade 2, students found the total number of objects using rectangular arrays, such as a 5 x 5, and wrote equations to represent the sum. This strategy is a foundation for multiplication because students should make a connection between repeated addition and multiplication. Students need to experience problem-solving involving equal groups (whole unknown or size of group is unknown) and multiplicative comparison (unknown product, group size unknown or number of groups unknown) as shown in Table 2 of the Common Core State Standards for Mathematics, page 89.	Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems.	Equal groups Multiplication Expression Factors Multiply Product Interpret
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.)	Students need to apply properties of operations (commutative, associative and distributive) as strategies to multiply and divide. Applying the concept involved is more important than students knowing the name of the property. Understanding the commutative property of multiplication is developed through the use of models as basic multiplication facts are learned. For example, the result of multiplying 3 x 5 (15) is the same as the result of multiplying 5 x 3 (15). To find the product of three numbers, students can use what they know about the product of two of the factors and multiply this by the third factor. For example, to multiply 5 x 7 x 2, students know that 5 x 2 is 10. Then, they can use mental math to find the product of 10 x 7 (70). Allow students to use their own strategies and share with the class when applying the associative property	The order of numbers in a multiplication problem does not change the product. Numbers can be regrouped in a multiplication problem without changing the product. In multiplication, one factor can be decomposed into parts; each part is multiplied separately by the other factor, then the results are added.	Commutative Property Associative Property Distributive Property

	of multiplication. Splitting arrays can help students understand the distributive property. They can use a known fact to learn other facts that may cause difficulty. For example, students can split a 6 x 9 array into 6 groups of 5 and 6 groups of 4; then, add the sums of the groups. In the Array situations, the roles of the factors do not differ. One factor tells the number of rows in the array, and the other factor tells the number of columns in the situation. But rows and columns depend on the orientation of the array. If an array is rotated 90º, the rows become columns and the columns become rows. This is useful for seeing the commutative property for multiplication in rectangular arrays and areas.		
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.	In second grade, students determine whether a number up to 20 is odd or even, skip count by 5s, 10s, or 100s. In third grade, students use these skills to identify arithmetic patterns and explain them using properties of operations. They can explore patterns by determining likenesses, differences and changes. Use patterns in addition and multiplication tables.	Identifying and describing generalizations about patterns can help us understand a variety of numerical concepts.	Pattern Commutative Property Associative Property Distributive Property
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.	At Grade 3, the major focus is multiplication, so students' work with addition and subtraction is limited to maintenance of fluency within 1000 for some students and building fluency to within 1000 for others...They focus on methods that generalize readily to larger numbers so that these methods can be extended to 1,000,000 in Grade 4 and fluency can be reached with such larger numbers. Fluency within 1000 implies that students use written methods without concrete models or drawings, though concrete models or drawings can be used with explanations to overcome errors and to continue to build understanding as needed.	Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic.	Place value Hundreds Tens Ones Associative Property Commutative Property Identity Property Digit Algorithm Strategy Sum Difference Addends

<table>
<tr><th colspan="5">UNIT 2: AREA AND MULTIPLICATION</th></tr>
<tr><td colspan="5">What are we measuring when we find area?
What are the different types of multiplication and division problems?
How can we show mathematical situations in word problems?</td></tr>
<tr><th>CCSS Standards #</th><th>Learning Targets</th><th>Summative Assessment Strategy</th><th>Lesson Progression and Connection to Math Practices</th><th>Common Learning Experiences and Assessments</th></tr>
<tr><th colspan="5">Section A: Concepts of Area Measurement</th></tr>
<tr><td>3.MD.C.5
3.MD.C.5.a
3.MD.C.5.b
3.MD.C.6
3.OA.A.1
3.MD.C.7.a</td><td>I can measure the area of a rectangle by counting unit squares.</td><td rowspan="2">X Selected Response
X Constructed Response
   Performance
X Observation</td><td>Lesson Progression:
Students spend time reasoning about areas as an attribute of two-dimensional shapes. They develop a sense of area as the amount of space covered by a shape. Then they tile shapes with squares and learn that the shape must be tiled with no gaps or overlaps to find the area by counting the number of squares. Students may apply the work of the previous unit to skip count or use multiplication to find the number of square tiles used to cover a space. Students use a number of square units to describe the area of the shape.</td><td>Mandatory Lessons/Activities:
iM Lessons 1,2,3,4</td></tr>
<tr><td>Pacing:</td><td>4 days</td><td>Math Practices:
SMP 1, 2, 3, 4, 5, 6, 7</td><td>Assessments:
Cool-downs 3 and 4
Checkpoint A</td></tr>
<tr><th colspan="5">Section B: Relate Area to Multiplication</th></tr>
<tr><td>3.OA.B.5
3.MD.C.6
3.MD.C.7.b
3.OA.D.9
3.MD.C.7.d</td><td>I can find the area of a rectangle by multiplying the side lengths.</td><td>X Selected Response
X Constructed Response
   Performance
X Observation</td><td>Lesson Progression:
Students build on their understanding of measuring area by counting squares as they relate the area of rectangles to multiplication expressions. Students represent whole-number products as rectangular areas as they see equal groups in the rows and columns of rectangular areas filled with squares. They understand that multiplying side lengths of a rectangle gives the same area as counting squares. Students are</td><td>Mandatory Lessons/Activities:
iM Lesson 5,6,7,8,9,10</td></tr>
</table>

			introduced to standard square units, such as inches, centimeters, feet, and meters and make sense of when different square units might be used. Students move from working exclusively with gridded rectangles to those that do not show the individual units of area. Students continue to build understanding of area through situations and multiply side lengths of rectangles to solve real-world and mathematical problems related to area.	
Pacing:	7 days		**Math Practices:** SMP 1, 2, 3, 4, 5, 6, 7, 8	**Assessments:** Cool-downs 8 and 10 Checkpoint B
Section C: Find Area of Figures Composed of Rectangles				
3.MD.C.5 3.MD.C.6 3.MD.C.7.b 3.MD.C.7.d 3.NBT.A.2	I can find the area of a figure composed of rectangles.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students understand that area is additive as they find the area of figures composed of rectangles by decomposing them into non-overlapping rectangles. Students continue to find area by multiplying side lengths of rectangles as they move from seeing gridded figures to seeing partially gridded figures to seeing figures with only side length measurements. Students also use their knowledge of the structure of rectangles to find missing side lengths in figures composed of rectangles.	**Mandatory Lessons/Activities:** iM Lessons 12, 13, 14
Pacing:	4 days		**Math Practices:** SMP 1, 3, 4, 5, 6, 7	**Assessments:** Cool-down 13 Checkpoint C

ADDITIONAL CONSIDERATIONS			
COMMON MISCONCEPTIONS	**PRIOR KNOWLEDGE NEEDED TO MASTER STANDARDS FOR THIS UNIT**	**ADVANCED STANDARDS FOR STUDENTS WHO HAVE DEMONSTRATED PRIOR MASTERY**	**OPPORTUNITIES FOR STUDENT-DIRECTED LEARNING WITHIN THE UNIT**
Students may not completely cover a shape with unit squares but may instead only put squares around the border of the shape. Students may not count all of the squares that cover the shape or may incorrectly count them (for example, double count a corner square). Students may think area is a linear measurement. Pose problem situations that require students to explain why area is measured in square units.	3.MD.C.5: 2.MD. A. 1 3.MD.C.6: 2.G.A. 2, 3.MD. C.5 3.MD.C.7: 3.MD. C. 5 3.OA.A.1: 2.OA.C.3, 2.OA.C.4 3.OA.B.5: 3.OA.A. 1, 3.OA.A.2 3.OA.D.9: 2.OA.C.3, 3. OA. B. 5 3.NBT.A.2: 1.OA.B.4, 2.NBT.B.7	Choose from iM leveled centers and exploration problems to differentiate for students who are ready.	iM Centers District-approved online resources

RESOURCES
Kendall Hunt Flourish Unit card sorts, Unit cool downs Pattern Blocks, Square Tiles, Rulers, Masking/Painter's Tape, Yardsticks, Grid Paper, Poster Paper

UNIT 3: WRAPPING UP 1,000			
Illustrative Mathematics Unit Focus: 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. **Essential Questions:** How can understanding place value help us? How do the properties of operations make computation simpler? How do we decide what operation to use when solving a real-world problem? How can we show mathematical situations in word problems? **Unit Pacing: 27 days (20 required lessons, 5 flex, 2 assessment and reaction)**			
UNWRAPPED STANDARDS			
Grade Level Standard	**Standard Progression**	**Concepts (Big Ideas/ Understandings)**	**Academic Vocabulary (Standard Based)**
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.)	Students need to apply properties of operations (commutative, associative and distributive) as strategies to multiply and divide. Applying the concept involved is more important than students knowing the name of the property. Understanding the commutative property of multiplication is developed through the use of models as basic multiplication facts are learned. For example, the result of multiplying 3 x 5 (15) is the same as the result of multiplying 5 x 3 (15). To find the product of three numbers, students can use what they know about the product of two of the factors and multiply this by the third factor. For example, to multiply 5 x 7 x 2, students know that 5 x 2 is 10. Then, they can use mental math to find the product of 10 x 7 (70). Allow students to use their own strategies and share with the class when applying the associative property of multiplication. Splitting arrays can help students understand the distributive property. They can use a known fact to learn other facts that may cause difficulty. For example, students can split a 6 x 9 array into 6	Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic.	Parentheses Associative Property Commutative Property Identity Property Distributive Property

	groups of 5 and 6 groups of 4; then, add the sums of the groups. In the Array situations, the roles of the factors do not differ. One factor tells the number of rows in the array, and the other factor tells the number of columns in the situation. But rows and columns depend on the orientation of the array. If an array is rotated 90º, the rows become columns and the columns become rows. This is useful for seeing the commutative property for multiplication in rectangular arrays and areas.		
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.	Encourage students to represent the problem situation in a drawing or with counters or blocks. Students should determine the reasonableness of the solution to all problems using mental computations and estimation strategies. Students gain a full understanding of which operation to use in any given situation through contextual problems. Number skills and concepts are developed as students solve problems. Problems should be presented on a regular basis as students work with numbers and computations. Use of two-step problems involving easy or middle difficulty adding and subtracting within 1,000 or one such adding or subtracting with one step of multiplication or division can help to maintain fluency with addition and subtraction while giving the needed time to the major Grade 3 multiplication and division standards.	The unknown in a problem can be represented with a symbol. Problems may have more than one step needed in order to find a solution. Rounding can be used to assess the reasonableness of answers.	Variable/Unknown Equations Algorithm Estimate Rounding
3.OA.D.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.	In second grade, students determine whether a number up to 20 is odd or even, skip count by 5s, 10s, or 100s. In third grade, students use these skills to identify arithmetic patterns and explain them using properties of operations. They can explore patterns by determining likenesses, differences and changes. Use patterns in addition and multiplication tables.	Identifying and describing generalizations about patterns can help us understand a variety of numerical concepts.	Addends Sum Pattern Commutative Property Associative Property Distributive Property

3.NBT.A.1: Use place value understanding to round whole numbers to the nearest 10 or 100.	Students need to understand that when moving to the right across the places in a number (e.g., 456), the digits represent smaller units. When rounding to the nearest 10 or 100, the goal is to approximate the number by the closest number with no ones or no tens and ones (e.g., so 456 to the nearest ten is 460; and to the nearest hundred is 500). Rounding to the unit represented by the leftmost place is typically the sort of estimate that is easiest for students and often is sufficient for practical purposes. Rounding to the unit represented by a place in the middle of a number may be more difficult for students (the surrounding digits are sometimes distracting). Rounding two numbers before computing can take as long as just computing their sum or difference.	Understanding place value enables us to round numbers and perform computations. Rounding helps solve problems mentally and assess the reasonableness of an answer.	Round Place value Tens Place Hundreds Place Ones Place
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.	At Grade 3, the major focus is multiplication, so students' work with addition and subtraction is limited to maintenance of fluency within 1000 for some students and building fluency to within 1000 for others...They focus on methods that generalize readily to larger numbers so that these methods can be extended to 1,000,000 in Grade 4 and fluency can be reached with such larger numbers. Fluency within 1000 implies that students use written methods without concrete models or drawings, though concrete models or drawings can be used with explanations to overcome errors and to continue to build understanding as needed.	Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic.	Place value Hundreds Tens Ones Associative Property Commutative Property Identity Property Digit Algorithm Strategy Sum Difference Addends

UNIT 3: WRAPPING UP 1,000

How can understanding place value help us?
How do the properties of operations make computation simpler?
How do we decide what operation to use when solving a real-world problem?
How can we show mathematical situations in word problems?

CCSS Standards #	Learning Targets	Summative Assessment Strategy	Lesson Progression and Connection to Math Practices	Common Learning Experiences and Assessments
Section A: Numbers Within 1,000				
3.NBT.A.2 3.OA.D.9	I can identify and explain arithmetic patterns.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students prepare to add and subtract within 1,000 by revisiting ideas from grade 2. Students look for arithmetic patterns in addition which gives them a chance to revisit the fluency expectations from grade 2 that students know from memory all single digit sums. In looking at the patterns, they may use the associative property. Students also revisit place value work with numbers within 1,000 and consider different ways to decompose numbers which will be useful in future sections. This section also gives teachers an opportunity to see what strategies students use to add and subtract within 1,000.	**Mandatory Lessons/Activities:** iM Lessons 1, 2, 3
Pacing:	3 days		**Math Practices:** SMP 1, 2, 3, 6, 7	**Assessments:** Cool-down 1 Checkpoint A
Section B: Add Within 1,000				
3.NBT.A.2 3.OA.B.5 3.OA.C.7	I can fluently add within 1,000 using a variety of strategies.	X Selected Response X Constructed Response	**Lesson Progression:** Students then use their place value understanding from grade 2 to continue the work on addition within 1,000. Base-ten diagrams are used to support student understanding as they progress to more abstract ways of representing addition.	**Mandatory Lessons/Activities:** iM Lessons 4, 5, 6, 7

		Performance X Observation	Students build on strategies based on place value and properties of operations toward more formal algorithms that are based on these same concepts.	
Pacing:	4 days		**Math Practices:** SMP 1, 3, 6, 7, 8	**Assessments:** Cool-downs 6 and 7 Checkpoint B
Section C: Subtract Within 1,000				
[3.NBT.A.2](3.NBT.A.2) [3.OA.B.5](3.OA.B.5) [3.OA.C.7](3.OA.C.7)	I can fluently subtract within 1,000 using a variety of strategies.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students build on their work with addition algorithms to analyze and use subtraction algorithms. Students begin by working with base-ten blocks and diagrams, however, since it is difficult to record regrouping using drawings, the algorithm becomes a helpful way to find differences. Students make sense of a subtraction algorithm that uses expanded form to show how numbers are being regrouped. Although the notation shows addition signs, this is to show expanded form of the number and the subtraction symbol on the far left side indicates the operation. $\begin{array}{lccccc} & \overset{400}{\cancel{500}} & + & \overset{120}{\cancel{20}} & + & 8 \\ - & 200 & + & 70 & + & 1 \\ \hline \end{array}$ This non-conventional notation allows students to see the meaning behind the digits used above the numbers in the standard algorithm. $\begin{array}{lccc} & \overset{4}{\cancel{5}} & \overset{12}{\cancel{2}} & 8 \\ - & 2 & 7 & 1 \\ \hline \end{array}$	**Mandatory Lessons/Activities:** iM Lessons 8, 9, 10, 11, 12, 13
Pacing:	6 days		**Math Practices:** SMP 1, 3, 6, 7, 8	**Assessments:** Cool-down 11 Checkpoint C
Section D: Round Within 1,000 and Solve Two-Step Problems				
[3.NBT.A.1](3.NBT.A.1)	I can round whole numbers to the		**Lesson Progression:**	**Mandatory Lessons/Activities:**

3.NBT.A.2 3.OA.B.5 3.OA.C.7 3.OA.D.8	nearest multiple of 10 and 100. I can represent and solve a variety of word problems.	X Selected Response X Constructed Response Performance X Observation	Students build on their place value understanding to learn the conventions of rounding whole numbers to the nearest multiple of 10 or 100. The number line diagram is used to help students think about which multiple of 10 or 100 a given number is closest to. Students also think about the reasonableness of answers and use rounding to estimate. They build a foundation of understanding for more complex problems as they match situations to tape diagrams and write equations that correspond. Finally, students apply what they've learned about adding and subtracting within 1,000 to solve two-step word problems that involve multiplication, addition, and subtraction. Students have worked with diagrams and equations with a ? or ___ to represent an unknown. Students interpret and write letters to stand for the unknown.	iM Lessons 14, 15, 16, 17, 18, 19, 20
Pacing:	8 days		**Math Practices:** SMP 1, 2, 3, 4, 5, 6	**Assessments:** Cool-downs 15 and 19 Checkpoint D

ADDITIONAL CONSIDERATIONS			
COMMON MISCONCEPTIONS	**PRIOR KNOWLEDGE NEEDED TO MASTER STANDARDS FOR THIS UNIT**	**ADVANCED STANDARDS FOR STUDENTS WHO HAVE DEMONSTRATED PRIOR MASTERY**	**OPPORTUNITIES FOR STUDENT-DIRECTED LEARNING WITHIN THE UNIT**
Students may think that a symbol used to represent a number once cannot be used to represent another number in a different problem/situation. Presenting students with multiple situations in which they select the symbol and explain what it represents will counter this misconception.	3.OA.D.8: 2.OA.A.1, 3.OA.A.3 3.OA.D.9: 2.OA.A.3, 3.OA.B.5 3.NBT.A.1: 2.NBT. A.1 3.NBT.A.2: 2.NBT.A.2	Choose from iM leveled centers and exploration problems to differentiate for students who are ready.	iM Centers District-approved online resources

The use of terms like “round up” and “round down” confuses many students. For example, the number 37 would round to 40 or they say it “rounds up”. The digit in the tens place is changed from 3 to 4 (rounds up). This misconception is what causes the problem when applied to rounding down. The number 32 should be rounded (down) to 30, but using the logic mentioned for rounding up, some students may look at the digit in the tens place and take it to the previous number, resulting in the incorrect value of 20. To remedy this misconception, students need to use a number line to visualize the placement of the number and/or ask questions such as: “What tens are 32 between and which one is it closer to?” Developing the understanding of what the answer choices are before rounding can alleviate much of the misconception and confusion related to rounding. Students may not have a conceptual understanding of place value so that they would think 234 is 2+3+4 rather than 200+30+4 and may not see the relevance of the zeros. Students may not have a conceptual understanding of place value so they would think 561 – 147 = 426, because they subtract the 7 in 147 from the 1 in 561 instead of regrouping. Students may attend to “key words” in problem situations rather than focusing on the structure of the problem and making sense of the situation.			
RESOURCES			
Kendall Hunt Flourish			

Blackline masters and materials from Teacher Resource Pack Base-ten blocks, paper clips, pencils, index cards, markers, poster paper, sticky notes

UNIT 4: RELATING MULTIPLICATION TO DIVISION

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

Essential Questions:
What are the different types of multiplication and division problems
How is division related to multiplication?
What are some strategies for helping learn multiplication and division facts?
How do we decide what operation to use when solving a real-world problem?
How can we show mathematical situations in word problems?

Unit Pacing: 34 days (22 required lessons, 10 flex, 2 assessment and reaction)

UNWRAPPED STANDARDS

Grade Level Standard	Standard Progression	Concepts (Big Ideas/ Understandings)	Academic Vocabulary (Standard Based)
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.	In Equal Groups, the roles of the factors differ. One factor is the number of objects in a group (like any quantity in addition and subtraction situations), and the other is a multiplier that indicates the number of groups. So, for example, 4 groups of 3 objects are arranged differently than 3 groups of 4 objects. Thus there are two kinds of division situations depending on which factor is the unknown (the number of objects in each group or the number of groups).	Division situations include fair sharing (partitive) and repeated subtraction (quotative). Division is related to subtraction, so 56 ÷ 8 can be solved by subtracting 8 until you reach zero or have less than 8 left. Division is related to multiplication.	Divide Division sentence Quotient Equal Describe Determine

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.	Students use mathematicals tools, such as sets of counters to represent situations involving equal groups or arrays. They should represent the model used as a drawing or equation to find the solution. This shows multiplication using grouping with 3 groups of 5 objects and can be written as 3 × 5. Relating Equal Group situations to Arrays, and indicating rows or columns within arrays, can help students see that a corner object in an array (or a corner square in an area model) is not double counted: at a given time, it is counted as part of a row or as a part of a column but not both. Problems in terms of "rows" and "columns," e.g., "The apples in the grocery window are in 3 rows and 6 columns," are difficult because of the distinction between the number of things in a row and the number of rows. There are 3 rows but the number of columns (6) tells how many are in each row. There are 6 columns but the number of rows (3) tells how many are in each column. Students do need to be able to use and understand these words, but this understanding can grow over time while students also learn and use the language in the other multiplication and division situations.	Division situations include fair sharing (partitive) and repeated subtraction (quotative). The unknown in a problem can be represented with a symbol. Real-world mathematical situations can be represented using drawings and equations.	Array Rows Columns Factors Product Variable Solve Multiplication Multiplication expression Multiplication symbol Commutative property
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 = ?	Students can use known multiplication facts to determine the unknown fact in a multiplication or division problem. Have them write a multiplication or division equation and the related multiplication or division equation. For example, to determine the unknown of the related multiplication fact of 3 × 9 = 27. They should ask themselves questions such as, "How many 3s are in 27 ?" or "3 times what number is 27?" Have them justify their thinking with models or drawings.	Multiplication and division problems include repeated addition/subtraction of equal groups and array/area problems. The unknown in a problem can occur in any position within the equation and must make that equation true.	Factors Product Multiplication Equation Expression Multiplication symbol Solve Determine Represent
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	Students need to apply properties of operations (commutative, associative and distributive) as strategies to multiply and divide. Applying the concept involved is more important than students	The order of numbers in multiplication does not change the product.	Commutative property Associative property Distributive property

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.)	knowing the name of the property. Understanding the commutative property of multiplication is developed through the use of models as basic multiplication facts are learned. For example, the result of multiplying 3 x 5 (15) is the same as the result of multiplying 5 x 3 (15). To find the product of three numbers, students can use what they know about the product of two of the factors and multiply this by the third factor. For example, to multiply 5 x 7 x 2, students know that 5 x 2 is 10. Then, they can use mental math to find the product of 10 x 7 (70). Allow students to use their own strategies and share with the class when applying the associative property of multiplication. Splitting arrays can help students understand the distributive property. They can use a known fact to learn other facts that may cause difficulty. For example, students can split a 6 x 9 array into 6 groups of 5 and 6 groups of 4; then, add the sums of the groups. In the Array situations, the roles of the factors do not differ. One factor tells the number of rows in the array, and the other factor tells the number of columns in the situation. But rows and columns depend on the orientation of the array. If an array is rotated 90º, the rows become columns and the columns become rows. This is useful for seeing the commutative property for multiplication in rectangular arrays and areas.	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.	Apply Relate
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.	Students' understanding of the part/whole relationships is critical in understanding the connection between multiplication and division.	Understand that the inverse, or opposite of division is multiplication, therefore the answer to 24 ÷ 8 can be found by solving 8 × $\square$ = 24.	Dividend Divisor Quotient Factor Relationship Inverse

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.	Patterns make multiplication by some numbers easier to learn than multiplication by others, so approaches may teach multiplications and divisions in various orders depending on what numbers are seen as or are supported to be easiest. All of the understandings of multiplication and division situations, of the levels of representation and solving, and of patterns need to culminate by the end of Grade 3 in fluent multiplying and dividing of all single-digit numbers and 10. Organizing practice so that it focuses most heavily on understood but not yet fluent products and unknown factors can speed learning. To achieve this by the end of Grade 3, students must begin working toward fluency for the easy numbers as early as possible.	There is an inverse relationship between multiplication and division that can help us learn our multiplication and division facts. (I.e Knowing that 8 x 3 = 24 helps us know the answer to 24 ÷ 8 is 3).	Product Factors Multiplication Related facts Commutative Property Distributive Property Associative Property Fluently
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.	At Grade 3, the major focus is multiplication, so students' work with addition and subtraction is limited to maintenance of fluency within 1000 for some students and building fluency to within 1000 for others...They focus on methods that generalize readily to larger numbers so that these methods can be extended to 1,000,000 in Grade 4 and fluency can be reached with such larger numbers. Fluency within 1000 implies that students use written methods without concrete models or drawings, though concrete models or drawings can be used with explanations to overcome errors and to continue to build understanding as needed.	Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic.	Place value Hundreds Tens Ones Associative Property Commutative Property Identity Property Digit Algorithm Strategy Sum Difference Addends
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.	Understanding what each number in a multiplication expression represents is important. Multiplication problems need to be modeled with pictures, diagrams or concrete materials to help students understand what the factors and products represent. The effect of multiplying numbers needs	Place value understanding and properties of operations can help us to multiply a one-digit number by multiples of 10.	Multiply Multiple Place Value Distributive Property Associative Property

	to be examined and understood. The use of area models is important in understanding the properties of operations of multiplication and the relationship of the factors and its product. Composing and decomposing area models is useful in the development and understanding of the distributive property in multiplication. For example, the product 3 x 50 can be represented as 3 groups of 5 tens, which is 15 tens, which is 150. This reasoning relies on the associative property of multiplication: 3 x 50 = 3 x (5 x 10) = (3 x 5) x 10 = 15 x 10 = 150. It is an example of how to explain an instance of a calculation pattern for these products: calculate the product of the non-zero digits, then shift the product one place to the left to make the result ten times as large.		
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.	Students can be taught to multiply length measurements to find the area of a rectangular region. But, in order to make sense of these quantities, they first learn to interpret measurement of rectangular regions as a multiplicative relationship of the number of square units in a row and the number of rows. Students learn to understand and explain that the area of a rectangular region of, for example, 12 length-units by 5 length-units can be found either by multiplying 12 x 5 or by adding two products, e.g., 10 x 5 and 2 x 5, illustrating the distributive property.	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.	Area Side lengths Square unit Formula Decompose Distributive Property Tiling

UNIT 4: RELATING MULTIPLICATION TO DIVISION

What are the different types of multiplication and division problems?
How is division related to multiplication?
What are some strategies for helping learn multiplication and division facts?
How do we decide what operation to use when solving a real-world problem?
How can we show mathematical situations in word problems?

CCSS Standards #	Learning Targets	Summative Assessment Strategy	Lesson Progression and Connection to Math Practices	Common Learning Experiences and Assessments
Section A: What is Division?				
3.NBT.A.2 3.OA.A.2 3.OA.A.3	I can represent and solve division problems.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students focus on both “how many in each group?” and “how many groups?” situations to lay a foundation of division understanding before focusing on how division and multiplication are related in the next section. It is likely that students may use their understanding of multiplication to solve division situations but the emphasis of this section is on the meaning, notation and representation of division. As students consider the two types of division, they see that equal groups drawings and expressions can match more than one context. Students apply their understanding of the two types of division problems to explain how division expressions can be interpreted in two ways when there’s not an associated situation.	**Mandatory Lessons/Activities:** iM Lessons 1, 2, 3, 4, 5
Pacing:	5 days		**Math Practices:** SMP 1, 2, 3, 4, 5, 6	**Assessments:** Cool-downs 3 and 5 Checkpoint A
Section B: Relating Multiplication and Division				
3.MD.C.7.c 3.NBT.A.3 3.OA.A.2	I can solve a variety of problems using multiplication and/or division.	X Selected Response	**Lesson Progression:** Students explicitly relate division to multiplication by understanding division as an unknown factor	**Mandatory Lessons/Activities:** iM Lessons 6, 7, 8, 9, 10, 11

3.OA.A.3 3.OA.B.5 3.OA.B.6 3.OA.C.7 3.OA.D.9	I can find the missing factor in a division problem.	X Constructed Response Performance X Observation	equation (for example, _____ x 6 = 30 relates to 30 ÷ 6 =_____). Students use this understanding to identify division facts they know based on multiplication facts they know. Students continue to develop fluency with multiplication and division facts by identifying patterns in the multiplication table and applying the distributive property. For example if they are trying to find the product of (7 x 3) and (5 x 3) they know . They can think about the problem as (5 x 3) + (2 x 3) and represent that on an area diagram.	
Pacing:	6 days		**Math Practices:** SMP 1, 2, 3, 4, 5, 6, 7	**Assessments:** Cool-down 7 Checkpoint B
Section C: Multiplying Larger Numbers				
3.MD.C.7.c 3.NBT.A.3 3.OA.A.3 3.OA.B.5 3.OA.C.7 3.OA.D.8	I can represent and solve multiplication problems using properties of operations.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students use strategies to multiply larger numbers, including multiplication of single digit numbers and multiples of ten and any multiplication expression with a value within 100. This work extends student understanding of the associative and distributive properties from the previous section as well as their place value understanding from a previous unit. Students consider both gridded and ungridded area diagrams as well as place value blocks arranged in arrays that encourage them to break factors down by place value. Students may choose to break up factors in any way that makes sense to them, but the emphasis in this section is on place value based strategies to prepare students for the multiplication work in grade 4.	**Mandatory Lessons/Activities:** iM Lessons 12, 13, 14, 15, 16, 17
Pacing:	6 days		**Math Practices:** SMP 1, 2, 3, 4, 5, 6, 7, 8	**Assessments:** Cool-down 14 Checkpoint C
Section D: Dividing Larger Numbers				

3.MD.C.7 3.NBT.A.3 3.OA.A.2 3.OA.A.3 3.OA.A.4 3.OA.B.5 3.OA.C.7 3.OA.D.8	I can represent and solve division problems using properties of operations.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students apply understandings from the previous sections to divide when the quotient or divisor is larger than 10. Students apply the two possible meanings of the divisor, the relationship between multiplication and division and place value understanding to divide larger numbers. The numbers used in division expressions encourage students to think about seeing the divisor as either the number of groups or the number in each group. When given the expression 57 ÷ 3 students may represent dividing 57 into 3 groups evenly. However, when given the expression 90 ÷ 15 students may make groups of 15 and see how many are needed to make 90. This flexibility helps students choose methods that are most efficient for them for any given problem. Students also use the relationship between multiplication and division and place value understanding to find quotients.	**Mandatory Lessons/Activities:** iM Lessons 18, 19, 20, 21, 22
Pacing:	6 days		**Math Practices:** SMP 1, 2, 3, 4, 5, 6, 7, 8	**Assessments:** Cool-down 18 Checkpoint D

ADDITIONAL CONSIDERATIONS			
COMMON MISCONCEPTIONS	**PRIOR KNOWLEDGE NEEDED TO MASTER STANDARDS FOR THIS UNIT**	**ADVANCED STANDARDS FOR STUDENTS WHO HAVE DEMONSTRATED PRIOR MASTERY**	**OPPORTUNITIES FOR STUDENT-DIRECTED LEARNING WITHIN THE UNIT**
Students may not know if the problem represents a subtraction situation or division situation. They also may not reason correctly about the type of division in a given situation. Some division situations give the number of groups and some give the number in each group. The student sees multiplication and	3.OA.A.2: 3.OA.A.1 3.OA.A.3: 3.OA.A.1, 3.OA.A.2 3.OA.B.5: 3.OA.A.1, 3.OA.A.2 3.OA.C.7: 3.OA.B.5, 3.OA.B.6 3.NBT.A.2: 2.NBT.A.2 3.NBT.A.3: 2.NBT.A.1, 3.OA.B.5 3.MD.C.7.c: 3.MD.C.5	Choose from iM leveled centers and exploration problems to differentiate for students who are ready.	iM Centers District-approved online resources

division as discrete and separate operations. Ex: Student has reasonable facility with multiplication facts but cannot master division facts. He may know that 6 × 7 = 42 but fails to realize that this fact also tells him that 42 ÷ 7 = 6. Students may think that 3 ÷ 15 = 5 and 15 ÷ 3 = 5 are the same equations. The use of models is essential in helping students eliminate this misunderstanding. Students may not know that 5 x 20 is the same amount as 20 x 5. Students may have difficulty seeing that each arrangement can be rotated to show the commutative property. Students think a symbol (? or) is always the place for the answer. This is especially true when the problem is written as 15 ÷ 3 =? or 15 = x 3. Students also think that 3 ÷ 15 = 5 and 15 ÷ 3 = 5 are the same equations. The use of models is essential in helping students eliminate this understanding. Students may not attend to place value when multiplying large numbers. Avoid teaching tricks such as “adding zeros.”For true understanding students need to understand and be able to explain the place value reasoning. Stating that you are “adding zeros” teaches many misconceptions. When multiplying 5 x 40, students multiply 5 groups of 4 and get the answer of 20. This may lead to confusion because the product of the single digit number already ends in zero and they fail to notice that it represents			

20 tens. Be sure to go back to the place value language. 5 groups of 4 is 20 therefore, 5 groups of 4 tens would be 20 tens. 20 tens is the same as 200.			

RESOURCES
Kendall Hunt Flourish Blackline masters and materials from Teacher Resource Pack Connecting cubes or counters, markers, poster paper, colored pencils, Base-ten blocks, sticky notes, grid paper

UNIT 5: FRACTIONS AS NUMBERS
Illustrative Mathematics Unit Focus: 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. **Essential Questions:** How are the numerator and denominator related in a fraction? How does the size of equal parts relate to the number of equal parts of a whole? When is one-half not equal to one-half? What are equivalent fractions? What do you have to think about when comparing fractions? How does partitioning help us reason about shapes? **Unit Pacing: 29 days (17 required lessons, 10 flex, 2 assessment and reaction)**

UNWRAPPED STANDARDS			
Grade Level Standard	**Standard Progression**	**Concepts (Big Ideas/ Understandings)**	**Academic Vocabulary (Standard Based)**
3.NF.A.1: Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a part of size 1/b.	Grade 3 students start with unit fractions (fractions with numerator 1), which are formed by partitioning a whole into equal parts and taking one part, e.g., if a whole is partitioned into 4 equal parts then each part is 1/4 of the whole, and 4 copies of that part make the whole. Next, students build fractions from unit fractions, seeing the numerator 3 of 3/4 as saying that 3/4 is the quantity you get by putting 3 of the 1/4's together. They read any fraction this way, and in particular there is no need to introduce "proper fractions" and "improper fractions" initially; 5/3 is the quantity you get by combining 5 parts together when the whole is divided into 3 equal parts.	A fraction is a number showing a relationship between the parts and the whole. Fractional parts have names that tell how many parts of a size are needed to make the whole (3 parts – thirds; 4 parts – fourths, etc.). Fractional parts can be described with words and symbols Fractions can be represented with visual models such as rectangular area models, arrays, and length models including number lines. The numerator tells the count of the number of equal parts and the denominator tells the number of equal parts in the whole.	Numerator Denominator Fraction Unit fraction Whole Part Partition

		As the number of equal parts of the whole increases, the size of the equal parts decreases and vice versa. The size of the fractional part is relative to the whole. One-half is not equal to one-half when the whole is a different size (e.g. ½ of a small pizza vs. ½ of a large pizza).	
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.	To construct a unit fraction on a number line diagram, e.g., 1/3, students partition the unit interval into 3 intervals of equal length and recognize that each has length 1/3. They locate the number 1/3 on the number line by marking off this length from 0, and locate other fractions with denominator 3 by marking off the number of lengths indicated by the numerator. The number line reinforces the analogy between fractions and whole numbers. Just as 5 is the point on the number line reached by marking off 5 times the length of the unit interval from 0, so 5/3 is the point obtained in the same way using a different interval as the basic unit of length, namely the interval from 0 to 1/3.	On a number line, the size of the part is measured by the distance from zero to the numbered point. A unit fraction represents one piece of the equal-sized pieces that make a whole (1/2 , 1/3 , 1/4 , 1/6 , 1/8). A unit fraction is the building block for fractions just as 1 is the building block for whole numbers.	Numerator Denominator Fraction Unit fraction Number line Interval Partition Distance
3.NF.A.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size 3.NF.A.3.A: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	As students experiment on number line diagrams they discover that many fractions label the same point on the number line, and are therefore equal; that is, they are equivalent fractions. For example, the fraction 1/2 is equal to 2/4 and also to 3/6. Students can also use fractions strips to see fraction equivalence.	Equivalent fractions use different sized fractional parts to describe the same amount, e.g., 1/2 = 2/4 . Two fractions are equivalent (equal) if they are the same size or the same point on a number line.	Numerator Denominator Equivalent fraction Fraction Unit fraction Whole number Equal Number line

	Equivalent fractions can be recognized and generated using fraction models. Fraction bars showing the same sized whole can also be used as models to compare fractions. Students should use different models and decide when to use a particular model.		
3.NF.A.3.B: Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.			
3.NF.A.3.C: Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.			
3.NF.A.3.D: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Previously, in Grade 2, students compared lengths using a standard measurement unit. In Grade 3, they build on this idea to compare fractions with the same denominator. They see that for fractions that have the same denominator, the underlying unit fractions are the same size, so the fraction with the greater numerator is greater because it is made of more unit fractions. For example, [a] segment from 0 to 3/4 is shorter than the segment from 0 to 5/4 because it measures 3 units of 1/4 as opposed to 5 units of 1/4. Therefore 3/4 < 5/4. Students need to know how big a particular fraction is and recognize which of two fractions is larger. The fractions must refer to parts of the same whole. Students should use a variety of models. Benchmarks such as 1/2 and 1 are also useful in comparing fractions. Students are to write the results of the comparisons with the symbols >, =, or < and justify the conclusions with a model.	Two fractions can be compared when the two fractions refer to the same whole. Comparing two fractions requires thinking about the size of the parts (denominator) and the number of the parts (numerator).	Fraction Unit fraction Numerator Denominator Whole Equivalent Compare Greater than > Less than < Equal to =
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 Grade 3, students are beginning to learn fraction concepts (3.NF). They understand fraction equivalence in simple cases, and they use visual fraction models to represent and order fractions. Grade 3 students also measure	Length measurement data can be generated and used to create a line plot. The scale of a line plot can be whole numbers or fractions such as halves, or	Line plot Halves Fourths Quarters Data

in appropriate units— whole numbers, halves, or quarters.	lengths using rulers marked with halves and fourths of an inch. They use their developing knowledge of fractions and number lines to extend their work from grade 2 by working with measurement data involving fractional measurement values.	fourths (quarters).	Units Intervals Plot
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.	In Grade 2, students partitioned rectangles into two, three or four equal shares, recognizing that the equal shares need not have the same shape. They described the shares using words such as; halves, thirds, half of, a third of, etc., and described the whole as two halves, three thirds or four fourths. In Grade 3, students will partition shapes into parts with equal areas (the spaces in the whole of the shape). These equal areas need to be expressed as unit fractions of the whole shape, i.e., describe each part of a shape partitioned into four parts as 1/4 of the area of the shape.	Partitioning a shape into equal parts in more than one way can help us see that equal parts can look different, but have the same area. When shapes are partitioned into equal areas, the area of each part is the unit fraction of the whole.	Partition Unit fraction Whole Area Equal

UNIT 5: FRACTIONS AS NUMBERS				
How are the numerator and denominator related in a fraction? How does the size of equal parts relate to the number of equal parts of a whole? When is one-half not equal to one-half? What are equivalent fractions? What do you have to think about when comparing fractions? How does partitioning help us reason about shapes?				
CCSS Standards #	**Learning Targets**	**Summative Assessment Strategy**	**Lesson Progression and Connection to Math Practices**	**Common Learning Experiences and Assessments**
Section A: Introduction to Fractions				
3.G.A.2 3.NF.A.1 3.NF.A.2	I can represent fractions using a variety of models and explain my reasoning.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students are introduced to fractions through area diagrams and fraction strips. Students use their prior knowledge of halves, thirds, and fourths as they partition rectangles into six or eight equal parts and describe the parts as sixths or eighths. Students learn that the notation 1/b means the whole is partitioned into b parts and each part has size 1/b . Students then use the fraction notation they learned for unit fractions to write non-unit fractions and use area diagrams to see that a fraction a/b is formed by a part of size 1/b. Students extend their understanding by using fraction strips to solidify the idea that non-unit fractions are built from unit fractions. The section wraps up with an activity in which students use fraction strips to represent situations involving fractional lengths to prepare for locating fractions on the number line in the next section. The section wraps up with an activity in which students use fraction strips to represent situations involving fractional lengths to prepare for locating fractions on the number line in the next section.	**Mandatory Lessons/Activities:** iM Lessons 1, 2, 3, 4
Pacing:	4 days		**Math Practices:** SMP 3, 5, 6, 7	**Assessments:** Cool-downs 2 and 4 Checkpoint A

<table>
<tr><th colspan="5">Section B: Fractions on the Number Line</th></tr>
<tr><td>3.NF.A.2
3.NF.A.2.a
3.NF.A.3.c</td><td>I can partition and label a number line with even intervals representing fractions.</td><td rowspan="2"><table><tr><td>X</td><td>Selected Response</td></tr><tr><td>X</td><td>Constructed Response</td></tr><tr><td></td><td>Performance</td></tr><tr><td>X</td><td>Observation</td></tr></table></td><td>Lesson Progression:
Students locate fractions on the number line. They first explore number lines with tick marks at fractions to build on their whole number experience, and fold number lines to connect to prior partitioning work with fraction strips. Then, students partition the interval from 0 to 1 into equal parts and label the endpoint of the first part with the corresponding unit fraction. Students then locate non-unit fractions on the number line by counting unit fraction lengths and examine how they know when a fraction is less than or greater than 1. Students have an opportunity to notice that certain fractions are in the same location as whole numbers on the number line, and use the location of a unit or non-unit fraction to locate 1 on the number line.</td><td>Mandatory Lessons/Activities:
iM Lessons 5, 6, 7 ,8, 9</td></tr>
<tr><td>Pacing:</td><td>5 days</td><td>Math Practices:
SMP 3, 5, 6, 7</td><td>Assessments:
Cool-down 7 and 8
Checkpoint B</td></tr>
<tr><th colspan="5">Section C: Equivalent Fractions</th></tr>
<tr><td>3.NF.A.3.a
3.NF.A.3.b
3.NF.A.3.c
3.NF.A.2</td><td>I can generate and explain equivalent fractions using a variety of models.</td><td rowspan="2"><table><tr><td>X</td><td>Selected Response</td></tr><tr><td>X</td><td>Constructed Response</td></tr><tr><td></td><td>Performance</td></tr><tr><td>X</td><td>Observation</td></tr></table></td><td>Lesson Progression:
Students recognize fractions that are equivalent and generate equivalent fractions. Students learn that fractions are equivalent if they are the same size or at the same point on a number line. Students identify fractions that are equivalent to whole numbers and express whole numbers as fractions.</td><td>Mandatory Lessons/Activities:
iM Lessons 10, 11, 12, 13</td></tr>
<tr><td>Pacing:</td><td>4 days</td><td>Math Practices:
SMP 3, 5, 6, 7</td><td>Assessments:
Cool-downs 11 and 12
Checkpoint C</td></tr>
<tr><th colspan="5">Section D: Fraction Comparisons</th></tr>
<tr><td>3.MD.B.4
3.NF.A.2
3.NF.A.3
3.NF.A.3.d</td><td>I can compare two fractions with the same numerator or denominator and justify my reasoning.</td><td><table><tr><td>X</td><td>Selected Response</td></tr></table></td><td>Lesson Progression:
Students begin this section by determining if fractions are equivalent using a method that makes sense to them and learn that comparisons are only valid if the fractions being</td><td>Mandatory Lessons/Activities:
iM Lessons 14, 15, 16, 17</td></tr>
</table>

		<table><tr><td>X</td><td>Constructed Response</td></tr><tr><td></td><td>Performance</td></tr><tr><td>X</td><td>Observation</td></tr></table>	compared refer to the same size whole. Throughout the section, students are encouraged to use representations of their choice from throughout the unit, such as diagrams, number lines, or written reasoning. Students compare fractions with the same denominator, and then the same numerator. They understand that fractions with the same denominator are split into parts that are the same size or length and that since the numerator determines the number of parts, the numerator determines which fraction is greater. Then, they learn that fractions with the same numerator have the same number of parts, but that the denominator indicates the size or length of those parts. Students make explicit the idea that as the denominator increases, the size or length of each part gets smaller. In the last required lesson of the unit, students compare fractions in and out of contexts that have the same numerator, same denominator, or are equivalent.	
Pacing:	6 days		**Math Practices:** SMP 1, 3, 5, 6, 7	**Assessments:** Cool-down 17 Checkpoint D

ADDITIONAL CONSIDERATIONS			
COMMON MISCONCEPTIONS	**PRIOR KNOWLEDGE NEEDED TO MASTER STANDARDS FOR THIS UNIT**	**ADVANCED STANDARDS FOR STUDENTS WHO HAVE DEMONSTRATED PRIOR MASTERY**	**OPPORTUNITIES FOR STUDENT-DIRECTED LEARNING WITHIN THE UNIT**
Students may not understand that fractional parts are equal parts. In order to be thirds, for example, there can't just be 3 pieces, there have to be 3 equal pieces. Students may be confused by the idea that the denominator (the bottom number) represents how many equal pieces are in the whole or set and the numerator (the top number) represents how many of those equal pieces you have.	3.NF.A.1: 2.GA.3, 2.MD.A.2 3.NF.A.2: 2.MD.B.6 3.NF.A.3: 3.NF. A.1, 3.NF.A.2 3.G.A.2 : 3.NF.A.1	Choose from iM leveled centers and exploration problems to differentiate for students who are ready.	iM Centers District-approved online resources

Students may draw lines on a shape to partition it into parts, but those parts may not be equal. Just because a shape has been partitioned into 3 parts it does not mean that those parts represent thirds. Students may not realize that shapes partitioned into equal parts can look different, but have the same area. Students only think of fractions as a rectangle or circle partitioned into equal parts rather than as numbers at distinct points on the number line. Students may not understand that you count fractions just like you count whole numbers and that the size of the piece doesn't change as you count them. Therefore, when we could fourths we count 1/4, 2/4, 3/4, 4/4 and so on. The unit fraction represents the size of the pieces you are counting. Students try to apply whole number understanding when comparing fractions, for example they think that eighths are larger than fourths because 8 is more than 4. Similarly, students may think that 4/8 is more than 2/4 because 8 is bigger than 4 and 4 is bigger than 2.			

RESOURCES
Kendall Hunt Flourish Blackline masters and materials from Teacher Resource Pack Chart paper, fraction strips, markers, poster paper, scissors

UNIT 6: MEASURING LENGTH, TIME, LIQUID VOLUME, AND WEIGHT
Illustrative Mathematics Unit Focus: 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 time, liquid volume, and weight, and use the four operations to solve problems involving measurement. **Essential Questions:** Why is it useful to know about time? Why is measurement useful? What are we measuring when we find liquid volume or mass? How do we estimate the measurement of an object? Why do we collect, organize, represent and analyze data? **Unit Pacing: 22 days (15 required lessons, 5 flex, 2 assessment and reaction)**

UNWRAPPED STANDARDS

Grade Level Standard	Standard Progression	Concepts and Disciplinary-Specific Vocabulary	Academic Vocabulary (Standard Based)
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.	Students use mathematicals tools, such as sets of counters to represent situations involving equal groups or arrays. They should represent the model used as a drawing or equation to find the solution. Relating Equal Group situations to Arrays, and indicating rows or columns within arrays, can help students see that a corner object in an array (or a corner square in an area model) is not double counted: at a given time, it is counted as part of a row or as a part of a column but not both. Problems in terms of “rows” and “columns,” e.g., “The apples in the grocery window are in 3 rows and 6 columns,” are difficult because of the distinction between the number of things in a row and the number of	Division situations include fair sharing (partitive) and repeated subtraction (quotative). The unknown in a problem can be represented with a symbol. Real-world mathematical situations can be represented using drawings and equations.	Array Rows Columns Factors Product Variable Solve Multiplication Multiplication expression Multiplication symbol Commutative property

	rows. There are 3 rows but the number of columns (6) tells how many are in each row. There are 6 columns but the number of rows (3) tells how many are in each column. Students do need to be able to use and understand these words, but this understanding can grow over time while students also learn and use the language in the other multiplication and division situations.		
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.	Patterns make multiplication by some numbers easier to learn than multiplication by others, so approaches may teach multiplications and divisions in various orders depending on what numbers are seen as or are supported to be easiest. All of the understandings of multiplication and division situations, of the levels of representation and solving, and of patterns need to culminate by the end of Grade 3 in fluent multiplying and dividing of all single-digit numbers and 10. Organizing practice so that it focuses most heavily on understood but not yet fluent products and unknown factors can speed learning. To achieve this by the end of Grade 3, students must begin working toward fluency for the easy numbers as early as possible.	There is an inverse relationship between multiplication and division that can help us learn our multiplication and division facts. (I.e Knowing that 8 x 3 = 24 helps us know the answer to 24 ÷ 8 is 3).	Product Factors Multiplication Related facts Commutative Property Distributive Property Associative Property Fluently
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.	At Grade 3, the major focus is multiplication, so students' work with addition and subtraction is limited to maintenance of fluency within 1000 for some students and building fluency to within 1000 for others...They focus on	Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic.	Place value Hundreds Tens Ones Associative Property Commutative Property

	methods that generalize readily to larger numbers so that these methods can be extended to 1,000,000 in Grade 4 and fluency can be reached with such larger numbers. Fluency within 1000 implies that students use written methods without concrete models or drawings, though concrete models or drawings can be used with explanations to overcome errors and to continue to build understanding as needed.		Identity Property Digit
3.NF.A.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a part of size 1/b.	Grade 3 students start with unit fractions (fractions with numerator 1), which are formed by partitioning a whole into equal parts and taking one part, e.g., if a whole is partitioned into 4 equal parts then each part is 1/4 of the whole, and 4 copies of that part make the whole. Next, students build fractions from unit fractions, seeing the numerator 3 of 3/4 as saying that 3/4 is the quantity you get by putting 3 of the 1/4's together. They read any fraction this way, and in particular there is no need to introduce "proper fractions" and "improper fractions" initially; 5/3 is the quantity you get by combining 5 parts together when the whole is divided into 3 equal parts.	A fraction is a number showing a relationship between the parts and the whole. Fractional parts have names that tell how many parts of a size are needed to make the whole (3 parts – thirds; 4 parts – fourths, etc.). Fractional parts can be described with words and symbols Fractions can be represented with visual models such as rectangular area models, arrays, and length models including number lines. The numerator tells the count of the number of equal parts and the denominator tells the number of equal parts in the whole. As the number of equal parts of the whole increases, the size of the equal parts decreases and vice versa. The size of the fractional part is relative to the whole. One-half is not equal to one-half when the wholes are different sizes (e.g. ½ of a small pizza vs. ½ of a large pizza).	Numerator Denominator Fraction Unit fraction Whole Part Partition

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.	As students experiment on number line diagrams they discover that many fractions label the same point on the number line, and are therefore equal; that is, they are equivalent fractions. For example, the fraction 1/2 is equal to 2/4 and also to 3/6. Students can also use fractions strips to see fraction equivalence. Equivalent fractions can be recognized and generated using fraction models. Fraction bars showing the same sized whole can also be used as models to compare fractions. Students should use different models and decide when to use a particular model.	Equivalent fractions use different sized fractional parts to describe the same amount, e.g., 1/2 = 2/4 . Two fractions are equivalent (equal) if they are the same size or the same point on a number line.	Numerator Denominator Equivalent fraction Fraction Unit fraction Whole number Equal Number line
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.	Students have experience in telling and writing time from analog and digital clocks to the hour and half hour in Grade 1 and to the nearest five minutes, using a.m. and p.m. in Grade 2. Now students will tell and write time to the nearest minute and measure time intervals in minutes. Provide analog clocks that allow students to move the minute hand. Students need experience representing time from a digital clock to an analog clock and vice versa. Provide word problems involving addition and subtraction of time intervals in minutes. Have students represent the problem on a number line. Students should relate using the number line with subtraction from Grade 2.	Time is measured in hours and minutes. Time can be measured to the nearest minute. Elapsed time measures the duration of an event. Being able to tell time and find elapsed time is useful for making plans and schedules and determining how long an event lasts.	Analog clock Digital clock Time interval Start time End time Elapsed time Number line diagram Hours Minutes Hour hand Minute hand A.M. P.M.
3.MD.A.2: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).1 Add,	In Grade 2, students measure length using rulers, yardsticks, or meter sticks. In grade 3, provide opportunities for students to use appropriate tools to	Measurement allows us to tell how many standard units of an attribute an item has and solve problems with the quantities.	Capacity Liquid volume Liter (L) Metric unit

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.	measure and estimate liquid volumes in liters only and masses of objects in grams and kilograms. Students need practice in reading the scales on measuring tools since the markings may not always be in intervals of one. The scales may be marked in intervals of two, five or ten. Allow students to hold gram and kilogram weights in their hand to use as a benchmark. Use water colored with food coloring so that the water can be seen in a beaker. Students should estimate volumes and masses before actually finding the measurement.	Liquid volume and mass tell us how much matter in a three-dimensional space. We estimate the measurement of an object by comparing the object to personal referents or easy-to-use "benchmark" units. Mass and liquid volume word problems are solved using whole number strategies.	Milliliter (mL) Grams (g) Kilograms (kg) Mass Estimate Weight
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.	In Grade 3, students are beginning to learn fraction concepts (3.NF). They understand fraction equivalence in simple cases, and they use visual fraction models to represent and order fractions. Grade 3 students also measure lengths using rulers marked with halves and fourths of an inch. They use their developing knowledge of fractions and number lines to extend their work from grade 2 by working with measurement data involving fractional measurement values.	Length measurement data can be generated and used to create a line plot. The scale of a line plot can be whole numbers or fractions such as halves, or fourths (quarters).	Line plot Halves Fourths Quarters Data Units Intervals Plot

UNIT 6: MEASURING LENGTH, TIME, LIQUID VOLUME, AND WEIGHT				
Why is it useful to know about time? Why is measurement useful? What are we measuring when we find liquid volume or mass? How do we estimate the measurement of an object? Why do we collect, organize, represent and analyze data?				
CCSS Standards #	**Learning Targets**	**Summative Assessment Strategy**	**Lesson Progression and Connection to Math Practices**	**Common Learning Experiences and Assessments**
Section A: Measurement Data on Line Plots				
3.MD.B.4 3.NF.A.3.c 3.OA.C.7	I can measure to the nearest half inch and quarter inch. I can create a line plot based on measurement data.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students relate fractions on a number line to fractions on a ruler as they measure in halves and fourths of an inch. Students measure more precisely than they did in Grade 2, when they only worked with whole numbers of length units. In working with the ruler, students see that some of the quarter inch marks also mark half inches. Students revisit equivalent forms of numbers and are introduced to mixed numbers to represent length. Students apply their work with the number line and the ruler to interpret and create line plots representing lengths. Students used line plots in grade 2 to represent whole number measurement data and now extend that work using their understanding of fractions as numbers.	**Mandatory Lessons/Activities:** iM Lessons 1, 2, 3, 4, 5
Pacing:	5 days		**Math Practices:** SMP 4, 5, 6, 7	**Assessments:** Cool-downs 3 and 5 Checkpoint A
Section B: Liquid Volume and Weight				

3.MD.A.2 3.NF.A.1 3.OA.C.7	I can measure and estimate liquid volumes and weights of objects.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students extend their work with measurement to estimate and measure liquid volume and weight. Students establish benchmarks for grams and kilograms and estimate weight. They make sense of liquid volume through activities that require pouring water into containers to establish the need for a common unit to compare volume. As students measure volume in liters, they compare the scale of liquid measuring tools to rulers and make sense of fractional units of volume.	**Mandatory Lessons/Activities:** iM Lessons 6, 7, 8
Pacing:	3 days		**Math Practices:** SMP 4, 5, 6, 7	**Assessments:** Cool-down 8 Checkpoint B
Section C: Problems Involving Time				
3.MD.A.1	I can tell time to the minute. I can solve real world problems involving time.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students learn to tell and write time to the nearest minute. They solve elapsed time problems with unknowns in all positions: start time, end time and duration. Students have an opportunity to use representations they are familiar with, such as the number line, tables, equations, and words to show their reasoning about elapsed time.	**Mandatory Lessons/Activities:** iM Lessons 9, 10, 11
Pacing:	3 days		**Math Practices:** SMP 1, 2, 3, 5, 6	**Assessments:** Cool-downs 9 and 11 Checkpoint C
Section D: Explore the Fair				
3.MD.A.1 3.MD.A.2 3.MD.B.4 3.NBT.A.2 3.OA.A.3 3.OA.C.7	I can solve real-world measurement problems using addition, subtraction, multiplication or division.	X Selected Response X Constructed Response	**Lesson Progression:** Students make sense of and solve problems in the context of the fair. Each lesson focuses on a single context at the fair, and gives a chance to notice how students are making sense of and solving problems using all four operations. The last lesson in the unit has students create a poster as they	**Mandatory Lessons/Activities:** iM Lessons 12, 13, 14, 15

		Performance	solve problems that might come up as they imagine a day at the fair.	
Pacing:	5 days	X Observation	**Math Practices:** SMP 1, 2, 3, 4, 5, 6, 7, 8	**Assessments:** Cool-down 13 Checkpoint D

ADDITIONAL CONSIDERATIONS			
COMMON MISCONCEPTIONS	**PRIOR KNOWLEDGE NEEDED TO MASTER STANDARDS FOR THIS UNIT**	**ADVANCED STANDARDS FOR STUDENTS WHO HAVE DEMONSTRATED PRIOR MASTERY**	**OPPORTUNITIES FOR STUDENT-DIRECTED LEARNING WITHIN THE UNIT**
Students need to understand that there are 60 minutes in an hour and that all 60 minutes are represented on a clock, not just the multiples of 5. Students may confuse adding and subtracting in base ten with elapsed time, forgetting that there are 60 minutes in one hour, not 100 minutes. When using measurement tools, students may read the mark on a scale that is below a designated number on the scale as if it was the next number. For example, a mark that is one mark below 80 grams may be read as 81 grams. Students realize it is one away from 80, but do not think of it as 79 grams. A line plot has data points marked above a number line. Students may incorrectly choose a line plot to display data such as favorite foods or class pets, rather than numerical data. They also may not include numbers in the scale if there is no data for that number. Students must try to keep the "x" marks on a line plot	3.OA.A.3: 3.OA.A.1, 3.OA.A.2 3.OA.C.7: 3.OA.B.5, 3.OA.B.6 3.NBT.A.2: 2.NBT.A.2 3.NF.A.1: 2.GA.3, 2.MD.A.2 3.NF.A.3: 3.NF. A.1, 3.NF.A.2 3.MD.A.1: 2.MD.7 3.MD.B.4: 2.MD. 9	Choose from iM leveled centers and exploration problems to differentiate for students who are ready.	iM Centers District-approved online resources

consistently sized and evenly spaced.			

RESOURCES
Kendall Hunt Flourish Blackline masters and materials from Teacher Resource Pack Rulers (inches), chart paper, glue, tape, markers (dry erase), poster paper, balance, large paper clips or gram weights

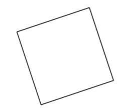
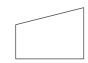
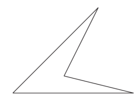
UNIT 7: POLYGONS AND PERIMETER			
Illustrative Mathematics Unit Focus: Students reason about polygons and their attributes, with a focus on quadrilaterals. They solve problems involving the perimeter and area of polygons. **Essential Questions:** How can polygons be described and classified? What are we measuring when we find perimeter? **Unit Pacing: 21 days (14 required lessons, 5 flex, 2 assessment and reaction)**			
UNWRAPPED STANDARDS			
Grade Level Standard	**Standard Progression**	**Concepts and Disciplinary-Specific Vocabulary**	**Academic Vocabulary (Standard Based)**
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.	Patterns make multiplication by some numbers easier to learn than multiplication by others, so approaches may teach multiplications and divisions in various orders depending on what numbers are seen as or are supported to be easiest. All of the understandings of multiplication and division situations, of the levels of representation and solving, and of patterns need to culminate by the end of Grade 3 in fluent multiplying and dividing of all single-digit numbers and 10. Organizing practice so that it focuses most heavily on understood but not yet fluent products and unknown factors can speed learning. To achieve this by the end of Grade 3, students must begin working toward fluency for the	There is an inverse relationship between multiplication and division that can help us learn our multiplication and division facts. (I.e Knowing that 8 x 3 = 24 helps us know the answer to 24 ÷ 8 is 3).	Product Factors Multiplication Related facts Commutative Property Distributive Property Associative Property Fluently

	easy numbers as early as possible.		
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.	Encourage students to represent the problem situation in a drawing or with counters or blocks. Students should determine the reasonableness of the solution to all problems using mental computations and estimation strategies. Students gain a full understanding of which operation to use in any given situation through contextual problems. Number skills and concepts are developed as students solve problems. Problems should be presented on a regular basis as students work with numbers and computations. Use of two-step problems involving easy or middle difficulty adding and subtracting within 1,000 or one such adding or subtracting with one step of multiplication or division can help to maintain fluency with addition and subtraction while giving the needed time to the major Grade 3 multiplication and division standards.	The unknown in a problem can be represented with a symbol. Problems may have more than one step needed in order to find a solution. Rounding can be used to assess the reasonableness of answers.	Variable/Unknown Equations Algorithm Estimate Rounding
3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	At Grade 3, the major focus is multiplication, so students' work with addition and subtraction is limited to maintenance of fluency within 1000 for some students and building fluency to within 1000 for others...They focus on methods that generalize readily to larger numbers so that these methods can be extended to 1,000,000 in Grade 4 and fluency can be reached with such larger numbers. Fluency within 1000 implies that students use written	Place value understanding, properties of operations, and the relationships between operations can help us to perform multi-digit arithmetic.	Place value Hundreds Tens Ones Associative Property Commutative Property Identity Property Digit Algorithm Strategy Sum Difference

	methods without concrete models or drawings, though concrete models or drawings can be used with explanations to overcome errors and to continue to build understanding as needed.		Addends
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.	The concept of multiplication can be related to the area of rectangles using arrays. Students need to discover that the length of one dimension of a rectangle tells how many squares are in each row of an array and the length of the other dimension of the rectangle tells how many squares are in each column. Ask questions about the dimensions if students do not make these discoveries. For example: • How do the squares covering a rectangle compare to an array? • How is multiplication used to count the number of objects in an array? Students should also make the connection of the area of a rectangle to the area model used to represent multiplication. This connection justifies the formula for the area of a rectangle. Provide students with the area of a rectangle (i.e., 42 square inches) and have them determine possible lengths and widths of the rectangle. Expect different lengths and widths such as, 6 inches by 7 inches or 3 inches by 14 inches.	The area of a rectangle can be found by multiplying the lengths of two adjacent sides of the rectangle.	Area Side lengths Square unit Square foot Square inch Square centimeter Square meter Square yard Formula Tiling
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.	Perimeter problems for rectangles and parallelograms often give only the lengths of two adjacent sides or only show numbers for these sides in a drawing of the shape. The common error is to add just those two numbers. Having students first label the lengths of the other two sides as a reminder is	Perimeter is found by adding all the outside (exterior) side lengths of a polygon. An unknown side length of a polygon can be found when given the perimeter and other side lengths or properties of the polygon.	Perimeter Length Width Polygon Side Unit Inch Centimeters

	helpful. Students then find unknown side lengths in more difficult “missing measurements” problems and other types of perimeter problems.	Different rectangles may have the same perimeter but different areas. Different rectangles may have the same area but different perimeters	Feet Meter Yard
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.	Students [should be able to] analyze, compare, and classify two dimensional shapes by their properties. Because they have built a firm foundation of several shape categories, these categories can be the raw material for thinking about the relationships between [the] classes.	Polygons are closed two-dimensional shapes with straight sides. Polygons can be compared, sorted and classified using attributes, e.g. number of sides.	Attribute Hexagon Octagon Pentagon Polygon Quadrilateral Triangle Rhombus Trapezoid Rectangle Square Categorize Right Angle

UNIT 7: POLYGONS AND PERIMETER				
How can polygons be described and classified? What are we measuring when we find perimeter?				
CCSS Standards #	**Learning Targets**	**Summative Assessment Strategy**	**Lesson Progression and Connection to Math Practices**	**Common Learning Experiences and Assessments**
Section A: Reason With Shapes				
3.G.A.1 3.NBT.A.3 3.OA.C.7	I can describe, compare, and sort shapes based on their properties. I can draw examples of quadrilaterals that are not rectangles, rhombuses or squares.	X Selected Response X Constructed Response Performance	**Lesson Progression:** Students describe, compare, and sort a variety of shapes. In previous grades, students used terms like square, rectangle, triangle, quadrilateral, pentagon, and hexagon. In this section, students spend more time thinking about ways to further categorize triangles and quadrilaterals. They sort in ways that form subcategories of triangles like	**Mandatory Lessons/Activities:** iM lessons 1, 2, 3, 4, 5

		X Observation	triangles whose sides are all the same length, and subcategories of quadrilaterals. They see that shapes can have more than one name, like this one:  which is a square, rhombus and a rectangle. The section wraps up with students drawing quadrilaterals that are not rhombuses, rectangles, or squares like these:  	
Pacing:	5 days		**Math Practices:** 3, 6, 7	**Assessments:** Cool Downs: 3, 5 Section A Checkpoint
Section B: What is Perimeter?				
[3.MD.D.8](#) [3.NBT.A.2](#) [3.OA.C.7](#)	I can find the perimeter of polygons.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students are introduced to perimeter as a measurable attribute of polygons. They find the "distance around" shapes before the term perimeter is formally introduced and then consider what situations involve perimeter. Students then draw shapes with specified perimeters and use their knowledge of shapes to find the perimeter of polygons given all or some of the side length measurements. They are encouraged to calculate the perimeter efficient ways using their knowledge of multiplication. Finally, students find missing side lengths of polygons given the perimeter and solve perimeter problems in context.	**Mandatory Lessons/Activities:** iM lessons 6, 7, 8, 9
Pacing:	4 days		**Math Practices:** 1,2, 3, 4, 5, 6, 7, 8	**Assessments:** Cool Downs: 7, 8 Section B Checkpoint

Section C: Expanding On Perimeter				
3.MD.D.8 3.OA.C.7 3.OA.D.8	I can solve problems involving perimeter and area.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression and connections:** Students consider both the area and perimeter of shapes. In order to attend to each aspect of a shape, they solve problems that require them to draw rectangles with the same perimeter and different areas and rectangles with the same area and different perimeters. They also solve problems that require them to understand and use both area and perimeter.	**Mandatory Lessons/Activities:** iM lessons 10, 11, 12
Pacing:	3 days		**Math Practices:** 1, 2, 3, 4, 5, 6, 7, 8	**Assessments:** Cool Downs: 11, 12 Section C Checkpoint
Section D: Design with Perimeter and Area				
3.G.A.1 3.MD.D.8	I can solve problems involving perimeter and area.	X Selected Response X Constructed Response Performance X Observation	**Lesson Progression:** Students have opportunities to apply what they've learned about geometric shapes, perimeter, and area to a variety of contexts that are related to design. Students design a park or a robot. Then, students solve area and perimeter problems involving these same contexts.	**Mandatory Lessons/Activities:** iM lessons 14 **or** 15 (Teacher choice)
Pacing:	3 days		**Math Practices:** 1, 2, 3, 4, 5, 6, 7, 8	**Assessments:** Section D Checkpoint

ADDITIONAL CONSIDERATIONS			
COMMON MISCONCEPTIONS	**PRIOR KNOWLEDGE NEEDED TO MASTER STANDARDS FOR THIS UNIT**	**ADVANCED STANDARDS FOR STUDENTS WHO HAVE DEMONSTRATED PRIOR MASTERY**	**OPPORTUNITIES FOR STUDENT-DIRECTED LEARNING WITHIN THE UNIT**
Students think that when they are presented with a problem where only two of the side lengths are shown, they	3.OA.C.7: 3.OA.B.5, 3.OA.B.6 3.OA.D.8: 2.OA.A.1, 3.OA.A.3 3.NBT.A.2: 2.NBT.B.7, 2.NBT.B.8	Choose from iM leveled centers and exploration problems to differentiate for students who are ready.	iM Centers District-approved online resources

add only those numbers to find the perimeter. They may also multiply these two dimensions, finding the area instead of the perimeter. Students do not recognize that perimeter is linear and is measured in units and that area is a measure of space and is measured in square units. Students may not see that shapes can belong to more than one category because of their attributes. For example, students may identify a square as a "non-rectangle" or a "non-rhombus". They do not recognize that a square is a rectangle because it has all of the properties of a rectangle and a rhombus because it has all of the properties of a rhombus.	3.NBT.A.3: 2.NBT.A.1, 3.OA.B.5 3.MD.D.8: 3.MD.C.5 3.G.A.1: 2.GA.1		

RESOURCES
Kendall Hunt Flourish Blackline masters and materials from Teacher Resource Pack Bags, envelopes, counters, folders, poster paper, scissors, tape, glue