Grade 5 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; PPS CCSS Correlations; North Carolina Dept of Public Instruction Unpacked Content; Common Core Institute. Adjustments and modifications have been made to customize content for the PPS district.

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***This cluster is well thought of as part of the student's progress to algebra, but is currently not identified as a major cluster as noted in the document achievethecore.org*

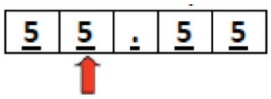
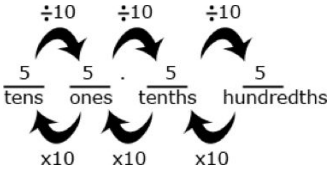
DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Understand the place value system.
Standard: 5.NBT.1

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
4.NF.C.5 **4.NF.C.6** **4.NF.C.7**	CCSS.MATH.CONTENT.5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	**5.NBT.A.4** **5.NBT.B.5** **5.NBT.B.6**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure.

Guiding Questions	
• How does a digit's position affect its value?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1⁄10 of what it represents in the place to its left.	

Academic Vocabulary	Explanations and Examples
Key Terms • Place value • Decimal • Decimal point • Tenths	In fourth grade, students examined the relationships of the digits in numbers for whole numbers only. This standard extends this understanding to the relationship of decimal fractions. Students use base ten blocks, pictures of base ten blocks, and interactive images of base ten blocks to manipulate and investigate the place value relationships. They use their understanding of unit fractions to compare decimal places and fractional language to describe those comparisons. Before considering the relationship of decimal fractions, students express their understanding that in multi-digit whole numbers, a digit in one place represents 10 times what it represents in the place to its right and 1/10 of what it represents in the place to its left. A student thinks, "I know that in the number 5555, the 5 in the tens place (5555) represents 50 and the 5 in the hundreds place (5555) represents 500. So a 5 in the hundreds place is ten times as much as a 5 in the tens place or a 5 in the tens place is 1/10 of the value of a 5 in the hundreds place. To extend this understanding of place value to their work with decimals, students use a model of one unit; they cut it into 10 equal pieces, shade in, or describe 1/10 of that model using fractional language ("This is 1 out of 10 equal parts. So it is 1/10". I can write this using 1/10 or 0.1"). They repeat the process by finding 1/10 of a 1/10 (e.g., dividing 1/10 into 10 equal parts to arrive at 1/100 or 0.01) and can explain their reasoning, "0.01 is 1/10 of 1/10 thus is 1/100 of the whole unit."

	In the number 55.55, each digit is 5, but the value of the digits is different because of the placement.  In the number 55.55, each digit is 5, but the value of the digits is different because of the placement. The 5 that the arrow points to is 1/10 of the 5 to the left and 10 times the 5 to the right. The 5 in the ones place is 1/10 of 50 and 10 times five tenths.  The 5 that the arrow points to is 1/10 of the 5 to the left and 10 times the 5 to the right. The 5 in the tenths place is 10 times five hundredths. 

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Understand the place value system.
Standard: 5.NBT.2

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
4.NF.C.5 **4.NF.C.6** **4.NF.C.7**	CCSS.MATH.CONTENT.5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	**5.NBT.A.4** **5.NBT.B.5** **5.NBT.B.6**

Mathematical Practices
5.MP.2 Reason abstractly and quantitatively. 5.MP.6 Attend to precision 5.MP.7 Look for and make use of structure

Guiding Questions	
How does a digit's position affect its value?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Represent powers of 10 using whole number exponents. • Translate between powers of 10 written as 10 raised to a whole number exponent, the expanded form, and standard notation.	• Explain the patterns in the number of zeros of the product when multiplying a number of powers of 10. • Explain the relationship of the placement of the decimal point when a decimal is multiplied or divided by a power of 10.

Academic Vocabulary	Explanations and Examples
Key Terms • Place value • Decimal • Decimal point • Tenths	Examples: •Students might write: $36x10 = 36x10^1 = 360$ $36x10x10 = 36x10^2 = 3,600$ $36x10x10x10 = 36x10^3 = 36,000$ $36x10x10x10x10 = 36x10^4 = 360,000$ •Students might think and/or say: I noticed that everytime, I multiplied by 10 I added a zero to the end of the number. That makes sense because each digit's value became 10 times larger. To make a digit 10 times larger, I have to move it one place value to the left. When I multiplied 36 by 10, the 30 became 300. The 6 became 60 or the 36 became 360. So I had to add a zero at the end to have the 3 represent 3 one-hundreds (instead of 3 tens) and the 6 represents 6 tens (instead of 6 ones). •Students should be able to use the same type of reasoning as above to explain why the following multiplication and division problem by powers of 10 make sense. $523x10^3=523,000$ The place value of 523 is increased by 3 places. $5.223x10^2=522.3$ The place value of 5.223 is increased by 2 places. $52.3 \div 10^1=5.23$ The place value of 52.3 is decreased by one place.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Understand the place value system.
Standard: 5.NBT.3

Connecting Standards	Standard/Learning Outcome:	Connecting Standard
4.NBT.A.2 **4.NF.C.5** **5.NBT.A.1**	CCSS.MATH.CONTENT.5.NBT.A.3 Read, write, and compare decimals to thousandths. CCSS.MATH.CONTENT.5.NBT.A.3.a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). CCSS.MATH.CONTENT.5.NBT.A.3.b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	**5.NBT.A.4**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure.
Guiding Questions
● How can two fractions have the same value?

Substandard Deconstruction	**5.NBT.3a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Read and write decimal to thousandths using base-ten numerals, number names, and expanded form.	
Substandard Deconstruction	**5.NBT.3b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Use >, =, and < symbols to record the results of comparisons between decimals.	● Compare two decimals to the thousandths, based on the place value of each digit.

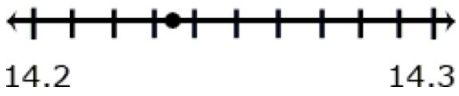
Academic Vocabulary	Explanations and Examples
Key Terms ● Decimal ● Decimal point ● Tenths ● Thousands ● Greater than ● Less than ● Equal to ● ‹, ›, =, ● Compare/comparison	Students build on the understanding they developed in fourth grade to read, write, and compare decimals to thousandths. They connect their prior experiences with using decimal notation for fractions and addition of fractions with denominators of 10 and 100. They use concrete models and number lines to extend this understanding to decimals to the thousandths. Models may include base ten blocks, place value charts, grids, pictures, drawings, manipulatives, technology-based, etc. They read decimals using fractional language and write decimals in fractional form, as well as in expanded notation as show in the standard 3a. This investigation leads them to understanding equivalence of decimals (0.8 = 0.80 = 0.800). **Example:** ● Some equivalent forms of 0.72 are: 72/100 — 70/100 + 2/100 7/10 + 2/100 — 0.720 7 × (1/10) + 2 × (1/100) — 7 × (1/10) + 2 × (1/100) + 0 × (1/1000) 0.70 + 0.02 — 720/1000 Students need to understand the size of decimal numbers and relate them to common benchmarks such as 0, 0.5 (0.50 and 0.500), and 1. Comparing tenths to tenths, hundredths to hundredths, and thousandths to thousandths is simplified if students use their understanding of fractions to compare decimals. **Example:** ● Comparing 0.25 and 0.17, a student might think, “25 hundredths is more than 17 hundredths”. They may also think that it is 8 hundredths more. They may write this comparison as 0.25 > 0.17 and recognize that 0.17 < 0.25 is another way to express this comparison. ● Comparing 0.207 to 0.26, a student might think, “Both numbers have 2 tenths, so I need to compare the hundredths. The second number has 6 hundredths and the first number has no hundredths so the second number must be larger. Another student might think while writing fractions, “I know that 0.207 is 207 thousandths (and may write 207/1000). 0.26 is 26 hundredths (and may write 26/100) but I can also think of it as 260 thousandths (260/1000). So, 260 thousandths is more than 207 thousandths.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Understand the place value system.
Standard: 5.NBT.4

Connecting Standards	Standard/Learning Outcome:	Connecting Standard
4.NBT.A.3 **5.NBT.A.1** **5.NBT.A.3**	CCSS.MATH.CONTENT.5.NBT.A.4 Use place value understanding to round decimals to any place.	

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure.

Guiding Questions	
● How does a digit's position affect its value?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Use knowledge of base ten and place value to round decimals to any place.	

Academic Vocabulary	Explanations and Examples
Key Terms ● Place value ● Decimal ● Decimal point ● Tenths ● Round	When rounding a decimal to a given place, students may identify the two possible answers, and use their understanding of place value to compare the given number to the possible answers. Example: ● Round 14.235 to the nearest tenth. Students recognize that the possible answer must be in tenths thus, it is either 14.2 or 14.3. They then identify that 14.235 is closer to 14.2 (14.20) than to 14.3 (14.30). 

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics

Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths.

Standard: 5.NBT.5

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
4.NBT.B.4 **4.NBT.B.5** **5.NBT.A.1**	CCSS.MATH.CONTENT.5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.	**5.NBT.B.6** **6.NS.B.3**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure. 5.MP.8. Look for and express regularity in repeated reasoning.

Guiding Questions	
● Why is the standard algorithm an efficient method for multiplication?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Fluently multiply multi-digit whole numbers using standard algorithms.	

Academic Vocabulary	Explanations and Examples
Key Terms ● Multiplication/multiply	In prior grades, students used various strategies to multiply. Students can continue to use these different strategies as long as they are efficient, but must also understand and be able to use the standard algorithm. In applying the standard algorithm, students recognize the importance of place value. Example: 123 x 34. When students apply the standard algorithm, they decompose 34 into 30 + 4. Then they multiply 123 by 4, the value of the number in the ones place, and then multiply 123 by 30, the value of the 3 in the tens place, and add the two products.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics

Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths.

Standard: 5.NBT.6

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
4.NBT.B.6 **5.NBT.A.1** **5.NBT.A.2**	CCSS.MATH.CONTENT.5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**6.NS.B.2** **6.NS.B.3**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.3. Construct viable arguments and critique the reasoning of others. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.7. Look for and make use of structure.

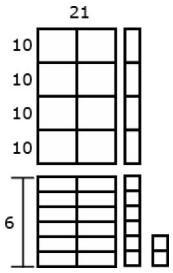
Guiding Questions	
● What is an efficient strategy for dividing numbers?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Find whole-number quotients of whole numbers.	● Use strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. ● Illustrate and explain calculations by using equations, rectangular arrays, and/or area models.

Academic Vocabulary	Explanations and Examples
Key Terms ● Multiplication/multiply ● Division/divide ● Tenths ● Hundredths ● Products ● Quotients ● Dividends ● Rectangular arrays ● Area models	In fourth grade, students' experiences with division were limited to dividing by one-digit divisors. This standard extends students' prior experiences with strategies, illustrations, and explanations. When the two-digit divisor is a "familiar" number, a student might decompose the dividend using place value. **Example**: ● Using expanded notation ~ 2682 ÷ 25 = (2000 + 600 + 80 + 2) ÷ 25 ● Using his or her understanding of the relationship between 100 and 25, a student might think: ○ I know that 100 divided by 25 is 4 so 200 divided by 25 is 8 and 2000 divided by 25 is 80. ○ 600 divided by 25 has to be 24. ○ Since 3 x 25 is 75, I know that 80 divided by 25 is 3 with a remainder of 5. (Note that a student might divide into 82 and not 80) ○ I can't divide 2 by 25 so 2 plus the 5 leaves a remainder of 7. ○ 80 + 24 + 3 = 107. So, the answer is 107 with a remainder of 7.

- Using an equation that relates division to multiplication, 25 x n = 2682, a student might estimate the answer to be slightly larger than 100 because s/he recognizes that 25 x 100 = 2500.

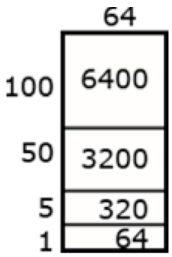
Example: 968 ÷ 21

- Using base ten models, a student can represent 962 and use the models to make an array with one dimension of 21. The student continues to make the array until no more groups of 21 can be made. Remainders are not part of the array.



Example: 9984 ÷ 64

- An area model for division is shown below. As the student uses the area model, s/he keeps track of how much of the 9984 is left to divide.



64 | 9984
-6400 (100 x 64)
3584
-3200 (50 x 64)
384
-320 (5 x 64)
64
-64 (1 x 64)
0

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics

Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths.

Standard: 5.NBT.7

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
4.NBT.B.4 **5.NBT.A.1** **5.NF.A.1** **5.NF.B.5** **5.NF.B.7**	CCSS.MATH.CONTENT.5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	**5.MD.A.1** **6.NS.B.3**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.3. Construct viable arguments and critique the reasoning of others. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.7. Look for and make use of structure.

Guiding Questions	
● What is an efficient strategy for adding, subtracting, multiplying and dividing decimals?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Add, subtract, multiply, and divide decimals to hundredths using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	● Relate the strategy to a written method and explain the reasoning used to solve decimal operation calculations.

Academic Vocabulary	Explanations and Examples
Key Terms ● Multiplication/multiply ● Division/divide ● Decimal ● Decimal point ● Tenths ● Hundredths ● Products ● Quotients ● Dividends ● Addition/add ● Subtraction/subtract ● Properties-rules about how numbers work ● Reasoning	This standard requires students to extend the models and strategies they developed for whole numbers in grades 1-4 to decimal values. Before students are asked to give exact answers, they should estimate answers based on their understanding of operations and the value of the numbers. **Examples:** ● 3.6 + 1.7 ○ A student might estimate the sum to be larger than 5 because 3.6 is more than 3 ½ and 1.7 is more than 1 ½. ● 5.4 – 0.8 ○ A student might estimate the answer to be a little more than 4.4 because a number less than 1 is being subtracted. ● 6 x 2.4 ○ A student might estimate an answer between 12 and 18 since 6 x 2 is 12 and 6 x 3 is 18. Another student might give an estimate of a little less than 15 because s/he figures the answer to be very close, but smaller than 6 x 2 ½ and think of 2 ½ groups of 6 as 12 (2 groups of 6) + 3 (½ of a group of 6).

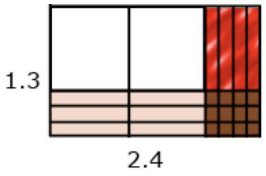
Students should be able to express that when they add decimals they add tenths to tenths and hundredths to hundredths. So, when they are adding in a vertical format (numbers beneath each other), it is important that they write numbers with the same place value beneath each other. This understanding can be reinforced by connecting addition of decimals to their understanding of addition of fractions. Adding fractions with denominators of 10 and 100 is a standard in fourth grade.

Example: 4 - 0.3

· 3 tenths subtracted from 4 wholes. The wholes must be divided into tenths.

The answer is 3 and 7/10 or 3.7.

Example: An area model can be useful for illustrating products.



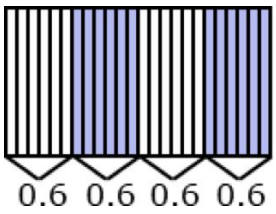
2.4
x 1.3
.12
.60
.40
+ 2.00
3.12

Students should be able to describe the partial products displayed by the area model. For example,

"3/10 times 4/10 is 12/100.
3/10 times 2 is 6/10 or 60/100.
1 group of 4/10 is 4/10 or 40/100.
1 group of 2 is 2."

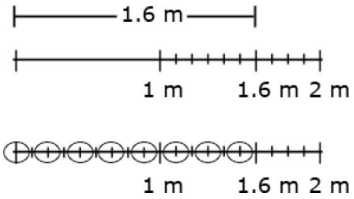
Example: Finding the number in each group or share

- Students should be encouraged to apply a fair sharing model separating decimal values into equal parts such as 2.4 ÷ 6 = 0.6



Example: Find the number of groups

- Joe has 1.6 meters of rope. He has to cut pieces of rope that are 0.2 meters long. How many can he cut?
- To divide to find the number of groups, a student might:
  - draw a segment to represent 1.6 meters. In doing so, s/he would count in tenths to identify the 6 tenths, and be able identify the number of 2 tenths within the 6 tenths. The student can then extend the idea of counting by tenths to divide the one meter into tenths and determine that there are 5 more groups of 2 tenths.



- Count groups of 2 tenths without the use of models or diagrams. Knowing that 1 can be thought of as 10/10, a student might think of 1.6 as 16 tenths. Counting 2 tenths, 4 tenths, 6 tenths, . . .16 tenths, a student can count 8 groups of 2 tenths.
- Use their understanding of multiplication and think, "8 groups of 2 is 16, so 8 groups of 2/10 is 16/10 or 1 6/10."

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Use equivalent fractions as a strategy to add and subtract fractions.
Standard: 5.NF.1

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
4.NF.A.1 **4.NF.B.3**	CCSS.MATH.CONTENT.5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*	**5.NBT.B.7** **5.NF.A.2** **6.EE.B.7** **7.NS.A.1**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.4. Model with mathematics. 5.MP.7. Look for and make use of structure.

Guiding Questions	
● How do I add or subtract fractions with unlike denominators?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Generate equivalent fractions to find the like denominator.	● Solve addition and subtraction problems involving fractions (including mixed numbers) with like and unlike denominators using an equivalent fraction strategy.

Academic Vocabulary	Explanations and Examples
Key Terms ● Fraction ● Equivalent ● Addition/ add ● Sum ● Subtraction/subtract ● Difference ● Unlike denominator	Students should apply their understanding of equivalent fractions developed in fourth grade and their ability to rewrite fractions in an equivalent form to find common denominators. They should know that multiplying the denominators will always give a common denominator but may not result in the smallest denominator. **Examples:** ● $\frac{2}{5}+\frac{7}{8}=\frac{16}{40}+\frac{35}{40}=\frac{51}{40}$ ● $3\frac{1}{4}-\frac{1}{6}=3\frac{3}{12}-\frac{2}{12}=3\frac{1}{12}$

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Use equivalent fractions as a strategy to add and subtract fractions.
Standard: 5.NF.2

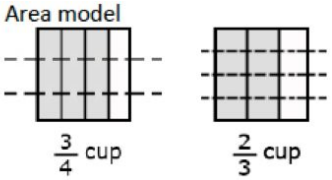
Connecting Standards	Standard/Learning Outcome:	Connecting Standards
4.NF.A.1 **5.NF.A.1**	CCSS.MATH.CONTENT.5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2*.	**5.MD.B.2**

Mathematical Practices
5.MP.1. Make sense of problems and persevere in solving them. 5.MP.2. Reason abstractly and quantitatively. 5.MP.3. Construct viable arguments and critique the reasoning of others. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure. 5.MP.8. Look for and express regularity in repeated reasoning

Guiding Questions	
● What is an efficient strategy for adding and subtracting, fractions?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Generate equivalent fractions to find like denominators.	● Evaluate the reasonableness of an answer, using fractional number sense, by comparing it to a benchmark fraction. ● Solve word problems involving addition and subtraction of fractions with unlike denominators referring to the same whole.

Academic Vocabulary	Explanations and Examples
Key Terms ● Fraction ● Equivalent ● Addition/ add ● Sum ● Subtraction/subtract ● Difference ● Unlike denominator ● Numerator	**Examples:** ● Jerry was making two different types of cookies. One recipe needed 2/3 cup of sugar and the other needed ¾ cup of sugar. How much sugar did he need to make both recipes? Mental estimation: A student may say that Jerry needs more than 1 cup of sugar but less than 2 cups. An explanation may compare both fractions to ½ and state that both are larger than ½ so the total must be more than 1. In addition, both fractions are slightly less than 1 so the sum cannot be more than 2.

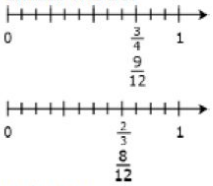
Area model



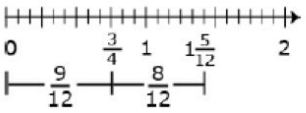
$\frac{3}{4}$ cup of sugar $\frac{2}{3}$ cup of sugar

$\frac{3}{4}=\frac{9}{12}$ $\frac{2}{3}=\frac{8}{12}$ $\frac{3}{4}+\frac{2}{3}=\frac{17}{12}=\frac{12}{12}+\frac{5}{12}=1\frac{5}{12}$

Linear model



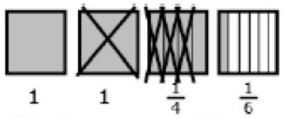
Solution:



Example: Using a bar diagram

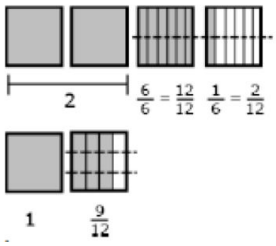
- Sonia had 2 ⅛ candy bars. She promised her brother that she would give him ½ of a candy bar. How much will she have left after she gives her brother the amount she promised?
- If Mary ran 3 miles every week for 4 weeks, she would reach her goal for the month. The first day of the first week she ran 1 ¾ miles. How many miles does she still need to run the first week?
  Using addition to find the answer: 1 ¾ + n = 3
  A student might add 1 ¼ to 1 ¾ to get to 3 miles. Then he or she would add 1/6 more. Thus 1 ¼ miles + 1/6 of a mile is what Mary needs to run during that week.

  - This model shows 1 ¾ subtracted from 3 1/6 leaving 1 + ¼ + 1/6 which a student can then change to 1 + 3/12 + 2/12 = 1 5/12.



    $3\frac{1}{6}$ and 1 ¾ can be expressed with a denominator of 12. Once this is done a student can complete the problem, 2 14/12 – 1 9/12 = 1 5/12.

  - This diagram models a way to show how $3\frac{1}{6}$ and 1 ¾ can be expressed with a denominator of 12. Once this is accomplished, a student can complete the problem, 2 14/12 – 1 9/12 = 1 5/12.



	Estimation skills 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 situations using various estimation strategies. Estimation strategies for calculations with fractions extend from students' work with whole number operations and can be supported through the use of physical models. **Example:** ● Elli drank 3/5 quart of milk and Javier drank 1/10 of a quart less than Ellie. How much milk did they drink all together? Solution: $\frac{3}{5} - \frac{1}{10} = \frac{6}{10} - \frac{1}{10} = \frac{5}{10}$ This is how much milk Javier drank $\frac{3}{5} + \frac{5}{10} = \frac{6}{10} + \frac{5}{10} = \frac{11}{10}$ Together they drank 1 1/10 quarts of milk This solution is reasonable because Ellie drank more than 1/2 quart and Javier drank 1/2 quart so together they drank slightly more than one quart.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Apply and extend previous understandings of multiplication and division.
Standard: 5.NF.3

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
3.OA.A.1 **3.OA.A.2** **3.OA.B.6** **4.MD.A.2** **4.OA.A.1** **4.OA.A.2**	CCSS.MATH.CONTENT.5.NF.B.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*	**6.RP.A.2** **7.NS.A.2**

Mathematical Practices
5.MP.1. Make sense of problems and persevere in solving them. 5.MP.2. Reason abstractly and quantitatively. 5.MP.3. Construct viable arguments and critique the reasoning of others. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.7. Look for and make use of structure.

Guiding Questions	
● What is an efficient strategy for adding and subtracting fractions?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Interpret a fraction as division of the numerator by the denominator.	● Interpret the remainder as a fractional part of the problem. ● Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.

Academic Vocabulary	Explanations and Examples
Key Terms ● Fraction ● Denominator ● Numerator ● Operations ● Multiplication/multiply ● Division/divide	Students are expected to demonstrate their understanding using concrete materials, drawing models, and explaining their thinking when working with fractions in multiple contexts. They read 3/5 as "three fifths" and after many experiences with sharing problems, learn that 3/5 can also be interpreted as "3 divided by 5." **Examples:** · Ten team members are sharing 3 boxes of cookies. How much of a box will each student get?

	· When working this problem a student should recognize that the 3 boxes are being divided into 10 groups, so s/he is seeing the solution to the following equation, 10 x *n* = 3 (10 groups of some amount is 3 boxes) which can also be written as n = 3 ÷ 10. Using models or diagram, they divide each box into 10 groups, resulting in each team member getting 3/10 of a box. · Two afterschool clubs are having pizza parties. For the Math Club, the teacher will order 3 pizzas for every 5 students. For the student council, the teacher will order 5 pizzas for every 8 students. Since you are in both groups, you need to decide which party to attend. How much pizza would you get at each party? If you want to have the most pizza, which party should you attend? · The six fifth grade classrooms have a total of 27 boxes of pencils. How many boxes will each classroom receive? Students may recognize this as a whole number division problem but should also express this equal sharing problem as 27/6. They explain that each classroom gets 27/6 boxes of pencils and can further determine that each classroom get 4 3/6 or 4 1/2 boxes of pencils.

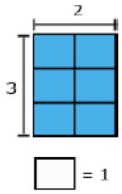
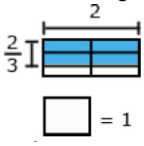
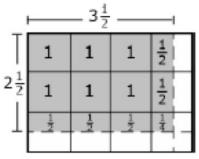
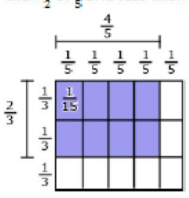
DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Apply and extend previous understandings of multiplication and division.
Standard: 5.NF.4

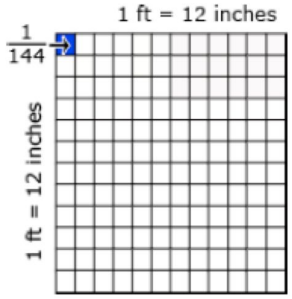
Connecting Standards	Standard/Learning Outcome:	Connecting Standards
4.NF.B.4 **3.MD.C.7**	CCSS.MATH.CONTENT.5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. CCSS.MATH.CONTENT.5.NF.B.4.a Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)* CCSS.MATH.CONTENT.5.NF.B.4.b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas	**5.NBT.B.7** **5.NF.B.5** **6.EE.B.7** **6.G.A.1** **7.SP.B.3** **7.NS.A.2**

Mathematical Practices
5.MP.1. Make sense of problems and persevere in solving them. 5.MP.2. Reason abstractly and quantitatively. 5.MP.3. Construct viable arguments and critique the reasoning of others. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure. 5.MP.8. Look for and express regularity in repeated reasoning.
Guiding Questions
● What is an efficient strategy to find the area of a rectangle with fractional side lengths?

Substandard Deconstruction	**5.nF.4a Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Multiply fractions by whole numbers. ● Multiply fractions by fractions.	● Interpret the product of a fraction times a whole number as total number of parts of the whole. ● Determine the sequence of operations that result in the total number of parts of the whole. ● Interpret the product of a fraction times a fraction as the total number of parts of the whole.

Substandard Deconstruction	**5.nF.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to nd areas of rectangles, and represent fraction products as rectangular areas.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Find area of a rectangle with fractional side lengths using different strategies.	• Represent fraction products as rectangular areas. • Justify multiplying fractional side lengths to nd the area is the same as tiling a rectangle with unit squares of the appropriate unit fraction side lengths.

Academic Vocabulary	Explanations and Examples
Key Terms • Partition(ed) • Equal parts • Fraction • Equal distance (intervals) • Equivalent • Equivalence • Reasonable • Denominator • Numerator • Comparison • Compare (symbols ‹, ›, =) • Justify	Students are expected to multiply fractions including proper fractions, improper fractions, and mixed numbers. They multiply fractions efficiently and accurately as well as solve problems in both contextual and non-contextual situations. • As they multiply fractions such as 3/5 x 6, they can think of the operation in more than one way. 3 x (6 ÷ 5) or (3 x 6/5) (3 x 6) ÷ 5 or 18 ÷ 5 (18/5) • Students create a story problem for 3/5 x 6 such as: Isabel had 6 feet of wrapping paper. She used 3/5 of the paper to wrap some presents. How much does she have left? Every day Tim ran 3/5 of mile. How far did he run after 6 days? (Interpreting this as 6 x 3/5) **Examples**: Building on previous understandings of multiplication · Rectangle with dimensions of 2 and 3 showing that 2 x 3 = 6.  · Rectangle with dimensions of 2 and 2/3 showing that 2 x 2/3 = 4/3  • $2\frac{1}{2}$ groups of $3\frac{1}{2}$:  In solving the problem $\frac{2}{3} \times \frac{4}{5}$, students use an area model to visualize it as a 2 by 4 array of small rectangles each of which has side lengths 1/3 and 1/5. They reason that 1/3 x 1/5 = 1/(3 x 5) by counting squares in the entire rectangle, so the area of the shaded area is (2 x 4) x 1/(3 x 5) = $\frac{2 \times 4}{3 \times 5}$. They can explain that the product is less than $\frac{4}{5}$ because they are finding $\frac{2}{3}$ of $\frac{4}{5}$. They can further estimate that the answer must be between $\frac{2}{5}$ and $\frac{4}{5}$ because $\frac{2}{3}$ of $\frac{4}{5}$ is more than $\frac{1}{2}$ of $\frac{4}{5}$ and less than one group of $\frac{4}{5}$.  The area model and the line segments show that the area is the same quantity as the product of the side lengths.

	· Larry knows that 1/12 x 1/12 is 1/144 . To prove this he makes the following array 

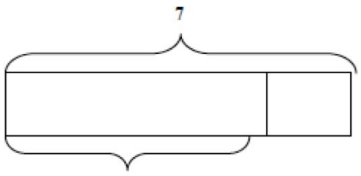
DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Apply and extend previous understandings of multiplication and division.
Standard: 5.NF.5

Connecting Standards	Standard/Learning Outcome:	Connecting Standard
3.OA.A.1 **3.OA.A.2** **4.MD.A.2** **4.NF.A.1** **4.OA.A.1** **4.OA.A.2** **5.NF.B.4**	CCSS.MATH.CONTENT.5.NF.B.5 Interpret multiplication as scaling (resizing), by: CCSS.MATH.CONTENT.5.NF.B.5.A Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. CCSS.MATH.CONTENT.5.NF.B.5.B Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.	**6.RP.A.1**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.4. Model with mathematics. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure.
Guiding Questions
• Why does the product of whole number multiplication differ from the multiplication of a whole number and fraction?

Substandard Deconstruction	**5.nF.5a Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Know that scaling (resizing) involves multiplication.	• Compare the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. •
Substandard Deconstruction	**5.nF.5b Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n×a)/(n×b) to the effect of multiplying a/b by 1.**

KNOW (Essential Concept)	DO (Learning Targets/Essential Skills)
• Know that multiplying whole numbers and fractions result in products greater than or less than one depending upon the factors.	• Draw a conclusion that multiplying a fraction greater than one will result in a product greater than the given number. • Draw a conclusion that when you multiply a fraction by one the resulting fraction is equivalent. • Draw a conclusion that when you multiply a fraction by a fraction, the product will be smaller than the given number.

Academic Vocabulary	Explanations and Examples
Key Terms • Fraction • Denominator • Numerator • Operations • Multiplication/multiply • Division/divide • Mixed numbers • Product • Quotient	**Examples:** • $\frac{3}{4} \times 7$ is less than 7 because 7 is multiplied by a factor less than 1 so the product must be less than 7.  ¾ of 7 • $2\frac{2}{3}$ x 8 must be more than 8 because 2 groups of 8 is 16 and $2\frac{2}{3}$ is almost 3 groups of 8. So the answer must be close to, but less than 24. • $\frac{3}{4} = \frac{5 \times 3}{5 \times 4}$ because multiplying $\frac{3}{4}$ by $\frac{5}{5}$ is the same as multiplying by 1.

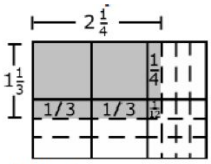
DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Apply and extend previous understandings of multiplication and division.
Standard: 5.NF.6

Connecting Standards	Standard/Learning Outcome:	Connecting Standard
3.OA.A.1 **3.OA.A.2** **4.MD.A.2** **4.OA.A.1** **4.OA.A.2**	CCSS.MATH.CONTENT.5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	**5.MD.B.2**

Mathematical Practices
5.MP.1. Make sense of problems and persevere in solving them. 5.MP.2. Reason abstractly and quantitatively. 5.MP.3. Construct viable arguments and critique the reasoning of others. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure. 5.MP.8. Look for and express regularity in repeated reasoning.

Guiding Questions	
● What is an efficient strategy for adding and subtracting fractions?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Represent word problems involving multiplication of fractions and mixed numbers. Interpret a fraction as division of the numerator by the denominator.	● Solve real world problems involving multiplication of fractions and mixed numbers.

Academic Vocabulary	Explanations and Examples
Key Terms ● Fraction ● Denominator ● Numerator ● Operations ● Multiplication/multiply ● Division/divide	**Examples:** ● Evan bought 6 roses for his mother. 2/3 of them were red. How many red roses were there? ○ Using a visual, a student divides the 6 roses into 3 groups and counts how many are in 2 of the 3 groups. ○  ○ A student can use an equation to solve. 2/3 × 6 = 12/3 = 4 red roses ● Mary and Joe determined that the dimensions of their school flag needed to be 1 1/3 ft. by 2 1/4 ft. What will be the area of the school flag? ○ A student can draw an array to find this product and can also use his or her understanding of decomposing numbers to explain the multiplication. Thinking ahead a student may decide to multiply by 1 1/3 instead of 2 1/4.



The explanation may include the following:

- First, I am going to multiply $2\frac{1}{4}$ by 1 and then by $\frac{1}{3}$.
- When I multiply $2\frac{1}{4}$ by 1, it equals $2\frac{1}{4}$.
- Now I have to multiply $2\frac{1}{4}$ by $\frac{1}{3}$.
- $\frac{1}{3}$ times 2 is $\frac{2}{3}$.
- $\frac{1}{3}$ times $\frac{1}{4}$ is $\frac{1}{12}$.

So the answer is $2\frac{1}{4} + \frac{2}{3} + \frac{1}{12}$ or $2\frac{3}{12} + \frac{8}{12} + \frac{1}{12} = 2\frac{12}{12} = 3$

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Apply and extend previous understandings of multiplication and division.
Standard: 5.NF.7

Connecting Standards	Standard/Learning Outcome:	Connecting Standards
3.OA.B.6 **3.NF.A.1** **4.NF.B.4**	CCSS.MATH.CONTENT.5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.1 CCSS.MATH.CONTENT.5.NF.B.7.A Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3*. CCSS.MATH.CONTENT.5.NF.B.7.B Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4*. CCSS.MATH.CONTENT.5.NF.B.7.C Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*	**5.MD.B.2** **5.NBT.B.7** **6.NS.A.1** **6.RP.A.2**

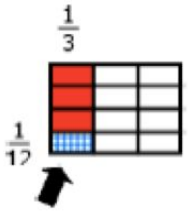
Mathematical Practices

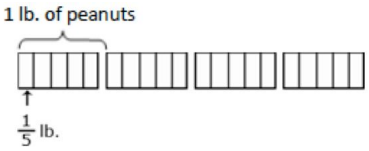
5.MP.1. Make sense of problems and persevere in solving them.
5.MP.2. Reason abstractly and quantitatively.
5.MP.3. Construct viable arguments and critique the reasoning of others.
5.MP.4. Model with mathematics.
5.MP.5. Use appropriate tools strategically.
5.MP.6. Attend to precision.
5.MP.7. Look for and make use of structure.
5.MP.8. Look for and express regularity in repeated reasoning.

Guiding Questions

- What models or equations can be used to efficiently solve problems using fractions and mixed numbers?

Substandard Deconstruction	**5.nF.7a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient.** **Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Know the relationship between multiplication and division.	• Interpret division of a unit fraction by a whole number and justify your answer using the relationship between multiplication and division, by creating story problems, using visual models, and relationship to multiplication, etc.
Substandard Deconstruction	**5.nF.7b Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Know the relationship between multiplication and division.	• Interpret division of a whole number by a unit fraction and justify your answer using the relationship between multiplication and division, and by representing the quotient with a visual fraction model. •
Substandard Deconstruction	**5.nF.7c Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
• Know the relationship between multiplication and division.	• Solve real world problems involving division of unit fractions by whole numbers other than 0 and division of whole numbers by unit fractions using strategies such as visual fraction models and equations.

Academic Vocabulary	Explanations and Examples
Key Terms • Fraction • Denominator • Numerator • Operations • Multiplication/multiply • Division/divide • Mixed numbers • Product • Quotient • Partition • Equal parts • Equivalent • Factor • Unit fraction	In fifth grade, students experience division problems with whole number divisors and unit fraction dividends (fractions with a numerator of 1) or with unit fraction divisors and whole number dividends. Students extend their understanding of the meaning of fractions, how many unit fractions are in a whole, and their understanding of multiplication and division as involving equal groups or shares and the number of objects in each group/share. In sixth grade, they will use this foundational understanding to divide into and by more complex fractions and develop abstract methods of dividing by fractions. **Example**: Knowing the number of groups/shares and finding how many/much in each group/share. • Four students sitting at a table were given 1/3 of a pan of brownies to share. How much of a pan will each student get if they share the pan of brownies equally? The diagram shows the 1/3 pan divided into 4 equal shares with each share equaling 1/12 of the pan. 

	Examples: Knowing how many in each group/share and finding how many groups/shares · Angelo has 4 lbs of peanuts. He wants to give each of his friends 1/5 lb. How many friends can receive 1/5 lb of peanuts? A diagram for 4 ÷ 1/5 is shown below. Students explain that since there are five fifths in one whole, there must be 20 fifths in 4 lbs.  · How much rice will each person get if 3 people share 1/2 lb of rice equally? $\frac{1}{2} \div 3 = \frac{3}{6} \div 3 = \frac{1}{6}$ A student may think or draw 1/2 and cut it into 3 equal groups then determine that each of those part is 1/6. · A student may think of 1/2 as equivalent to 3/6. 3/6 divided by 3 is 1/6.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Geometric measurement: understand concepts of volume.
Standard: 5.MD.3

Connecting Standard	Standard/Learning Outcome:	Connecting Standards
3.MD.C.5	CCSS.MATH.CONTENT.5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. CCSS.MATH.CONTENT.5.MD.C.3.a A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. CCSS.MATH.CONTENT.5.MD.C.3.b A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.	**5.MD.C.4** **5.MD.C.5**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure.

Guiding Questions	
● How do I calculate volume?	
Substandard Deconstruction	**5.MD.3a A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Recognize that volume is the measurement of the space inside a solid three-dimensional gure. ● Recognize a unit cube has 1 cubic unit of volume and is used to measure volume of three- dimensional shapes.	
Substandard Deconstruction	**5.MD.3b A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Recognize any solid figure packed without gaps or overlaps and filled with n unit cubes indicates the total cubic units or volume.	

Academic Vocabulary	Explanations and Examples
Key Terms ● Measurement ● Attribute ● Volume	Students' prior experiences with volume were restricted to liquid volume. As students develop their understanding volume they understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. This cube has a length of 1 unit, a width of 1 unit and a height of 1 unit and is called a cubic unit. This cubic unit is written with an exponent of 3 (e.g., in3, m3). Students connect this notation to their understanding of powers of 10 in our place value system. Models of cubic inches, centimeters, cubic feet, etc., are helpful in developing an image of a cubic unit. Students estimate how many cubic yards would be needed to fill the classroom or how many cubic centimeters would be needed to fill a pencil box.

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Geometric measurement: understand concepts of volume.
Standard: 5.MD.4

Connecting Standard	Standard/Learning Outcome:	Connecting Standard
5.MD.C.3	CCSS.MATH.CONTENT.5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	**5.MD.C.5**

Mathematical Practices
5.MP.2. Reason abstractly and quantitatively. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.6. Attend to precision.

Guiding Questions	
● How can I accurately find the volume of a shape?	
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Measure volume by counting unit cubes, cubic cm, cubic in, cubic ft, and improvised units.	

Academic Vocabulary	Explanations and Examples
Key Terms ● Measurement ● Attribute ● Volume ● Solid figure ● Right rectangular prism ● Unit ● Unit cube ● Cubic units (cubic cm, cubic in., cubic ft., nonstandard cubic units)	Students understand that same sized cubic units are used to measure volume. They select appropriate units to measure volume. For example, they make a distinction between which units are more appropriate for measuring the volume of a gym and the volume of a box of books. They can also improvise a cubic unit using any unit as a length (e.g., the length of their pencil). Students can apply these ideas by filling containers with cubic units (wooden cubes) to find the volume. They may also use drawings or interactive computer software to simulate the same filling process.

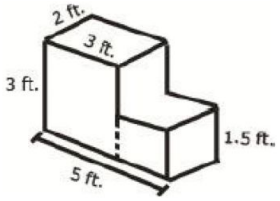
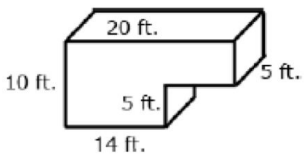
DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics
Cluster: Geometric measurement: understand concepts of volume.
Standard: 5.MD.5

Connecting Standards	Standard/Learning Outcome:	Connecting Standard
3.OA.B.5 **4.MD.A.3** **5.MD.C.3** **5.MD.C.4**	CCSS.MATH.CONTENT.5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. CCSS.MATH.CONTENT.5.MD.C.5.a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. CCSS.MATH.CONTENT.5.MD.C.5.b Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. CCSS.MATH.CONTENT.5.MD.C.5.c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	**6.G.A.2**

Mathematical Practices
5.MP.1. Make sense of problems and persevere in solving them. 5.MP.2. Reason abstractly and quantitatively. 5.MP.3. Construct viable arguments and critique the reasoning of others. 5.MP.4. Model with mathematics. 5.MP.5. Use appropriate tools strategically. 5.MP.6. Attend to precision. 5.MP.7. Look for and make use of structure. 5.MP.8. Look for and express regularity in repeated reasoning.
Guiding Questions
● How do I solve real world problems using volume efficiently?

Substandard Deconstruction	**5.mD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Identify a right rectangular prism. ● Multiply the three dimensions in any order to calculate	● Develop volume formula for a rectangular prism by comparing volume when filled with cubes to volume by multiplying the height by the area of the base, or when multiplying the edge lengths (L x W x H).

volume (Commutative and associative properties). ● Know that “B” is the area of the base.	● Apply the following formulas to right rectangular prisms having whole number edge lengths in the context of real world mathematical problems: Volume = length x width x height Volume = area of base x height. ● Solve real world problems by decomposing a solid figure into two non-overlapping right rectangular prisms and adding their volumes. ● Find the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes.
Substandard Deconstruction	**5.MD.5c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.**
KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Recognize volume as additive.	● Solve real world problems using volume of solid figures with non-overlapping parts.

Academic Vocabulary	Explanations and Examples
Key Terms ● Measurement ● Attribute ● Volume ● Solid figure ● Right rectangular prism ● Unit ● Unit cube ● Gap ● Overlap ● Cubic units (cubic cm, cubic in., cubic ft., nonstandard cubic units) ● Multiplication ● Addition ● Edge lengths ● Height ● Area of base	Students need multiple opportunities to measure volume by filling rectangular prisms with cubes and looking at the relationship between the total volume and the area of the base. They derive the volume formula (volume equals the area of the base times the height) and explore how this idea would apply to other prisms. Students use the associative property of multiplication and decomposition of numbers using factors to investigate rectangular prisms with a given number of cubic units. Examples: ● When given 24 cubes, students make as many rectangular prisms as possible with a volume of 24 cubic units. Students build the prisms and record possible dimensions. Length | Width | Height 1 | 2 | 12 2 | 2 | 6 4 | 2 | 3 8 | 3 | 1 ● Students determine the volume of concrete needed to build the steps in the diagram below.  ● A homeowner is building a swimming pool and needs to calculate the volume of water needed to fill the pool. The design of the pool is shown in the illustration below. 

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics

***Cluster:** Graph points on the coordinate plane to solve real-world and mathematical problems.

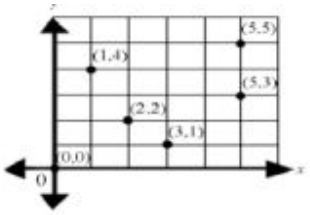
Standard: 5.G.1

Connecting Standards	Standard/Learning Outcome:	Connecting Standard
3.NF.A.2	CCSS.MATH.CONTENT.5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).	

Mathematical Practices
5.MP.4.□Model□ with□ mathematics. 5.MP.6.□Attend□ to□ precision.□ 5.MP.7.□Look □for□ and □make□ use of□ structure.□

Guiding Questions
● What are the parts of the coordinate system?

KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Define the coordinate system. ● Identify the *x*- and *y*- axes. ● Locate the origin on the coordinate system. ● Recognize and describe the connection between the ordered pair and *x*- and *y*- axes from the origin. ● Graph points in the first quadrant.	

Academic Vocabulary	**Explanations and Examples**
Key Terms ● Coordinate system ● Coordinate plane ● First quadrant ● Points ● Lines ● axis/axes ● *x*- axis/axes ● *y*- axis/axes ● Horizontal ● Vertical ● Intersection of lines ● Origin ● Ordered pairs ● Coordinates ● *x*-coordinate ● *y*-coordinate	•Students□ can □use□ a□ classroom□ size □coordinate□ system□ to□ physically □locate □the□ coordinate □point□ (5,□3) □by□ starting □at□ the □origin □point□ (0,0), □walking□ 5□ units □along□ the *x*-axis □to □find□ the □first□ number □in □the □pair□ (5), and□ then □walking □up □3 □units□ for□ the□ second□ number□ in□ the□ pair □(3).□ The □ordered□ pair□ names□ a□ point□ in□ the □plane.□ • Graph□ and□ label□ the □points□ below□ in□ a □coordinate□ system.□ o A□(0,□0)□ o B□(5,□1)□ o C□(0,□6)□ o D□(2.5,□6)□ o E□(6,□2)□ o F□(4,□1)□ o G□(3,□0)□ 

DECONSTRUCTED PRIORITY CCSS STANDARDS: Mathematics

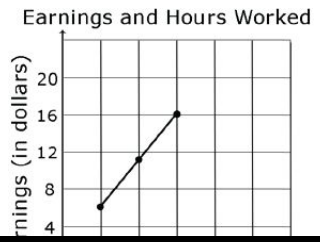
***Cluster:** Graph points on the coordinate plane to solve real-world and mathematical problems.
Standard: 5.G.2

Connecting Standard	Standard/Learning Outcome:	Connecting Standards
3.NF.A.2	CCSS.MATH.CONTENT.5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	**6.G.A.3** **6.NS.C.8** **6.RP.A.3**

Mathematical Practices
5.MP.1.□Make□ sense □of□ problems □and□ persevere □in□ solving □them.□ 5.MP.2.□Reason □abstractly□ and□ quantitatively.□ 5.MP.4.□Model□ with□ mathematics.□ 5.MP.5.□Use□ appropriate□ tools □strategically. 5.MP.6.□Attend □to□ precision.□ 5.MP.7.□Look □for□ and □make□ use□ of □structure.□

Guiding Questions
● How can you use the coordinate graph to solve problems?

KNOW (Essential Concept)	**DO (Learning Targets/Essential Skills)**
● Graph points in the first quadrant.	● Interpret coordinate values of points in real world context and mathematical problems. ● Represent real world and mathematical problems by graphing points in the first quadrant.

Academic Vocabulary	**Explanations and Examples**
Key Terms ● Coordinate system ● Coordinate plane ● First quadrant ● Points ● Lines ● axis/axes ● *x*- axis/axes ● *y*- axis/axes ● Horizontal ● Vertical ● Intersection of lines ● Origin ● Ordered pairs ● Coordinates ● *x*-coordinate ● *y*-coordinate	Sara □has□ saved □$20.□ She□ earns□ $8 □for□ each□ hour□ she□ works.□ ● If□ Sara□ saves □all □of her□ money, □how□ much □will□ she□ have□ after□ working□ 3□ hours? □5 □hours?□ 10 □hours? ● □Create□ a□ graph□ that□ shows □the □relationship□ between□ the□ hours □Sara□ worked□ and□ the□ amount□ of□ money□ she □has □saved.□ ● What□ other□ information □do □you□ know□ from□ analyzing□ the □graph?□ ● Use the□ graph□ below □to□ determine□ how □much□ money□ Jack □makes □after □working□ exactly □9□ hours.□ 

Fifth Grade Supporting Standards

Operations and Algebraic Thinking

Write and interpret numerical expressions.

5.OA.A.1
Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

5.OA.A.2
Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*

Analyze patterns and relationships.

5.OA.B.3
Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and
graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe*
that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.

Measurement and Data

Convert like measurement units within a given measurement system.

5.MD.A.1
Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

Represent and interpret data.

5.MD.B.2
Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

Geometry

Classify two-dimensional figures into categories based on their properties.

5.G.B.3
Understand that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are*
rectangles, so all squares have four right angles.

5.G.B.4
Classify two-dimensional figures in a hierarchy based on properties.