North Carolina Department of Public Instruction
INSTRUCTIONAL SUPPORT TOOLS
FOR ACHIEVING NEW STANDARDS

3rd Grade Mathematics ● Unpacked Content

For the new Common Core State Standards that will be effective in all North Carolina schools in the 2012-13 school year.

This document is designed to help North Carolina educators teach the Common Core (Standard Course of Study). NCDPI staff are continually updating and improving these tools to better serve teachers.

What is the purpose of this document?
To increase student achievement by ensuring educators understand specifically what the new standards mean a student must know, understand and be able to do.

What is in the document?
Descriptions of what each standard means a student will know, understand and be able to do. The "unpacking" of the standards done in this document is an effort to answer a simple question "What does this standard mean that a student must know and be able to do?" and to ensure the description is helpful, specific and comprehensive for educators.

How do I send Feedback?
We intend the explanations and examples in this document to be helpful and specific. That said, we believe that as this document is used, teachers and educators will find ways in which the unpacking can be improved and made ever more useful. Please send feedback to us at feedback@dpi.state.nc.us and we will use your input to refine our unpacking of the standards. Thank You!

Just want the standards alone?
You can find the standards alone at http://corestandards.org/the-standards

Mathematical Vocabulary is identified in bold print. These are words that students should know and be able to use in context.

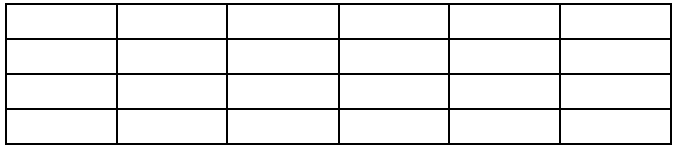
Operations and Algebraic Thinking 3.0A

Common Core Cluster

Represent and solve problems involving multiplication and division.

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.

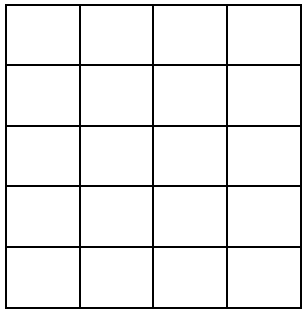
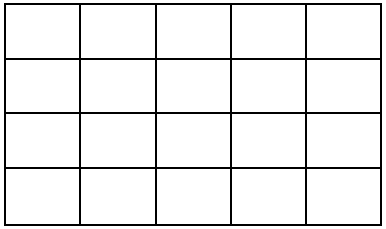
Common Core Standard	Unpacking What do these standards mean a child will know and be able to do?
3.OA.1 Interpret **products** of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*	**3.OA.1** Interpret products of whole numbers. Example: 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, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*	**3.OA.2** focuses on two distinct models of division: partition models and measurement (repeated subtraction) models. Partition models focus on the question, "How many in each group?" A context for partition models would be: There are 12 cookies on the counter. If you are sharing the cookies equally among three bags, how many cookies will go in each bag? O O O O O O O O O O O O Measurement (repeated subtraction) models focus on the question, "How many groups can you make?" A context for measurement models would be: There are 12 cookies on the counter. If you put 3 cookies in each bag, how many bags will you fill? O O O O O O O O O O O O
3.OA.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	**3.OA.3** students should apply their skills to solve word problems. This could include one or two-step word problems, such as: If you divide 4 dozen brownies among 8 people, how many cookies does each person receive? *(4x12 = 48, 48 ÷ 8 = 6).* Glossary, Table 2 gives examples of a variety of problem solving contexts, in which students need to find the

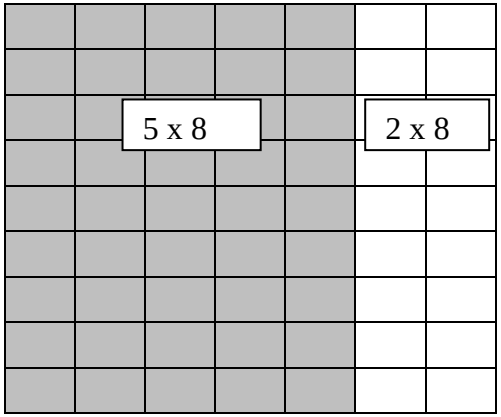
equations with a symbol for the **unknown** number to represent the problem.[1] [1] See Glossary, Table 2.	product, the group size, or the number of groups. Students should be given ample experiences to explore all of the different problem structures. **3.OA.3** references various strategies that can be used to solve word problems involving multiplication and division. Examples: 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 task can also be solved by drawing pictures. 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." **3.OA.3** 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. Example: 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 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?*	**3.OA.4** refers to Glossary, Table 2 and equations for the different types of multiplication and division problem structures. The easiest problem structure includes Unknown Product (3 x ? = 18 or 18 ÷ 3 = 6). The more difficult problem structures include Group Size Unknown (3 x ? = 18 or 18 ÷ 3 = 6) or Number of Groups Unknown (? x 6 = 18, 18 ÷ 6 = 3). The focus of 3.OA.4 goes beyond the traditional notion of *fact families*, by having students explore the inverse relationship of multiplication and division.

Common Core Cluster

Understand properties of multiplication and the relationship between multiplication and division.

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.

Common Core Standard	Unpacking What do these standards mean a child will know and be able to do?
3.OA.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.)* [2] Students need not use formal terms for these properties.	**3.OA.5** references properties of multiplication. While students DO NOT need to not use the formal terms of these properties, student should understand that properties are rules about how numbers work, they need to be flexibly and fluently applying each of them. The associative property states that the sum or product stays the same when the grouping of addends or factors is changed. For example, when a student multiplies 7 x 5 x 2, a student could rearrange the numbers to first multiply 5 x 2 = 10 and then multiply 10 x 7 = 70. properties – **rules about how numbers work** The commutative property (order property) states that the order of numbers does not matter when you are adding or multiplying numbers. For example, if a student knows that 5 x 4 = 20, then they also know that 4 x 5 = 20. The array below could be described as a 5 x 4 array for 5 columns and 4 rows, or a 4 x 5 array for 4 rows and 5 columns. There is no "fixed" way to write the dimensions of an array as rows x columns or columns x rows. Students should have flexibility in being able to describe both dimensions of an array. Example: 4 x 5 or 5 x 4  4 x 5 or 5 x 4  Example of the distributive property would be using mental math to determine a product. Here are ways that students could use the distributive property to determine the product of 7 x 6. Again, students should use the distributive property, but can refer to this in informal language such as "breaking numbers apart".

	<table><tr><td>Student 1 7 x 6 7 x 5 = 35 7 x 1 = 7 35 + 7 = 42</td><td>Student 2 7 x 6 7 x 3 = 21 7 x 3 = 21 21 + 21 = 42</td><td>Student 3 7 x 6 5 x 6 = 30 2 x 6 = 12 30 + 12 = 42</td></tr></table> Another example if the distributive property helps students determine the products and factors of problems by breaking numbers apart. For example, for the problem 7 x 8 = ?, students can decompose the 7 into a 5 and 2, and reach the answer by multiplying 5 x 8 = 40 and 2 x 8 =16 and adding the two products (40 +16 = 56). 
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.*	**3.OA.6** refers back to Glossary, Table 2 and the various problem structures. Since multiplication and division are inverse operations, students are expected to solve problems and explain their processes of solving division problems that can also be represented as unknown factor multiplication problems. Example: A student knows that 2 x 12 = 24. How can they use that fact to determine the answer to the following question: 24 people are divided into pairs in P.E. class? How many pairs are there? Write a division equation and explain your reasoning.

Common Core Cluster	
Multiply and divide within 100.	
Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
3.OA.7 Fluently **multiply** and **divide** within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all **products** of two one-digit numbers.	**3.OA.7** uses the word fluently, which means accuracy (correct answer), efficiency (within 3-4 seconds), and flexibility (using strategies such as the distributive property). "Know from memory" should not focus only on timed tests and repetitive practice, but ample experiences working with manipulatives, pictures, arrays, word problems, and numbers to internalize the basic facts (up to 9 x 9).

Common Core Cluster	
Solve problems involving the four operations, and identify and explain patterns in arithmetic.	
Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the **unknown** quantity. Assess the **reasonableness** of answers using mental computation and **estimation** strategies including **rounding.**[3] [3] This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular	**3.OA.8** refers to two-step word problems using the four operations. The size of the numbers should be limited to related 3rd grade standards (e.g., 3.OA.7 and 3.NBT.2). Adding and subtracting numbers should include numbers within 1,000, and multiplying and dividing numbers should include single-digit factors and products less than 100. **3.OA.8** calls for students to represent problems using equations with a letter to represent unknown quantities. Example: Mike runs 2 miles a day. His goal is to run 25 miles. After 5 days, how many miles does Mike have left to run in order to meet his goal? Write an equation and find the solution (2 x 5 + m = 25). **3.OA.8** refers to estimation strategies, including using compatible numbers (numbers that sum to 10, 50, or 100) or rounding. The focus in this standard is to have students use and discuss various strategies. Students should estimate during problem solving, and then revisit their estimate to check for reasonableness. Example: Here are some typical estimation strategies for the problem:

<table>
<tr><td>order.</td><td>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?

<table>
<tr>
<td>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.</td>
<td>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.</td>
<td>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.</td>
</tr>
</table>

The assessment of estimation strategies should only have one reasonable answer (500 or 530), or a range (between 500 and 550). Problems should be structured so that all acceptable estimation strategies will arrive at a reasonable answer.</td></tr>
<tr><td>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.</td><td>3.OA.9 calls for students to examine arithmetic patterns involving both addition and multiplication. Arithmetic patterns are patterns that change by the same rate, such as adding the same number. For example, the series 2, 4, 6, 8, 10 is an arithmetic pattern that increases by 2 between each term.

3.OA.9 also mentions identifying patterns related to the properties of operations.
Examples:
*Even numbers are always divisible by 2. Even numbers can always be decomposed into 2 equal addends (14 = 7 + 7).
*Multiples of even numbers (2, 4, 6, and 8) are always even numbers.
*On a multiplication chart, the products in each row and column increase by the same amount (skip counting).
*On an addition chart, the sums in each row and column increase by the same amount.

3.OA.9 What do you notice about the numbers highlighted in pink in the multiplication table? Explain a pattern using properties of operations.</td></tr>
</table>

When (commutative property) one changes the order of the factors they will still gets the same product, example 6 x 5 = 30 and 5 x 6 = 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

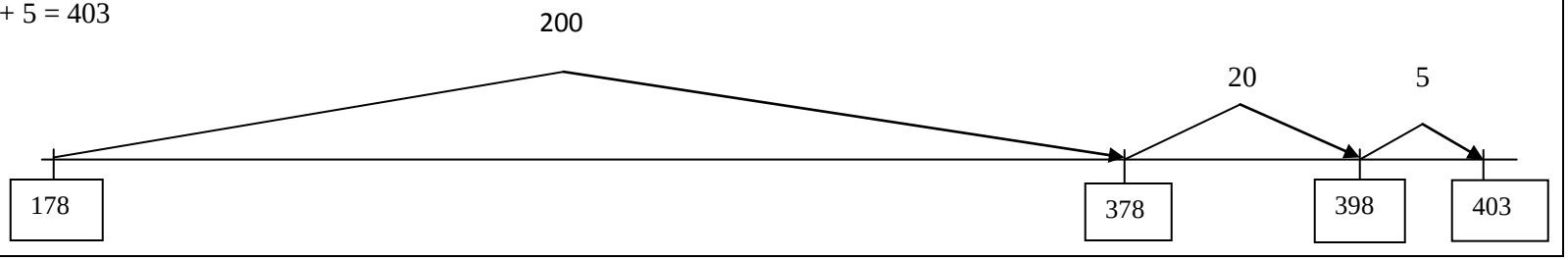
Number and Operations in Base Ten 3.NBT

Common Core Cluster

Use place value understanding and properties of operations to perform multi-digit arithmetic.[1]

[1] A range of algorithms may be used.

Common Core Standard	Unpacking What do these standards mean a child will know and be able to do?
3.NBT.1 Use place value understanding to **round** whole numbers to the nearest 10 or 100.	**3.NBT.1** refers to place value understanding, which extends beyond an algorithm or procedure for rounding. The expectation is that students have a deep understanding of place value and number sense and can explain and reason about the answers they get when they round. Based on the cluster goal, students are using rounding in the context of multi-digit arithmetic. Students should have numerous experiences using a number line and a hundreds chart as tools to support their work with rounding.
3.NBT.2 Fluently **add** and **subtract** within 1000 using strategies and algorithms based on place value, properties of operations, and/or the	**3.NBT.2** refers to fluently, which means accuracy (correct answer), efficiency (within 3-4 seconds), and flexibility (using strategies such as the distributive property). The word algorithm refers to a procedure or a series of steps. There are other algorithms other than the standard algorithm. Third grade students should have experiences beyond the standard algorithm. A variety of algorithms will be assessed on EOG.

relationship between addition and subtraction. [1] A range of algorithms may be used.	Example: There are 178 fourth graders and 225 fifth graders on the playground. How many total students are on the playground? Student 1 100 + 200 = 300 70 + 20 = 90 8 + 5 = 13 300 + 90 + 13 = 403 students 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. 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. Student 4 178 + 225 = ? 178 + 200 = 378 378 + 20 = 398 398 + 5 = 403 
3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.	**3.NBT.3** extends students' work in multiplication by having them apply their understanding of place value. This standard expects that students go beyond tricks that hinder understanding such as "just adding zeros" and explain and reason about their products. For example, for the problem 50 x 4, students should think of this as 4 groups of 5 tens or 20 tens. Twenty tens equals 200.

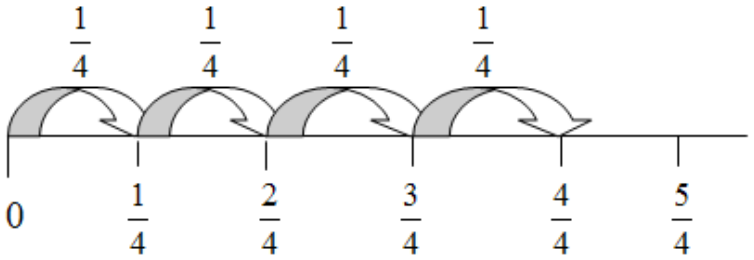
Number and Operation – Fractions[1] 3.NF

Common Core Cluster

Develop understanding of fractions as numbers.

[1] Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, 8.

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, ½ 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.

Common Core Standard	Unpacking What do these standards mean a child will know and be able to do?
3.NF.1 Understand a **fraction** 1/*b* as the quantity formed by 1 part when *a* whole is **partitioned** into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by a parts of size 1/*b*.	**3.NF.1** 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.
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* 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. b. Represent a fraction *a*/*b* on a number line diagram by marking off a lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.	**3.NF.2a** and **3.NF.2b** The number line diagram is the first time students work with a number line for numbers that are between whole numbers (e.g., that ½ is between 0 and 1). In the number line diagram below, the space between 0 and 1 is divided (partitioned) into 4 equal regions. The distance from 0 to the first segment is 1 of the 4 segments from 0 to 1 or ¼ (**3.NF.2a**). Similarly, the distance from 0 to the third segment is 3 segments that are each one-fourth long. Therefore, the distance of 3 segments from 0 is the fraction ¾ (**3.NF.2b**). 

3.NF.3 Explain **equivalence** of fractions in special cases, and **compare** fractions by reasoning about their size. a. Understand two fractions as **equivalent (equal)** if they are the same size, 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.	**3.NF.3a** and **3.NF.3b** call for students to use visual fraction models (area models) and number lines to explore the idea of equivalent fractions. Students should only explore equivalent fractions using models, rather than using algorithms or procedures.
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.3c** includes writing whole numbers as fractions. The concept relates to fractions as division problems, where the fraction 3/1 is 3 wholes divided into one group. This standard is the building block for later work where students divide a set of objects into a specific number of groups. Students must understand the meaning of a/1 Example: If 6 brownies are shared between 2 people, how many brownies would each person get?
d. Compare two fractions with the same **numerator** or the same **denominator** by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the **symbols >, =, or <,** and justify the conclusions, e.g., by using a visual fraction model.	**3.NF.3d** involves comparing fractions with or without visual fraction models including number lines. Experiences should encourage students to reason about the size of pieces, the fact that 1/3 of a cake is larger than ¼ of the same cake. Since the same cake (the whole) is split into equal pieces, thirds are larger than fourths. In this standard, students should also reason that comparisons are only valid if the wholes are identical. For example, ½ of a large pizza is a different amount than ½ of a small pizza. Students should be given opportunities to discuss and reason about which ½ is larger.

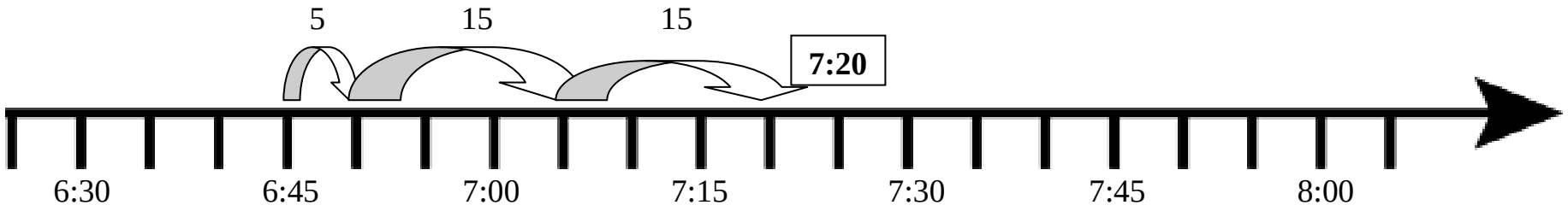
Measurement and Data 3.MD

Common Core Cluster

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

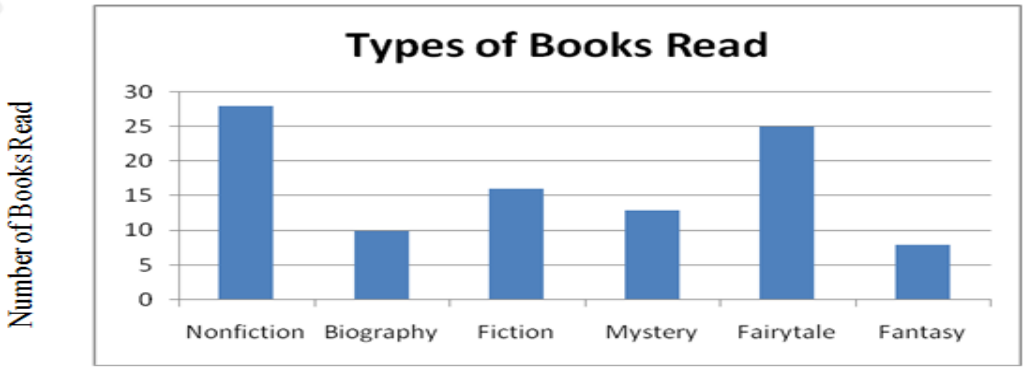
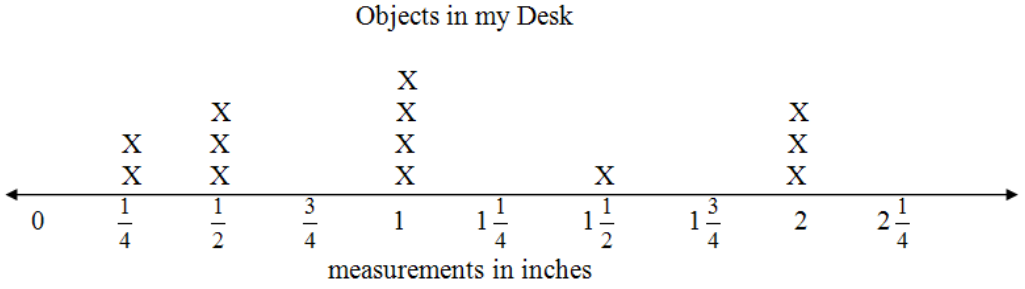
Unpacking Common Core	Unpacking What do these standards mean a child will know and be able to do?
3.MD.1 Tell and write **time** to the nearest **minute** and measure time **intervals** in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	**3.MD.1** calls for students to solve **elapsed time**, including word problems. Students could use clock models or number lines to solve. On the number line, students should be given the opportunities to determine the intervals and size of jumps on their number line. Students could use pre-determined number lines (intervals every 5 or 15 minutes) or open number lines (intervals determined by students).
3.MD.2 Measure and **estimate liquid volumes** and **masse**s 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	**3.MD.2** asks for students to reason about the units of mass and volume. Example: A paper clip weighs about a) a gram, b) 10 grams, c) 100 grams? **3.MD.2** Word problems should only be one-step and include the same units (grams, kilograms, or liters).

Example:
Tonya wakes up at 6:45 a.m. 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?



same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.[2] [1] Excludes compound units such as cm3 and finding the geometric volume of a container. [2] Excludes multiplicative comparison problems (problems involving notions of "times as much"; see Glossary, Table 2).	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).

Common Core Cluster	
Represent and interpret data.	
Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
3.MD.3 Draw a **scaled picture graph** and a **scaled bar graph** to represent a **data** set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*	**3.MD.3** While exploring data concepts, students should Pose a question, Collect data, Analyze data, and Interpret data (PCAI). Students should be graphing data that is relevant to their lives 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

	 Analyze and Interpret data: • How many more nofiction 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? Students should be given opportunities to discuss and reason about appropriate scales of their graphs.
3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a **line plot,** where the horizontal scale is marked off in appropriate units— whole numbers, **halves, or quarters.**	**3.MD.4** This standard provides a context for students to work with fractions by measuring objects to a quarter of an inch. Example: Measure objects in your desk to the nearest ½ or ¼ of an inch, display data collected on a line plot. How many objects measured ¼? ½? etc… 

Common Core Cluster	
Geometric measurement: understand concepts of area and relate area to multiplication and to addition. 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.	
Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
3.MD.5 Recognize **area** as an **attribute** of **plane figures** and understand concepts of area measurement. 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. b. A plane figure which can be covered without **gaps or overlaps** by *n* unit squares is said to have an area of *n* square units.	**3.MD.5 a** and **3.MD.5b** calls 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.6 Measure areas by counting unit squares (**square cm, square m, square in, square ft**, and improvised units).	**3.MD.6** counting the square units to find the area could be done in metric, customary, or non-standard square units.

3.MD.7 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.

3.MD.7a tile rectangle then multiply the side lengths to show it is the same.

To find the area one could count the squares or multiply 3 x 4 = 12

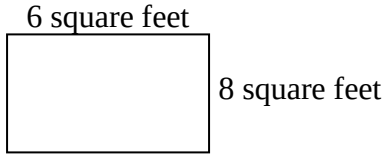
1	2	3	4
5	6	7	8
9	10	11	12

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.7b solve real world and mathematical problems

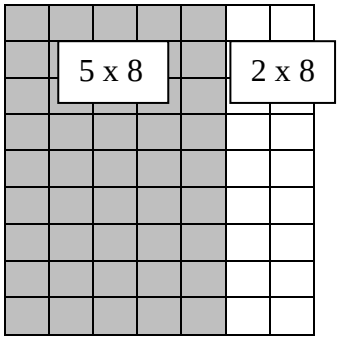
Example:

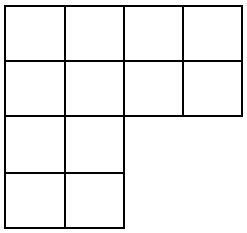
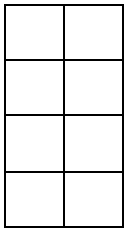
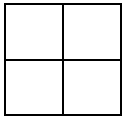
Drew wants to tile the bathroom floor. How many square tiles will he need?

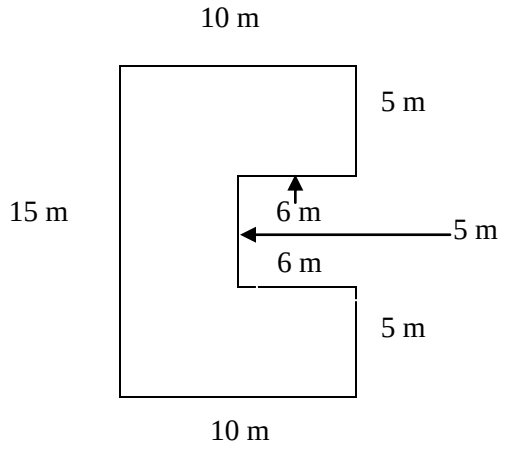


c. Use **tiling** to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.

3.MD.7c extends students' work with the distributive property. For example, in the picture below the area of a 7 x 8 figure can be determined by finding the area of a 5 x 8 and 2 x 8 and adding the two sums.



d. Recognize area as additive. Find areas of rectilinear figures by **decomposing** them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	**3.MD.7d** uses the word rectilinear. A rectilinear figure is a polygon that has all right angles.  How could this figure be decomposed to help find the area?   This portion of the decomposed figure is a 4 x 2. This portion of the decomposed figure is 2 x 2. 4 x 2 = 8 and 2 x 2 = 4 So 8 + 4 = 12 Therefore the total area of this figure is 12 square units

	Example: A storage shed is pictured below. What is the total area? How could the figure be decomposed to help find the area? 

Common Core Cluster	
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	
Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
3.MD.8 Solve real world and mathematical problems involving **perimeters** of **polygons**, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	**3.MD.8** calls for students to solve problems about perimeter, or the distance around a shape. Students should have ample opportunities to measure and determine the perimeters of polygons. Example: What rectangles can be made with a perimeter of 12 units? Which rectangle gives you the greatest area? How do you know?

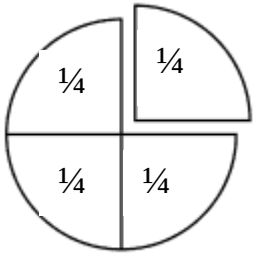
	3.MD.8 discusses the relationship between area and perimeter. For example, a rectangle with a perimeter of 12 feet, could be three different shapes: Perimeter: 12 — Dimensions: 5 ft x 1 ft — Area: 5 sq ft Perimeter: 12 — Dimensions: 4 ft x 2 ft — Area: 8 sq ft Perimeter: 12 — Dimensions: 3 ft x 3 ft — Area: 9 sq ft

Geometry 3.G

Common Core Cluster

Reason with shapes and their attributes.
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.

Common Core Standard	Unpacking What do these standards mean a child will know and be able to do?
3.G.1 Understand that shapes in different categories (e.g., **rhombuses, rectangles**, and others) may share **attributes** (e.g., having four sides), and that the shared attributes can define a larger **category** (e.g., **quadrilaterals**). Recognize **rhombuses, rectangles**, and **squares** as examples of **quadrilaterals**, and draw examples of **quadrilaterals** that do not belong to any of these subcategories.	**3.G.1** involves classifying shapes by attributes and drawing shapes that fit specific categories. For example, parallelograms include: squares, rectangles, rhombi, or other shapes that have two pairs of parallel sides. Also, the broad category quadrilaterals include all types of parallelograms, trapezoids and other four-sided figures. Example: 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.*	**3.G.2** builds on students' work with fractions and area. Students are responsible for partitioning shapes into halves, thirds, fourths, sixths and eighths. Example: This figure was partitioned/divided into four equal parts. Each part is ¼ of the total area of the figure.

	 ¼ ¼ ¼ ¼