Grade 3 Mathematics

Standards Resources:

This document does not contain all of the Common Core Standards, but stresses the major clusters as identified by Achieve the Core. These priority standards require greater emphasis than the others based on the depth of the ideas, the time that it takes to master, and/or their importance to future mathematics or the demands of college and career readiness.*

However, it is important that the standards which are not deconstructed in this document continue to be part of your instruction. Neglecting those standards may leave gaps in student skill and understanding as well as not preparing students for the challenges of a later grade.

**This project was funded from the nonprofit organization Student Achievement Partners. This organization assembles educators and researchers to design actions based on evidence that will improve student achievement.*

***PPS Deconstructed Standards: Unpacked Content by Learning Progressions** is intended to clarify concepts inherent in the Common Core State Standards. These are an instructional resource that should be used to facilitate planning for units of study in Math, creating common assessments and general instructional support of CCSS.*

Resources from the following states were used to draft these documents: Arizona Dept. of Education; Kentucky Dept of Education Core Academic Standards with Targets; North Carolina Dept of Public Instruction Unpacked Content. Adjustments and modifications have been made to customize content for the PPS district.

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DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Represent and solve problems involving multiplication and division.
Standard: 3.OA.1

Connecting Standards	**Standard/Learning Outcome:**	**Connecting Standards**
2.OA.C.3 **2.OA.C.4**	CCSS.MATH.CONTENT.3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*	**3.OA.A.2** **3.OA.A.3** **3.OA.B.5** **3.OA.B.6**

Mathematical Practices
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.4. Model with mathematics. 3.MP.7. Look for and make use of structure.

Guiding Questions	
● How can I find the total number of objects in equal groups?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Find the product of multiple groups of objects.	● I can interpret products of whole numbers as a total number of objects in a number of groups.

Problem Type: Compare	
Difference Unknown: Jim purchased 5 packages of muffins. Each package contained 3 muffins. How many muffins did Jim purchase? 5 groups of 3, 5x3=15. Describe another situation where there would be 5 groups of 3 or 5x3.	***Bigger Unknown:*** Sonya earns $7 a week pulling weeds. After 5 weeks of work, how much has Sonya worked? Write an equation and find the answer. Describe another situation that would match 7x5.

Academic Vocabulary	**Explanations and Examples**
Key Terms ● Multiplication ● Factor ● Product ● Groups of	Students 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. Multiplication requires students to think in terms of groups of things rather than individual things.Students learn that the multiplication symbol ‘x’ means “groups of” and problems such as 5 x 7 refer to 5 groups of 7. To further develop this understanding, students interpret a problem situation requiring multiplication using pictures, objects, words, numbers, and equations. Then, given a multiplication expression (e.g., 5 x 6) students interpret the expression using a multiplication context. (See Table 2) They should begin to use the terms, factor and product, as they describe multiplication.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Represent and solve problems involving multiplication and division.
Standard: 3.OA.2

Connecting Standard	**Standard/Learning Outcome:**	**Connecting Standards**
3.OA.A.1	CCSS.MATH.CONTENT.3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8*.	**3.OA.A.3** **3.OA.B.5** **5.NF.B.3** **5.NF.B.5** **5.NF.B.6**

Mathematical Practices	
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.4. Model with mathematics. 3.MP.7. Look for and make use of structure.	
Guiding Questions	
• When you divide, what do you find?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Know what the numbers in a division problem represent.	• Explain what division means and how it relates to equal shares. • Interpret quotients as the number of shares or the number of groups when a set of objects is divided equally.

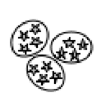
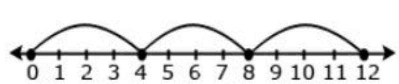
Academic Vocabulary	**Explanations and Examples**
Key Terms • Quotient • Dividend • Divisor • Factor	Students recognize the operation of division in two different types of situations. One situation requires determining how many groups and the other situation requires sharing (determining how many in each group). Students should be exposed to appropriate terminology (quotient, dividend, divisor, and factor). To develop this understanding, students interpret a problem situation requiring division using pictures, objects, words, numbers, and equations. Given a division expression (e.g., 24 ÷ 6) students interpret the expression in contexts that require both interpretations of division.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Represent and solve problems involving multiplication and division.
Standard: 3.OA.3

Connecting Standards	**Standard/Learning Outcome:**	**Connecting Standards**
3.OA.A.1 **3.OA.A.2**	CCSS.MATH.CONTENT.3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	**3.OA.D.8** **4.OA.A.1** **4.OA.A.2** **4.NF.B.4**

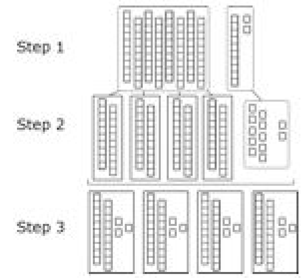
Mathematical Practices
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.4. Model with mathematics. 3.MP.7. Look for and make use of structure.
Guiding Questions
● How do I know when to use multiplication or division to solve a problem?

KNOW (Essential Concept)	**DO** (Learning Targets/Essential Skills)
● Multiply and divide within 100.	● Determine when to multiply and divide in word problems. ● Solve word problems in situations involving equal groups, arrays, and measurement quantities. ● Represent a word problem using a picture, and an equation with a symbol for the unknown number.

Academic Vocabulary	**Explanations and Examples**
Key Terms ● Product ● Groups of ● Quotient ● Partitioned equally ● Multiplication ● Multiply ● Division ● Divide ● Equal groups ● Group size ● Array ● Equation ● Unknown ● Strategies	Students use a variety of representations for creating and solving one-step word problems, i.e., numbers, words, pictures, physical objects, or equations. They use multiplication and division of whole numbers up to 10 x10. Students explain their thinking, show their work by using at least one representation, and verify that their answer is reasonable. Word problems may be represented in multiple ways: ● Equations: 3 x 4 = ?, 4 x 3 = ?, 12 ÷ 4 = ? and 12 ÷ 3 = ? ● Array: o o o o o o o o o o o o ● Equal groups  ● Repeated addition: 4 + 4 + 4 or repeated subtraction ● Three equal jumps forward from 0 on the number line to 12 or three equal jumps backwards from 12 to 0 

Examples of division problems:

- Determining the number of objects in each share (partitive division, where the size of the groups is unknown):
    - The bag has 92 hair clips, and Laura and her three friends want to share them equally. How many hair clips will each person receive?



- Determining the number of shares (measurement division, where the number of groups is unknown)
    - Max the monkey loves bananas. Molly, his trainer, has 24 bananas. If she gives Max 4 bananas each day, how many days will the bananas last?

Starting	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
24	24-4= 20	20-4= 16	16-4= 12	12-4= 8	8-4= 4	4-4= 0

Solution: The bananas will last for 6 days.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Represent and solve problems involving multiplication and division.
Standard: 3.OA.4

Connecting Standards	Standard/Learning Outcome:	Connecting Standard
3.OA.A.1 **3.OA.A.2**	CCSS.MATH.CONTENT.3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?*	**3.OA.D.8**

Mathematical Practices
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.2. Reason abstractly and quantitatively. 3.MP.6. Attend to precision. 3.MP.7. Look for and make use of structure.
Guiding Questions
• In what ways can multiplication and divisions affect numbers? • How does multiplication and division offer efficient ways to get an answer?

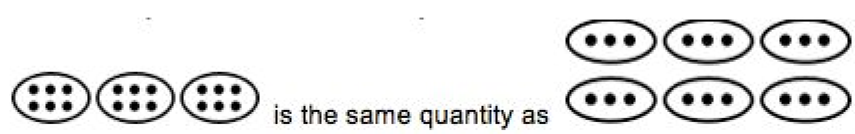
KNOW (Essential Concept)	**DO** (Learning Targets/Essential Skills)
• Multiply and divide within 100	• Determine which operation (multiplication or division) is needed to determine the unknown whole number. • Solve to find the unknown whole number in a multiplication or division equation.

Academic Vocabulary	Explanations and Examples
Key Terms • Product • Groups of • Quotient • Partitioned equally • Multiplication • Multiply • Division • Divide • Equal groups • Group size • Array • Equation • Unknown • Strategies	This standard is strongly connected to 3.AO.3 when students solve problems and determine unknowns in equations. Students should also experience creating story problems for given equations. When crafting story problems, they should carefully consider the question(s) to be asked and answered to write an appropriate equation. Students may approach the same story problem differently and write either a multiplication equation or division equation. Students apply their understanding of the meaning of the equal sign as "the same as" to interpret an equation with an unknown. When given 4 x ? = 40, they might think: • 4 groups of some number is the same as 40 • 4 times some number is the same as 40 • I know that 4 groups of 10 is 40 so the unknown number is 10 • The missing factor is 10 because 4 times 10 equals 40. Equations in the form of a x b = c and c = a x b should be used interchangeably, with the unknown in different positions. Examples: Solve the equations below: 24 = ? x 6 72÷Δ = 9 • Rachel has 3 bags. There are 4 marbles in each bag. How many marbles does Rachel have altogether? 3 x 4 = m

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Understand properties of multiplication and the relationship between multiplication and division
Standard: 3.OA.5

Connecting Standards	**Standard/Learning Outcome:**	**Connecting Standards**
3.OA.A.1 **3.OA.A.2**	CCSS.MATH.CONTENT.3.OA.B.5 Apply properties of operations as strategies to multiply and divide.2 *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)*	**3.OA.C.7** **3.OA.D.9** **3.NBT.A.3** **4.NBT.B.5** **4.NBT.B.6**

Mathematical Practices	
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.4. Model with mathematics. 3.MP.7. Look for and make use of structure. 3.MP.8. Look for and express regularity in repeated reasoning.	
Guiding Questions	
• What are the properties of multiplication and division?	
KNOW **(Essential Concept)**	**DO** **(Learning Targets/Essential Skills)**
• Multiply and divide within 100.	• Explain how the properties of operations work. • Apply properties of operations as strategies to multiply and divides.

Academic Vocabulary	**Explanations and Examples**
Key Terms • Operation • Multiply • Divide • Factor • Product • Quotient • Properties - rules about how numbers work	Students represent expressions using various objects, pictures, words and symbols in order to develop their understanding of properties. They multiply by 1 and 0 and divide by 1. They change the order of numbers to determine that the order of numbers does not make a difference in multiplication (but does make a difference in division). Given three factors, they investigate changing the order of how they multiply the numbers to determine that changing the order does not change the product. They also decompose numbers to build fluency with multiplication. Models help build understanding of the commutative property: Example: 3 x 6 = 6 x 3 In the following diagram it may not be obvious that 3 groups of 6 is the same as 6 groups of 3. A student may need to count to verify this. 

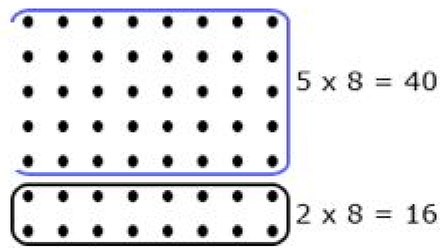
Example: 4 x 3 = 3 x 4

An array explicitly demonstrates the concept of the commutative property.

4 rows of 3 or 4 x 3   3 rows of 4 or 3 x 4

Students are introduced to the distributive property of multiplication over addition as a strategy for using products they know to solve products they don't know. For example, if students are asked to find the product of 7 x 8, they might decompose 7 into 5 and 2 and then multiply 5 x 8 and 2 x 8 to arrive at 40 + 16 or 56. Students should learn that they can decompose either of the factors. It is important to note that the students may record their thinking in different ways.

$$\begin{array}{r} 5 \times 8 = 40 \\ 2 \times 8 = \underline{16} \\ 56 \end{array}$$



$$\begin{array}{r} 7 \times 4 = 28 \\ 7 \times 4 = \underline{28} \\ 56 \end{array}$$

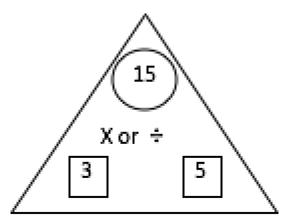
To further develop understanding of properties related to multiplication and division, students use different representations and their understanding of the relationship between multiplication and division to determine if the following types of equations are true or false.

- 0 x 7 = 7 x 0 = 0 (Zero Property of Multiplication)
- 1 x 9 = 9 x 1 = 9 (Multiplicative Identity Property of 1)
- 3 x 6 = 6 x 3 (Commutative Property)
- 8 ÷ 2 = 2 ÷ 8 (Students are only to determine that these are not equal)
- 2 x 3 x 5 = 6 x 5
- 10 x 2 < 5 x 2 x 2
- 2 x 3 x 5 = 10 x 3
- 0 x 6 > 3 x 0 x 2

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Understand properties of multiplication and the relationship between multiplication and division
Standard: 3.OA.6

Connecting Standard	**Standard/Learning Outcome:**	**Connecting Standards**
	CCSS.MATH.CONTENT.3.OA.B.6 Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*	**3.OA.C.7** **4.NBT.B.6** **5.NF.B.3** **5.NF.B.7** **6.NS.A.1**

Mathematical Practices	
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.7. Look for and make use of structure.	
Guiding Questions	
• In what ways can division affect numbers?	
KNOW **(Essential Concept)**	**DO** **(Learning Targets/Essential Skills)**
• Identify the multiplication problem related to the division problem. • Identify the unknown factor in the related multiplication problem.	• Recognize multiplication and division as related operations and explain how they are related. • Use multiplication to solve division problems.

Academic Vocabulary	**Explanations and Examples**
Key Terms • Operation • Multiply • Divide • Factor • Product • Quotient • Properties - rules about how numbers work	Multiplication and division are inverse operations and that understanding can be used to find the unknown. Fact family triangles demonstrate the inverse operations of multiplication and division by showing the two factors and how those factors relate to the product and/or quotient. Examples: • 3 x 5 = 15 5 x 3 = 15 • 15 ÷ 3 = 5 15 ÷ 5 = 3  Students use their understanding of the meaning of the equal sign as "the same as" to interpret an equation with an unknown. When given 32 ÷ ☐= 4, students may think: • 4 groups of some number is the same as 32 • 4 times some number is the same as 32 • I know that 4 groups of 8 is 32 so the unknown number is 8 • The missing factor is 8 because 4 times 8 is 32. Equations in the form of a ÷ b = c and c = a ÷ b need to be used interchangeably, with the unknown in different positions.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Multiply and divide within 100.
Standard: 3.OA.7

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
3.OA.B.5 **3.OA.B.6**	CCSS.MATH.CONTENT.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.	**4.OA.B.4** **4.NBT.B.5** **4.NBT.B.6** **4.MD.A.1**

Mathematical Practices
3.MP.2. Reason abstractly and quantitatively. 3.MP.7. Look for and make use of structure. 3.MP.8. Look for and express regularity in repeated reasoning.
Guiding Questions
● Which strategy is most efficient when solving multiplication and division problems? ● Why do we need math facts?

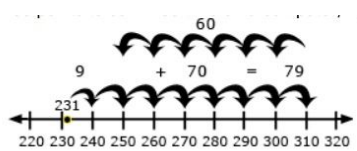
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Know from memory all products of two one-digit numbers. ● Fluently multiply and divide within 100.	● Analyze a multiplication or division problem in order to choose an appropriate strategy to fluently multiply or divide within 100

Academic Vocabulary	**Explanations and Examples**
Key Terms ● Operation ● Multiply ● Divide ● Factor ● Product ● Quotient ● Unknown ● Strategies ● Reasonableness ● Mental computation ● Property	By studying patterns and relationships in multiplication facts and relating multiplication and division, students build a foundation for fluency with multiplication and division facts. Students demonstrate fluency with multiplication facts through 10 and the related division facts. Multiplying and dividing fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. Strategies students may use to attain fluency include: ● Multiplication by zeros and ones ● Doubles (2s facts), Doubling twice (4s), Doubling three times (8s) ● Tens facts (relating to place value, 5 x 10 is 5 tens or 50) ● Five facts (half of tens) ● Skip counting (counting groups of __ and knowing how many groups have been counted) ● Square numbers (ex: 3 x 3) ● Nines (10 groups less one group, e.g., 9 x 3 is 10 groups of 3 minus one group of 3) Decomposing into known facts (6 x 7 is 6 x 6 plus one more group of 6) ● Turn-around facts (Commutative Property) ● Fact families (Ex: 6 x 4 = 24; 24 ÷ 6 = 4; 24 ÷ 4 = 6; 4 x 6 = 24) ● Missing factors General Note: Students should have exposure to multiplication and division problems presented in both vertical and horizontal forms.

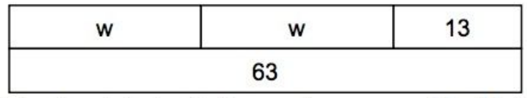
DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Solve problems involving the four operations, and identify and explain patterns in arithmetic.
Standard: 3.OA.8

Connecting Standards	**Standard/Learning Outcome:**	**Connecting Standard**
2.OA.A.1 **3.OA.A.3**	CCSS.MATH.CONTENT.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.	**4.OA.A.3**

Mathematical Practices	
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.2. Reason abstractly and quantitatively. 3.MP.4. Model with mathematics. 3.MP.5. Use appropriate tools strategically.	
Guiding Questions	
• Why is it important to develop an equation to determine an unknown quantity in a two-step word problem? • What strategies can be used to solve two –step word problem using the four operations?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Know the order of operations. • Know strategies for estimating and mental computation.	• Construct an equation with a letter standing for the unknown quantity • Solve two-step word problems using the four operations. • Justify answers to problems using various estimation strategies.

Academic Vocabulary	**Explanations and Examples**
Key Terms • Operation • Multiply • Divide • Factor • Product • Quotient • Subtract • Add • Addend • Sum	Students should be exposed to multiple problem-solving strategies (using any combination of words, numbers, diagrams, physical objects or symbols) and be able to choose which ones to use. Examples: Jerry earned 231 points at school last week. This week he earned 79 points. If he uses 60 points to earn free time on a computer, how many points will he have left?  A student may use the number line above to describe his/her thinking, “231 + 9 = 240 so now I need to add 70 more. 240, 250 (10 more), 260 (20 more), 270, 280, 290, 300, 310 (70 more). Now I need to count back 60. 310, 300 (back 10), 290 (back 20), 280, 270, 260, 250 (back 60).” A student writes the equation, 231 + 79 – 60 = m and uses rounding (230 + 80 – 60) to estimate. A student writes the equation, 231 + 79 – 60 = m and calculates 79-60 = 19 and then calculates 231 + 19 = m.

The soccer club is going on a trip to the water park. The cost of attending the trip is $63. Included in that price is $13 for lunch and the cost of 2 wristbands, one for the morning and one for the afternoon. Write an equation representing the cost of the field trip and determine the price of one wristband.



The above diagram helps the student write the equation, w + w + 13 = 63. Using the diagram, a student might think, “I know that the two wristbands cost $50 ($63-$13) so one wristband costs $25.” To check for reasonableness, a student might use front end estimation and say 60-10 = 50 and 50 ÷ 2 = 25.

When students solve word problems, they use various estimation skills which include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of solutions.

Estimation strategies include, but are not limited to:

- Using benchmark numbers that are easy to compute.
- Front-end estimation with adjusting (using the highest place value and estimating from the front end making adjustments to the estimate by taking into account the remaining amounts).
- Rounding and adjusting (students round down or round up and then adjust their estimate depending on how much the rounding changed the original values).

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics

Cluster: Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Standard: 3.OA.9

Connecting Standards	Standard/Learning Outcome:	Connecting Standard
2.OA.C.3 **3.OA.B.5**	CCSS.MATH.CONTENT.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.*	**4.OA.C.5**

Mathematical Practices
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.2. Reason abstractly and quantitatively. 3.MP.3. Construct viable arguments and critique the reasoning of others. 3.MP.6. Attend to precision. 3.MP.7. Look for and make use of structure.
Guiding Questions
● Where can you see patterns in our world (music, art, architecture, nature, words, numbers)? ● How do patterns help us understand our world (music, art, architecture, nature, words, numbers)?

KNOW (Essential Concept)	**DO** (Learning Targets/Essential Skills)
● Identify arithmetic patterns.	● Explain rules for a pattern using properties of operations. ● Explain relationships between the numbers in a pattern.

Academic Vocabulary	Explanations and Examples
Key Terms ● Operation ● Multiply ● Divide ● Factor ● Product ● Quotient ● Subtract ● Add ● Addend ● Sum	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. For 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 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.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Develop understanding of fractions as numbers.
Standard: 3.NF.1

Connecting Standards	**Standard/Learning Outcome:**	**Connecting Standards**
2.G.A.3 **2.MD.A.2**	CCSS.MATH.CONTENT.3.NF.A.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.	**3.G.A.2** **3.NF.A.3** **4.NF.B.3** **4.NF.B.4** **5.NF.B.7**

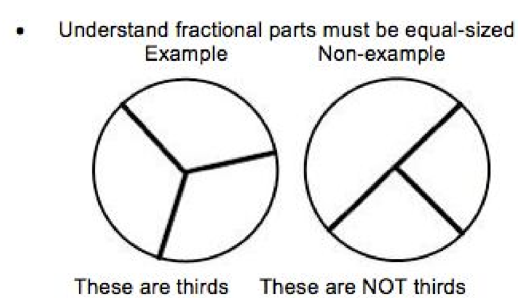
Mathematical Practices

3.MP.1. Make sense of problems and persevere in solving them.
3.MP.4. Model with mathematics.
3.MP.7. Look for and make use of structure.

Guiding Questions

- How does a fraction differ from a whole number?

KNOW (Essential Concept)	**DO** (Learning Targets/Essential Skills)
• Identify a fraction such as 2/3 and explain that the quantity formed is 2 equal parts of the whole partitioned into 3 equal parts (1/3 and 1/3 of the whole 3/3). • Recognize a unit fraction such as 1/4 as the quantity formed when the whole is partitioned into 4 equal parts.	• Express a fraction as the number of unit fractions • Use accumulated unit fractions to represent numbers equal to, less than, and greater than one (1/3 and 1/3 is 2/3; 1/3, 1/3, 1/3, and 1/3 is 4/3).

Academic Vocabulary	**Explanations and Examples**
Key Terms • Partition(ed) • Equal parts • Fraction • Equal distance (intervals) • Equivalent • Equivalence • Reasonable • Denominator • Numerator • Comparison • Compare (symbols ‹, ›, =) • Justify	Some important concepts related to developing understanding of fractions include:  • The number of equal parts tell how many make a whole • As the number of equal pieces in the whole increases, the size of the fractional pieces decreases • The size of the fractional part is relative to the whole ○ The number of children in one-half of a classroom is different than the number of children in one-half of a school. (the whole in each set is different therefore the half in each set will be different) • When a whole is cut into equal parts, the denominator represents the number of equal parts

- The numerator of a fraction is the count of the number of equal parts
    - ¾ means that there are 3 one-fourths
    - Students can count *one fourth, two fourths, three fourths*
- Students express fractions as fair sharing, parts of a whole, and parts of a set. They use various contexts (candy bars, fruit, and cakes) and a variety of models (circles, squares, rectangles, fraction bars, and number lines) to develop understanding of fractions and represent fractions. Students need many opportunities to solve word problems that require fair sharing.

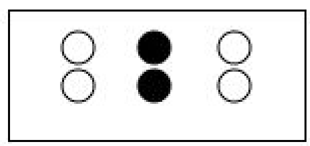
To develop understanding of fair shares, students first participate in situations where the number of objects is greater than the number of children and then progress into situations where the number of objects is less than the number of children.

Examples:

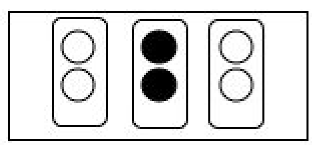
- Four children share six brownies so that each child receives a fair share. How many brownies will each child receive?
- Six children share four brownies so that each child receives a fair share. What portion of each brownie will each child receive?
- What fraction of the rectangle is shaded? How might you draw the rectangle in another way but with the same fraction shaded?

Solution: $\frac{2}{4}$ or $\frac{1}{2}$

What fraction of the set is black?



Solution: $\frac{2}{6}$



Solution: $\frac{1}{3}$

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics

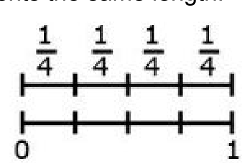
Cluster: Develop understanding of fractions as numbers.

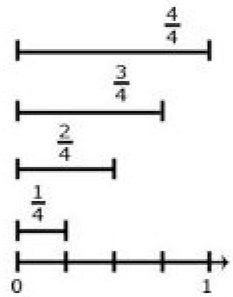
Standard: 3.NF.2

Connecting Standard	**Standard/Learning Outcome:**	**Connecting Standards**
2.MD.B.6	CCSS.MATH.CONTENT.3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. CCSS.MATH.CONTENT.3.NF.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. CCSS.MATH.CONTENT.3.NF.2.b Represent a fraction *a*/*b* on a number line diagram by marking off a lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.	**3.NF.A.3** **4.NF.B.3** **5.G.A.1** **5.G.A.2** **6.NS.C.6**

Mathematical Practices
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.4. Model with mathematics. 3.MP.7. Look for and make use of structure.
Guiding Questions
● How does a fraction differ from a whole number?

KNOW (Essential Concept)	**DO** (Learning Targets/Essential Skills)
● Define the interval from 0 to 1 on a number line as the whole. ● Divide a whole on a number line into equal parts. ● Recognize that the equal parts between 0 and 1 have a fractional representation.	● Explain that the endpoint of each equal part is represented by a fraction (1/ the number of equal parts). ● Represent each equal part on a number line with a fraction.

Academic Vocabulary	**Explanations and Examples**
Key Terms ● Partition(ed) ● Equal parts ● Fraction ● Equal distance (intervals) ● Equivalent ● Equivalence ● Reasonable ● Denominator ● Numerator	Students transfer their understanding of parts of a whole to partition a number line into equal parts. There are two new concepts addressed in this standard which students should have time to develop. 1. On a number line from 0 to 1, students can partition (divide) it into equal parts and recognize that each segmented part represents the same length. 

● Comparison ● Compare (symbols ‹, ›, =) ● Justify	2. Students label each fractional part based on how far it is from zero to the endpoint. 

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Develop understanding of fractions as numbers.
Standard: 3.NF.3

Connecting Standards	**Standard/Learning Outcome:**	**Connecting Standard**
3.NF.A.1 **3.NF.A.2**	CCSS.MATH.CONTENT.3.NF.A.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. CCSS.MATH.CONTENT.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. CCSS.MATH.CONTENT.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. CCSS.MATH.CONTENT.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*. CCSS.MATH.CONTENT.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.	**4.NF.A.1**

Mathematical Practices	
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.2. Reason abstractly and quantitatively. 3.MP.3. Construct viable arguments and critique the reasoning of others. 3.MP.4. Model with mathematics. 3.MP.6. Attend to precision. 3.MP.7. Look for and make use of structure. 3.MP.8. Look for and express regularity in repeated reasoning.	
Guiding Questions	
• How can two fractions have the same value?	
Substandard Deconstruction	**3.NF.3a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Describe equivalent fractions. • Recognize simple equivalent fractions .	• Compare fractions by reasoning about their size to determine equivalence. • Use number lines, size, visual fraction models, etc. to find equivalent fractions.

Substandard Deconstruction	**3.NF.3b. 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.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Recognize whole numbers written in fractional parts on a number line. ● Recognize the difference between a whole number and a fraction.	● Explain how a fraction is equivalent to a whole number.
Substandard Deconstruction	**3.NF.3c 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*.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Whole numbers can be represented as fractions.	● Express whole numbers as fractions. ● Recognize fractions that are equivalent to whole numbers.
Substandard Deconstruction	**3.NF.3d 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.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Recognize whether or not different fractions refer to the same whole. ● Determine if comparisons of fractions can be made (if they refer to the same whole).	● Compare two fractions with the same numerator by reasoning about their size. ● Compare two fractions with the same denominator by reasoning about their size. ● Record the results of comparisons using symbols >, =, or < . ● Justify conclusions about the equivalence of fractions. ● Explain what the numerator in a fraction represents and its location. ● Explain what the denominator in a fraction represents and its location.

Academic Vocabulary	Explanations and Examples
Key Terms ● Partition(ed) ● Equal parts ● Fraction ● Equal distance (intervals) ● Equivalent ● Equivalence ● Reasonable ● Denominator ● Numerator ● Comparison ● Compare (symbols ‹, ›, =) ● Justify	An important concept when comparing fractions is to look at the size of the parts and the number of the parts. For example, ⅛ 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. Students recognize when examining fractions with common denominators, the wholes have been divided into the same number of equal parts. So the fraction with the larger numerator has the larger number of equal parts. $\frac{2}{6} < \frac{5}{6}$ To compare fractions that have the same numerator but different denominators, students understand that each fraction has the same number of equal parts but the size of the parts are different. They can infer that the same number of smaller pieces is less than the same number of bigger pieces. $\frac{3}{8} < \frac{3}{4}$

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Solve problems involving measurement and estimation.
Standard: 3.MD.1

Connecting Standard	Standard/Learning Outcome:	Connecting Standard
	CCSS.MATH.CONTENT.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.	

Mathematical Practices	
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.4. Model with mathematics. 3.MP.6. Attend to precision.	
Guiding Questions	
● Why is telling time to the minute important?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Recognize minute marks on an analog clock face and minute position on a digital clock face. ● Know how to write time to the minute.	● Compare an analog clock face with a number line diagram. ● Use a number line diagram to add and subtract time intervals in minutes. ● Solve word problems involving addition and subtraction of time intervals in minutes. ● Tell time to the minute.

Academic Vocabulary	Explanations and Examples
Key Terms ● Estimate ● Time ● Time intervals ● Minute ● Hour ● Elapsed time	Students in second grade learned to tell time to the nearest five minutes. In third grade, they extend telling time and measure elapsed time both in and out of context using clocks and number lines. Students may use an interactive whiteboard to demonstrate understanding and justify their thinking.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Solve problems involving measurement and estimation.
Standard: 3.MD.2

Connecting Standard	**Standard/Learning Outcome:**	**Connecting Standard**
	CCSS.MATH.CONTENT.3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	**4.MD.A.1**

Mathematical Practices
3.MP.1. Make sense of problems and persevere in solving them. 3.MP.4. Model with mathematics. 3.MP.6. Attend to precision.
Guiding Questions
• How do I measure accurately? • How do you use weight and measurement in your life?

KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Explain how to measure liquid volume in liters. • Explain how to measure mass in grams and kilograms. • Know various strategies to represent a word problem involving liquid volume or mass. • Add, subtract, multiply, and divide units of liters, grams, and kilograms.	• Solve one-step word problems involving masses given in the same units. • Solve one-step word problems involving liquid volume given in the same units. • Measure liquid volumes using standard units of liters. • Measure mass of objects using standard units of grams (g) and kilograms (kg).

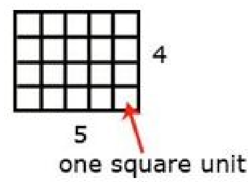
Academic Vocabulary	**Explanations and Examples**
Key Terms • Measure • Liquid • Volume • Mass • Standard units • Metric • Gram (g) • Kilogram (kg) • Liter (L)	Students in second grade learned to tell time to the nearest five minutes. In third grade, they extend telling time and measure elapsed time both in and out of context using clocks and number lines. Students may use an interactive whiteboard to demonstrate understanding and justify their thinking.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
Standard: 3.MD.5

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
1.G.A.2 **2.MD.A.1**	CCSS.MATH.CONTENT.3.MD.C.5 Recognize area as an attribute of plane figures and understand concepts of area measurement. CCSS.MATH.CONTENT.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. CCSS.MATH.CONTENT.3.MD.C.5.b A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.	**3.MD.C.6** **3.MD.C.7** **3.MD.D.8** **5.MD.C.3**

Mathematical Practices
3.MP.2. Reason abstractly and quantitatively. 3.MP.4. Model with mathematics. 3.MP.5. Use appropriate tools strategically. 3.MP.6. Attend to precision.
Guiding Questions
● What does the area of a 2 dimensional figure represent?

Substandard Deconstruction	**3.MD.5a. 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.**
KNOW **(Essential Concept)**	**DO** **(Learning Targets/Essential Skills)**
● Define unit square. ● Define area.	
Substandard Deconstruction	**3.MD.5b. 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.**
KNOW **(Essential Concept)**	**DO** **(Learning Targets/Essential Skills)**
	● Relate the number (n) of unit squares to the area of a plane figure.

<table>
<tr><th>Academic Vocabulary</th><th>Explanations and Examples</th></tr>
<tr><td>Key Terms
Attribute
Area
square unit
Plane figure
Gap
Overlap
Square centimeter
Square meter
Square inch
Square foot
Nonstandard units
Tiling
Side length
Decomposing</td><td>Students develop understanding of using square units to measure area by:
Using different sized square units
Filling in an area with the same sized square units and counting the number of square units

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DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
Standard: 3.MD.6

Connecting Standards	**Standard/Learning Outcome:**	**Connecting Standard**
2.G.A.2 **3.MD.C.5**	CCSS.MATH.CONTENT.3.MD.C.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	**3.MD.C.7**

Mathematical Practices
3.MP.5. Use appropriate tools strategically. 3.MP.6. Attend to precision.
Guiding Questions
● What does the area of a 2 dimensional figure represent?

KNOW (Essential Concept)	**DO** (Learning Targets/Essential Skills)
● Measure areas by counting unit squares. ● Use unit squares of cm, m, in, ft, and other sizes of unit squares to measure area.	

Academic Vocabulary	**Explanations and Examples**
Key Terms ● Square cm ● Square m ● Square in. ● Square ft ● Nonstandard units	Using different sized graph paper, students can explore the areas measured in square centimeters and square inches. An interactive whiteboard may also be used to display and count the unit squares (area) of a figure.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
Standard: 3.MD.7

Connecting Standards	**Standard/Learning Outcome:**	**Connecting Standards**
3.MD.C.5 **3.MD.C.6**	CCSS.MATH.CONTENT.3.MD.C.7 Relate area to the operations of multiplication and addition. CCSS.MATH.CONTENT.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. CCSS.MATH.CONTENT.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. CCSS.MATH.CONTENT.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 $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. CCSS.MATH.CONTENT.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.	**4.MD.A.3** **5.NF.B.4**

Mathematical Practices

3.MP.1. Make sense of problems and persevere in solving them.
3.MP.2. Reason abstractly and quantitatively.
3.MP.4. Model with mathematics.
3.MP.5. Use appropriate tools strategically.
3.MP.6. Attend to precision.

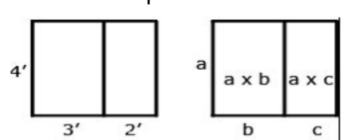
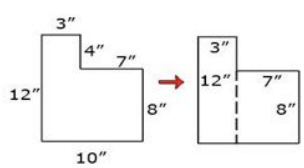
Guiding Questions

- What is an efficient strategy to determine the area of a 2 dimensional figure?

Substandard Deconstruction	**3.MD.7a. 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.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Find the area of a rectangle by tiling it in unit squares. • Find the side lengths of a rectangle in units.	• Compare the area found by tiling a rectangle to the area found by multiplying the side lengths.
Substandard Deconstruction	**3.MD.7b. 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.**

KNOW (Essential Concept)	DO (Learning Targets/Essential Skills)
● Multiply side lengths to find areas of rectangles.	● Solve real world and mathematical area problems by multiplying side lengths of rectangles. ● Use rectangular arrays to represent whole-number products in multiplication problems

Substandard Deconstruction	**3.MD.7c. 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.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Multiply using an area model (array).	● Relate area of a rectangle to multiplication and addition by modeling the distributive property.
Substandard Deconstruction	**3.MD.7d. 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.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Recognize that areas of each rectangle in a rectilinear (straight line) figure can be added together to find the area of the figure. ● Find areas of rectangles Add areas of rectangles.	● Use the technique of decomposing rectilinear figures to find the area of each rectangle to solve real world problems. ● Decompose rectilinear figures into non overlapping rectangles.

Academic Vocabulary	Explanations and Examples
Key Terms ● Tiling ● Side length ● Decomposing ● Overlapping	Students tile areas of rectangles, determine the area, record the length and width of the rectangle, investigate the patterns in the numbers, and discover that the area is the length times the width. Students use pictures, words, and numbers to explain their understanding of the distributive property in this context. Example: Joe and John made a poster that was 4' by 3'. Mary and Amir made a poster that was 4' by 2'. They placed their posters on the wall side-by-side so that that there was no space between them. How much area will the two posters cover?  4 x 3 + 4 x 2 = 20 4 (3 + 2) = 20 4 x 5 = 20 Example: 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.  area is 12 x 3 + 8 x 7 = 92 sq inches