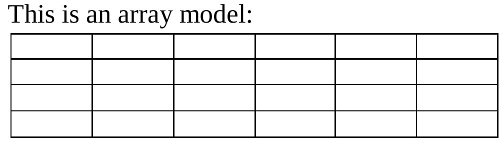
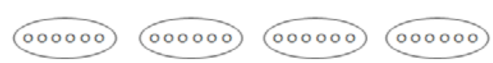
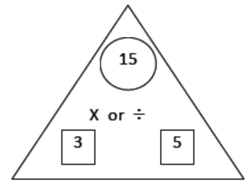
3rd Grade

Instructional Focus:
In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes. 1. Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division. 2. Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators. 3. Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle. 4. Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

Standard	Objective	Examples
Operations and Algebraic Thinking		
Represent and solve problems involving multiplication and division.		
3.OA.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, show objects in rectangular arrays or describe a context in which a total number of objects can be expressed as 5 × 7.*	*Identify and explain one-digit multiplication equations based on arrays or equal groups. *Model arrays and equal groups based on given multiplication equations and explain thinking. (** Multiplication requires students to think in terms of groups of things rather than individual things.) **Recognize multiplication as a means to determine the total number of objects when there are a specific number of groups with the same number of objects in each group. **Recognize that the multiplication symbol 'x' means "groups of" and problems such as 5 x 7 refer to 5 groups of 7.	*Activate prior knowledge: arrays demonstrate repeated addition, multiplication is a shortcut. *Read aloud-<u>100 Hungry Ants</u> to introduce concept of multiplication. ** Jim purchased 5 packages of muffins. Each package contained 3 muffins. How many muffins did Jim purchase? 5 groups of 3, 5 x 3 = 15. Describe another situation where there would be 5 groups of 3 or 5 x 3.

3.OA.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, deconstruct rectangular arrays or describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*	**Recognize the operation of division by: 1. determining the number of equal groups 2. determining how many in each group *model division by deconstructing rectangular arrays into equal groups. **Interpret a problem situation requiring division using pictures, objects, words, numbers, and equations.	*Activate prior knowledge: arrays demonstrate successive subtraction *<u>When the Doorbell Rang</u> This book illustrates "How many in each group." Opportunity for students to role play while learning the objective.
3.OA.3. Use multiplication and division numbers up to 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).	*Apply the skills of multiplication or division to solve one step word problems. *Write an equation for a word problem, using a symbol for the unknown factor. *Solve using a variety of representations and equations. *Explain thinking (show work) *Verify that answer is reasonable	This standard references various strategies that can be used to solve word problems involving multiplication & division. Students should apply their skills to solve word problems. Students should use a variety of representations for creating and solving one-step word problems, such as: If you divide 4 packs of 9 brownies among 6 people, how many cookies does each person receive? *(4 x 9 = 36, 36 ÷ 6 = 6).* Glossary page 89, Table 2 (table also included at the end of this document for your convenience) gives examples of a variety of problem solving contexts, in which students need to find the product, the group size, or the number of groups. Students should be given ample experiences to explore all of the different problem structures. Examples of multiplication: There are 24 desks in the classroom. If the teacher puts 6 desks in each row, how many rows are there? This task can be solved by drawing an array by putting 6 desks in each row. This is an array model:  This task can also be solved by drawing pictures of equal groups. 4 groups of 6 equals 24 objects  A student could also reason through the problem mentally or verbally, "I know 6 and 6 are 12. 12 and 12 are 24. Therefore, there are 4 groups of 6 giving a total of 24 desks in the classroom." A number line could also be used to show equal jumps. Students in third grade students should use a variety of pictures, such as stars, boxes, flowers to represent unknown numbers (variables). Letters are also introduced to represent unknowns in third

		grade. Examples of Division: There are some students at recess. The teacher divides the class into 4 lines with 6 students in each line. Write a division equation for this story and determine how many students are in the class *(□ ÷ 4 = 6. There are 24 students in the class).*
3.OA.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 x ? = 48, 5 = ? ÷ 3, 6 x 6 = ?*	*Explore the inverse operation of multiplication and division *Identify unknown product, group size or number of groups *Apply their understanding of the meaning of the equal sign as "the same as" to interpret an equation with an unknown.	*UNKNOWN: Product (3x6=? Or 18÷3=6) Group Size (3x?=18 or 18÷3=6) Number of Groups ((?x6=18 or 18÷6=3) *Introduce using fact families
Understand properties of multiplication and the relationship between multiplication and division.		
3.OA.5. Make, test, support, draw conclusions and justify conjectures about properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) • Commutative property of multiplication: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. • Associative 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. • Distributive property: 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. • Inverse property (relationship) of multiplication and division.	**Understand that properties are rules about how numbers work. *Represent equations using various objects, pictures, words and symbols in order to develop their understanding of properties.	**Changing the order of numbers to determine that the order of numbers does not make a difference in multiplication, but it DOES make a difference in division. **splitting arrays helps in understanding the distributive property. *Models help develop understanding of the Commutative Property. *Distributive Property/breaking numbers apart: 7x6 7x6 7x5=35 7x3=21 7x1=7 7x3=21 35+7=42 21+21=42

3.OA.6. Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*	*Understand division as an unknown-factor problem.	*Fact family triangles demonstrate the inverse operations of multiplication and division.  Examples: • 3 x 5 = 15 5 x 3 = 15 • 15 ÷ 3 = 5 15 ÷ 5 = 3
Multiply and divide up to 100.		
3.OA.7. Fluently multiply and divide numbers up to 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.	*Build a foundation for multiplication and division fact fluency with accuracy and efficiency. *Demonstrate knowledge of fluency procedures and explain when and how to use them.	**This standard uses the word fluently, which means *accuracy, efficiency* (**using a reasonable amount of steps and time),** and flexibility (using strategies such as the distributive property). “Know from memory” does **not** mean focusing only on timed tests and repetitive practice, but ample experiences working with manipulatives, pictures, arrays, word problems, numbers (etc.) to internalize basic facts up to 9x9.
Solve problems involving the four operations, and identify and explain patterns in arithmetic.		
3.OA.8. Solve and create two-step word problems using any of the four operations. Represent these problems using equations with a symbol (box, circle, question mark) standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	*Analyze the structure of the problem before attempting to solve. *Use and discuss various strategies for solving word problems. *Estimation should be used during problem solving, then revisited to check for reasonableness. *Represent problems using equations with a symbol to represent unknown quantities. *Justify conclusions with mathematical ideas.	*Kelly runs 3 miles a day. Her goal is to run 24 miles. After 5 days, now many miles does Kelly have left to run in order to meet her goal? Write an equation and find a solution. (3 x 5 + ? = 24) *Students could critique each other’s work. *Typical estimation strategies: On a vacation, your family travels 267 miles on the first day, 194 miles on the second day and 34 miles on the third day. How many total miles did they travel? Student 1 I first thought about 267 and 34. I noticed that their sum is about 300. Then I knew that 194 is close to 200. When I put 300 and 200 together, I get 500. Student 2 I first thought about 194. It is really close to 200. I also have 2 hundreds in 267. That gives me a total of 4 hundreds. Then I have 67 in 267 and the 34. When I put 67 and 34 together that is really close to 100. When I add that hundred to the 4 hundreds that I already had, I end up with 500. Student 3 I rounded 267 to 300. I rounded 194 to 200. I rounded 34 to 30. When I added 300, 200 and 30, I know my answer will be about 530.
3.OA.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.*	*Observe and identify important numerical patterns related operations. *Investigate addition and multiplication tables in search of patterns. *Explain why patterns make sense mathematically.	*Build upon previous experiences with properties related to addition and subtraction. <u>PROPERTIES OF OPERATIONS PATTERNS</u> Even numbers always divisible by 2. Even numbers can always be decomposed into 2 equal addends (14=7+7). Multiples of even numbers are always even numbers. The sums in each column and row on 100’s chart increase by same amount. The products in each row and column increase by the same amount **(skip counting)** *****What do you notice about the numbers highlighted in pink in the multiplication table? Explain a pattern using properties of operations. ***When (commutative property) one changes the order of the factors they will still get the same product: 6x5=30 and 5x6=30.***

x	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

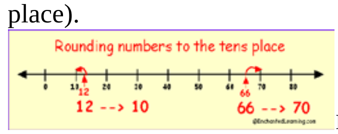
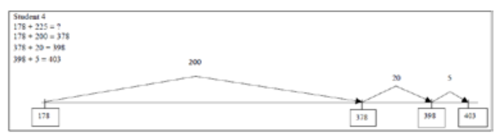
Teacher: What pattern do you notice when 2, 4, 6, 8, or 10 are multiplied by any number (even or odd)?
Student: The product will always be an even number.
Teacher: Why?

x	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

What patterns do you notice in this addition table? Explain why the pattern works this way.

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	19	11	12	13	14	15	16	17	18	19	20

Students need ample opportunities to observe and identify important numerical patterns related to operations.
They should build on their previous experiences with properties related to addition and subtraction.
Students investigate addition and multiplication tables in search of patterns and explain why these patterns make sense mathematically.
Example:
• Any sum of two even numbers is even.
• Any sum of two odd numbers is even.
• Any sum of an even number and an odd number is odd.
• The multiples of 4, 6, 8, and 10 are all even because they can all be decomposed into two equal groups.
• The doubles (2 addends the same) in an addition table fall on a diagonal while the doubles (multiples of 2) in
a multiplication table fall on horizontal and

<table>
<tr><td></td><td></td><td>vertical lines.
• The multiples of any number fall on a horizontal and a vertical line due to the commutative property.
• All the multiples of 5 end in a 0 or 5 while all the multiples of 10 end with 0. Every other multiple of 5 is a multiple of 10.
Students also investigate a hundreds chart in search of addition and subtraction patterns. They record and organize all the different possible sums of a number and explain why the pattern makes sense.
<table><tr><th>addend</th><th>addend</th><th>sum</th></tr><tr><td>0</td><td>20</td><td>20</td></tr><tr><td>1</td><td>19</td><td>20</td></tr><tr><td>2</td><td>18</td><td>20</td></tr><tr><td>3</td><td>17</td><td>20</td></tr><tr><td>4</td><td>16</td><td>20</td></tr><tr><td>☐</td><td>☐</td><td>☐</td></tr><tr><td>☐</td><td>☐</td><td>☐</td></tr><tr><td>☐</td><td>☐</td><td>☐</td></tr><tr><td>20</td><td>0</td><td>20</td></tr></table></td></tr>
<tr><td colspan="3">Numbers and Operations in Base Ten</td></tr>
<tr><td colspan="3">Use place value understanding and properties of operations to perform multi-digit arithmetic.</td></tr>
<tr><td>3.NBT.1. Use place value understanding to round whole numbers to the nearest 10 or 100.</td><td>*Demonstrate a strong understanding of place value
*Learn when and why to round numbers.
*Identify possible answers and halfway points.
*Identify where a given number falls between possible answers and halfway points.
*Understand that if a number is exactly at the halfway point of the two possible answers, the number is rounded up.</td><td>When a number is rounded (or rounded off), it is approximated by eliminating the least significant digits. When rounding, find the closest multiple of ten (or one hundred, or other place value) to your number. For example, the number 42 can be rounded down to 40 (this number was rounded to the tens place). Similarly, 285 can be rounded up to 300 (this number was rounded to the hundreds place).

 Enchanted Learning</td></tr>
<tr><td>3.NBT.2. Use strategies and/or algorithms to fluently add and subtract with numbers up to 1000, demonstrating understanding of place value, properties of operations, and/or the relationship between addition and subtraction.</td><td>*Solve problems using both vertical and horizontal forms.
*Applies a variety of strategies including commutative and associative properties, as well as traditional algorithms to solve problems.
*Verbalize methods and show work used for solving problems.
*Check work for accuracy to verify reasonableness of answers.</td><td>*There are 178 fourth graders and 225 third graders on the playground. What is the total number of students on the playground?
<table><tr><td>Student 1
100 + 200 = 300
70 + 20 = 90
8 + 5 = 13
300 + 90 + 13 = 403 students</td><td>Student 2
I added 2 to 178 to get 180. I added 220 to get 400. I added the 3 left over to get 403.</td><td>Student 3
I know the 75 plus 25 equals 100. I then added 1 hundred from 178 and 2 hundreds from 275. I had a total of 4 hundreds and I had 3 more left to add. So I have 4 hundreds plus 3 more which is 403.</td></tr></table>

</td></tr>
<tr><td>3.NBT.3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 10 x 60) using strategies based on place value and properties of operations.</td><td>*Apply knowledge of place value.
*Explain and reason about their products.
*Use base ten tools, diagrams, hundreds charts to understand the meanings of the multiples of 10.
*Recognize patterns in multiplying by multiples of 10.</td><td>*For the problem 50x4, students should think of this as 4 groups of 5 tens or 20 tens. Twenty tens equal 200.
*30 is 3 Tens and 70 is 7 tens.
*Use manipulative, drawings, document camera, and/or white board to demonstrate understanding.</td></tr>
<tr><td colspan="3">Number and Operations</td></tr>
<tr><td colspan="3">Develop understanding of fractions as numbers.</td></tr>
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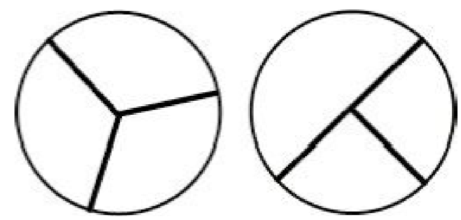
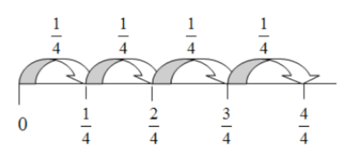
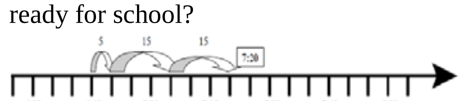
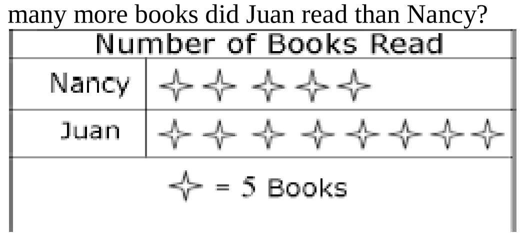
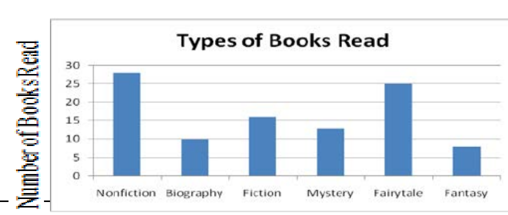
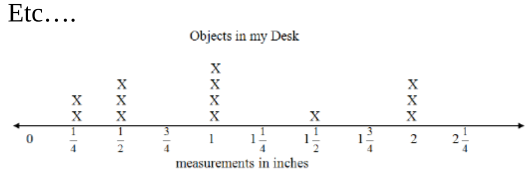
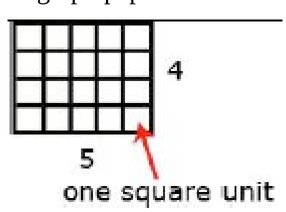
3.NF.1. Understand a fraction 1/*b* (e.g., 1/4) as the quantity formed by 1 part when a whole is partitioned into *b* (e.g., 4) equal parts; understand a fraction *a*/*b* (e.g., 2/4) as the quantity formed by *a* (e.g., 2) parts of size 1/*b*. (e.g., 1/4)	*Develop an understanding that fractional parts are equal sized. *Develop an understanding that the number of equal parts tells many make a whole.	This standard refers to the sharing of a whole being partitioned or split. Fraction models in third grade include area (parts of a whole) models (circles, rectangles, squares) and number lines. Set models (parts of a group) are not introduced in Third Grade. In 3.NF.1 students should focus on the concept that a fraction is made up (composed) of many pieces of a unit fraction, which has a numerator of 1. For example, the fraction 3/5 is composed of 3 pieces that each has a size of 1/5. Some important concepts related to developing understanding of fractions include: • Understand fractional parts must be equal-sized. Example Non-example  These are thirds These are NOT thirds • The number of equal parts tells how many make a whole. • As the number of equal pieces in the whole increases, the size of the fractional pieces decreases.
3.NF.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1/*b* (e.g., 1/4) on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* (e.g., 4) equal parts. Recognize that each part has size 1/*b* (e.g., 1/4) and that the endpoint of the part based at 0 locates the number 1/*b* (e.g., 1/4) on the number line. b. Represent a fraction *a*/*b* (e.g., 2/8) on a number line diagram or ruler by marking off *a* lengths 1/*b* (e.g., 1/8) from 0. Recognize that the resulting interval has size *a*/*b* (e.g., 2/8) and that its endpoint locates the number *a*/*b* (e.g., 2/8) on the number line.	*Label a number line that is divided into equal parts. *Recognize from 0 - 1 on the number line as one whole. *Partition the whole into equal parts, and label with fractions. (1/b)	*Fold construction paper strips into equal parts and label with fractions. 

3.NF.3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent if they are the same size (modeled) or the same point on a number line. 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). c. Express and model whole numbers as fractions, and recognize and construct fractions that are equivalent to whole numbers. *For example: 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.* 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).	a. Use manipulatives and number lines to explore the idea of equivalent fractions. *Understand two fractions as equivalent if they are the same size. b. Recognize and generate simple equivalent fractions *Explain why the fractions are equivalent (e.g., by using a visual fraction model). *Express and model whole numbers as fractions. *Recognize and construct fractions that are equivalent to whole numbers. d(1). Compare two fractions with the same numerator by reasoning about their size. d(2). Compare two fractions with the same denominators 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).	a & b. experiment with pattern blocks to determine equivalency. (2 trapezoids = 1 hexagon= shows 2/2 = 1; 4 triangles = 2 parallelograms shows 4/6 = 2/3) c. *For example: 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.* d(1). Use visual models to show that the wholes are divided into the same number of equal parts so the fraction with the larger numerator has the larger number of equal parts. (2/6 < 5/6) d(2). Use visual fraction models to show that each fraction has the same number of equal parts, but the size of the parts are different. (1/8 is smaller than ½ because when 1 whole is cut into 8 pieces, the pieces are much smaller than when 1 whole is cut into 2 pieces.)
Measurement and Data		
Solve problems involving measurement and estimation of intervals of time, liquid volumes and masses of objects.		
3.MD.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 or hours (e.g., by representing the problem on a number line diagram or clock).	*Solve elapsed time to the minute with and without word problems. *Determine (verbally and in writing) time intervals to the minute. *Extend telling time and measure elapsed time both in and out of context using clocks and number lines.	Tonya wakes up at 6:45 am. It takes her 5 minutes to shower, 15 minutes to get dressed, and 15 minutes to eat breakfast. What time will she be ready for school? 
3.MD.2. Estimate and measure liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm^3 and	*Reason about the units of mass and volumes. *Develop a basic understanding of the size and weight of a liter, a gram, and a kilogram. *Solve one-step word problems using the same units. *Develop a basic understanding to measure and estimate liquid volumes in liters only	This standard asks for students to reason about the units of mass and volume. Students need multiple opportunities weighing classroom objects and filling containers to help them develop a basic understanding of the size and weight of a liter, a gram, and a kilogram. Milliliters may also be used to show amounts that are less than a liter. Word

finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve and create 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). (Excludes multiplicative comparison problems [problems involving notions of “times as much.”])	using appropriate tools.	problems should only be one-step and include the same units. Example: Students identify 5 things that weigh about one gram. They record their findings with words and pictures. (Students can repeat this for 5 grams and 10 grams.) This activity helps develop gram benchmarks. One large paperclip weighs about one gram. A box of large paperclips (100 clips) weighs about 100 grams so 10 boxes would weigh one kilogram. Example: A paper clip weighs about a) a gram, b) 10 grams, c) 100 grams? Foundational understandings to help with measure concepts: Understand that larger units can be subdivided into equivalent units (partition). Understand that the same unit can be repeated to determine the measure (iteration). Understand the relationship between the size of a unit and the number of units needed (compensatory principal).
3.MD.3. Select an appropriate unit of English, metric, or non-standard measurement to estimate the length, time, weight, or temperature (L)	*Use prior knowledge of units of measurement (length, time, weight or temperature) to complete various measurement activities. (NOTE: by the end of 2nd grade students are expected to have mastered the use of inches, feet, yards, cm, m, and time to 5 minutes)	
Represent and interpret data.		
3.MD.4. 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.*	*Draw a picture graph showing scaled data of 4 or more categories. *Solve 1 and 2 step addition and subtraction problems using information from scaled picture graphs.	Example: Pose a question: Student should come up with a question. What is the typical genre read in our class? Collect and organize data: student survey Pictographs: Scaled pictographs include symbols that represent multiple units. Below is an example of a pictograph with symbols that represent multiple units. Graphs should include a title, categories, category label, key, and data. How many more books did Juan read than Nancy?  Single Bar Graphs: Students use both horizontal and vertical bar graphs. Bar graphs include a title, scale, scale label, categories, category label, and data. Analyze and Interpret data: 

		How many more nonfiction books where read than fantasy books? • Did more people read biography and mystery books or fiction and fantasy books? • About how many books in all genres were read? • Using the data from the graphs, what type of book was read more often than a mystery but less often than a fairytale? • What interval was used for this scale? • What can we say about types of books read? What is a typical type of book read? • If you were to purchase a book for the class library which would be the best genre? Why?
3.MD.5. Measure and record lengths using rulers marked with halves and fourths of an inch. Make a line plot with the data, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.	* Measure and record lengths using rulers marked with halves and fourths of an inch. *Make a line plot with the data, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. *Connect understanding of fractions to measuring to ½ and ¼ inch.	*Measure 5 objects in your desk to the nearest 1/2 or ¼ inch and display data collected on a line plot. How many objects measure ¼ inch? ½ inch? Etc…. 
3.MD.6. Explain the classification of data from real-world problems shown in graphical representations. Use the terms minimum and maximum. (L)	*Recognize that minimum means least and maximum means most.	*Use the words minimum and maximum when answering questions related to various types of graphs.
Geometric measurement: Understand concepts of area and relate are to multiplication and to addition.		
3.MD.7. Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit is said to have "one square unit" and can be used to measure area. b. Demonstrate that a plane figure which can be covered without gaps or overlaps by *n* (e.g., 6) unit squares is said to have an area of *n* (e.g., 6) square units.	*Recognize area as an attribute of plane figures and *Understand concepts of area measurement. a. Develop the concept of square unit. b. Demonstrate the area of a plane figure.	These standards call for students to explore the concept of covering a region with "unit squares", which could include square tiles or shading on grid or graph paper. 
3.MD.8. Measure areas by tiling with unit squares (square centimeters, square meters, square inches, square feet, and improvised units).	*Measure areas by tiling with square units.	*Measure like areas with various square units (different size graph papers, a section marked on the floor)

3.MD.9. Relate area to the operations of multiplication and addition.

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. *For example, after tiling rectangles, develop a rule for finding the area of any rectangle.*

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.

c. Use area models (rectangular arrays) to represent the distributive property in mathematical reasoning. 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*.

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. *For example, the area of a 7 by 8 rectangle can be determined by decomposing it into a 7 by 3 rectangle and a 7 by 5 rectangle.*

a. Find the area of a rectangle with whole-number side lengths

a. show that the area of a rectangle is the same as would be found by multiplying the side lengths.

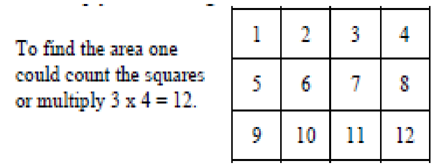
b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real-world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

c. Use area models (rectangular arrays) to represent the distributive property in mathematical reasoning. 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*.

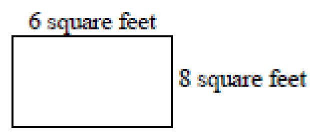
d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems. *For example, the area of a 4 by 5 rectangle can be determined by decomposing it into a 4 by 3 rectangle and a 4 by 2 rectangle.*

a. tile various sizes of rectangles then discuss to develop a rule for finding the area of any rectangle.

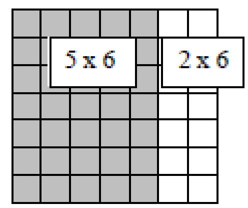
The goal is to have students tile the rectangle then multiply the side lengths to show it's the same.

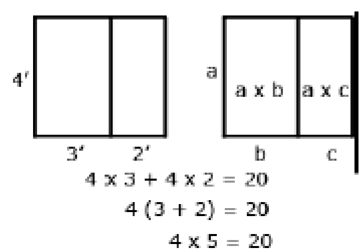


b. Drew wants to tile the bathroom using 1 foot tiles. How many square foot tiles will he need?

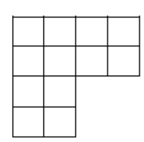


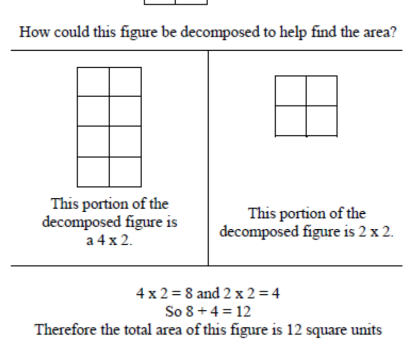
c. The picture below shows the area of a 7 x 6 figure can be determined by finding the area of a 5 x 6 and a 2 x 6 and adding the two sums together.

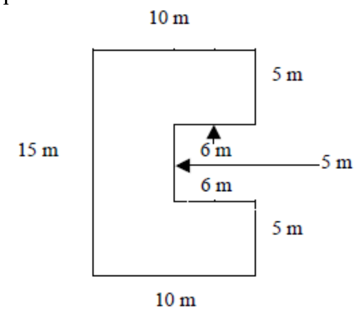


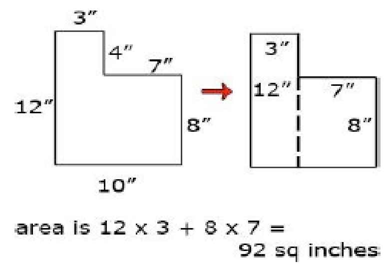


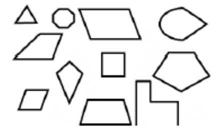
This standard uses the word rectilinear. A rectilinear figure is a polygon that has all right angles.





<table>
<tr>
<td></td>
<td></td>
<td>This storage shed it pictured below. What is the total area? How could the figure be decomposed to help find the area?


Students can decompose a rectilinear figure into different rectangles. They find the area of the figure by adding the areas of each of the rectangles together.

</td>
</tr>
<tr>
<td colspan="3">Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.</td>
</tr>
<tr>
<td>3.MD.10. Solve real-world and mathematical problems involving perimeters of polygons, including:
• finding the perimeter given the side lengths,
• finding an unknown side length,
• exhibiting rectangles with the same perimeter and different areas,
• exhibiting rectangles with the same area and different perimeters.</td>
<td>a. finding the perimeter given the side lengths,
b. finding an unknown side length,
c. exhibiting rectangles with the same perimeter and different areas,
d. exhibiting rectangles with the same area and different perimeters.</td>
<td>*Use geobards, tiles, and graph paper to find all the possible rectangles that have a given perimeter (e.g., find the rectangles with a perimeter of 12 sq in). Record all the possibilities using using graph paper, compile the possibilities into an organized list or a table, and determine whether they have all the possible rectangles.
<table>
<tr><th>Area</th><th>Length</th><th>Width</th><th>Perimeter</th></tr>
<tr><td>12 sq. in.</td><td>1 in.</td><td>12 in.</td><td>26 in.</td></tr>
<tr><td>12 sq. in.</td><td>2 in.</td><td>6 in.</td><td>16 in.</td></tr>
<tr><td>12 sq. in</td><td>3 in.</td><td>4 in.</td><td>14 in.</td></tr>
<tr><td>12 sq. in</td><td>4 in.</td><td>3 in.</td><td>14 in.</td></tr>
<tr><td>12 sq. in</td><td>6 in.</td><td>2 in.</td><td>16 in.</td></tr>
<tr><td>12 sq. in</td><td>12 in.</td><td>1 in.</td><td>26 in.</td></tr>
</table>
The patterns in the chart allow the students to identify the factors of 12, connect the results to the commutative property, and discuss the differences in perimeter within the same area. This chart can also be used to investigate rectangles with the same perimeter. It is important to include squares in the investigation.</td>
</tr>
</table>

Geometry		
Reason with shapes and their attributes.		
3.G.1. Categorize shapes by different attribute classifications and recognize that shared attributes can define a larger category. Generalize to create examples or non-examples.	*Identify attributes of a given shape. *Classify shapes by shared attributes that range from general to specific categories. *Draw shapes based on specific attributes. *Differentiate between examples and non-examples of a given shape. *Explain their mathematical thinking, using proper vocabulary.	Sort shapes by sides and angles. Give details and use proper vocabulary.  *Draw a picture of a quadrilateral. Draw a picture of a rhombus: How are they alike? How are they different? Is a quadrilateral a rhombus? Is a rhombus a quadrilateral? Justify your thinking.
3.G.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.*	*Given a shape, students partition it into equal parts, recognizing that these parts all have the same area. *Identify and express the fractional name of each part *Practice partitioning shapes into parts with equal areas in several different ways.