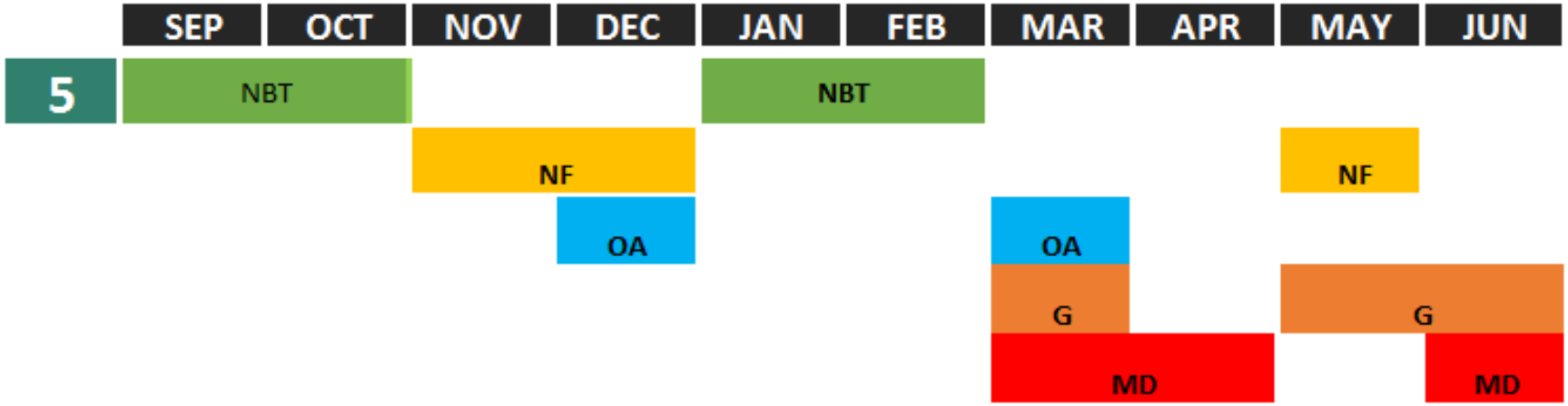
5th Grade Mathematics

Unit 1 Curriculum Map – Math in Focus

ORANGE PUBLIC SCHOOLS
OFFICE OF CURRICULUM AND INSTRUCTION
OFFICE OF MATHEMATICS

A STORY OF UNITS



Numbers Base Ten: Understand the place value system and perform operations with multi-digit whole numbers and with decimals to hundredths

Numbers and Operations-Fractions: Use equivalent fractions as a strategy to add and subtract fractions and apply and extend previous understandings of multiplication and division to multiply and divide fractions

Operations and Algebraic Thinking: Write and interpret numerical expressions and analyze patterns and relationships

Geometry: Graph points on the coordinate plane to solve real-world and mathematical problems and classify two-dimensional figures into categories based on their properties

Measurment and Data: Convert like measurement units within a given measurement system, represent and interpret data, and understand concepts of volume and relate volume to mulitplication and division

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Unit Overview

Unit 1: Chapters 1-3

In this Unit Students will be:

- Writing whole numbers in different forms and comparing and rounding numbers according to their place value.
- Using patterns to help multiply and divide, simplifying numeric expressions using the order of operations, and solving real-world problems using multiplication and division.
- Adding and subtracting unlike fractions and mixed numbers, and understanding the relationships among fractions, mixed numbers, division expressions, and decimals.

Essential Questions

- What changes the value of a digit?
- What patterns occur in the number system?
- What happens when we multiply or divide a number by powers of ten?
- What are the ways to find a quotient with two-digit divisors?
- How do you add or subtract fractions with unlike denominators?
- How do you know your answer is reasonable when adding or subtracting fractions?
- What do the values of a numerator and denominator tell you about the value of a fraction?

Enduring Understandings

- Patterns occur in our number system.
- Fractions allow us to express quantities with greater precision
- Decimals allow us to express quantities with greater precision
- Understanding place value leads to proficient number sense.

Common Core State Standards

5.NBT.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.

Students extend their understanding of the base-ten system to the relationship between adjacent places, how numbers compare, and how numbers round for decimals to thousandths. This standard calls for students to reason about the magnitude of numbers. Students should work with the idea that the tens place is ten times as much as the ones place, and the ones place is 1/10th the size of the tens place.

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.

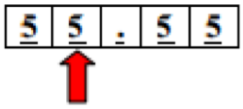
Before considering the relationship of decimal fractions, students express their understanding that in multi-digit whole numbers, a digit in one place represents 10 times what it represents in the place to its right and 1/10 of what it represents in the place to its left.

Example:
The 2 in the number 542 is different from the value of the 2 in 324. The 2 in 542 represents 2 ones or 2, while the 2 in 324 represents 2 tens or 20. Since the 2 in 324 is one place to the left of the 2 in 542 the value of the 2 is 10 times greater. Meanwhile, the 4 in 542 represents 4 tens or 40 and the 4 in 324 represents 4 ones or 4. Since the 4 n 324 is one place to the right of the 4 in 542 the value of the 4 in the number 324 is 1/10th of its value in the number 542.

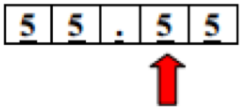
Example:
A student thinks, "I know that in the number 5555, the 5 in the tens place (5555) represents 50 and the 5 in the hundreds place (5555) represents 500. So a 5 in the hundreds place is ten times as much as a 5 in the tens place or a 5 in the tens place is 1/10 of the value of a 5 in the hundreds place.
Base on the base-10 number system digits to the left are times as great as digits to the right; likewise, digits to the right are 1/10th of digits to the left. For example, the 8 in 845 has a value of 800 which is ten times as much as the 8 in the number 782. In the same spirit, the 8 in 782 is 1/10th the value of the 8 in 845.

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."

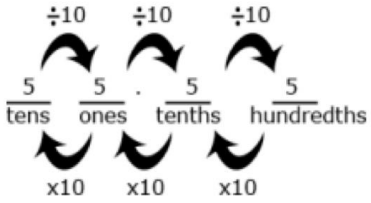
In the number 55.55, each digit is 5, but the value of the digits is different because of the placement.



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 the 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.



5.NBT.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.

New at Grade 5 is the use of whole number exponents to denote powers of 10. Students understand why multiplying by a power of 10 shifts the digits of a whole number or decimal that many places to the left. Example: Multiplying by 10^4 is multiplying by 10 four times. Multiplying by 10 once shifts every digit of the

multiplicand one place to the left in the product (the product is ten times as large) because in the base-ten system the value of each place is 10 times the value of the place to its right. So multiplying by 10 four times shifts every digit 4 places to the left.

Patterns in the number of 0s in products of a whole numbers and a power of 10 and the location of the decimal point in products of decimals with powers of 10 can be explained in terms of place value. Because students have developed their understandings of and computations with decimals in terms of multiples rather than powers, connecting the terminology of multiples with that of powers affords connections between understanding of multiplication and exponentiation.

This standard includes multiplying by multiples of 10 and powers of 10, including 10^2 which is 10 x 10=100, and 10^3 which is 10 x 10 x 10=1,000. Students should have experiences working with connecting the pattern of the number of zeros in the product when you multiply by powers of 10.
Example: $2.5 \times 10^3 = 2.5 \times (10 \times 10 \times 10) = 2.5 \times 1{,}000 = 2{,}500$. Students should reason that the exponent above the 10 indicates how many places the decimal point is moving (not just that the decimal point is moving but that you are multiplying or making the number 10 times greater three times) when you multiply by a power of 10. Since we are multiplying by a power of 10 the decimal point moves to the right.

$350 \div 10^3 = 350 \div 1{,}000 = 0.350 = 0.35$ 350/10 = 35, 35 /10 = 3.5 3.5 /10 =.0.35, or 350 x 1/10, 35 x 1/10, 3.5 x 1/10 this will relate well to subsequent work with operating with fractions. This example shows that when we divide by powers of 10, the exponent above the 10 indicates how many places the decimal point is moving (how many times we are dividing by 10 , the number becomes ten times smaller). Since we are dividing by powers of 10, the decimal point moves to the left.

Students need to be provided with opportunities to explore this concept and come to this understanding; this should not just be taught procedurally.

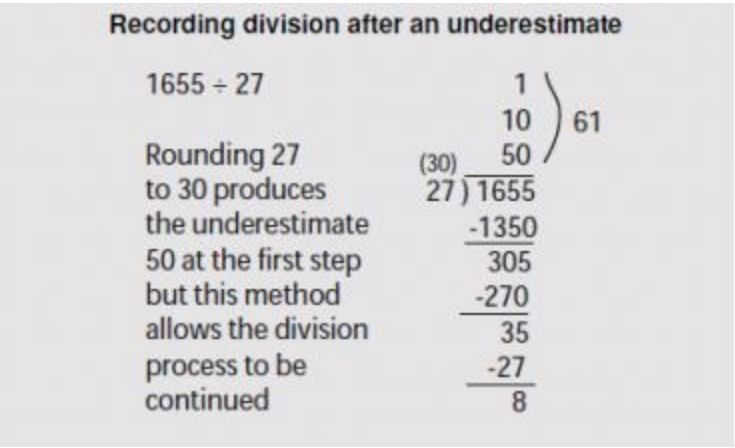
Example: Students might write:
- 36 x 10 = 36 x 101 = 360
- 36 x 10 x 10 = 36 x 102 = 3600
- 36 x 10 x 10 x 10 = 36 x 103 = 36,000
- 36 x 10 x 10 x 10 x 10 = 36 x 104 = 360,000

Students might think and/or say:
- I noticed that every time, 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.
- $523 \times 10^3 = 523{,}000$ The place value of 523 is increased by 3 places.
- $5.223 \times 10^2 = 522.3$ 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.

5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.

In fifth grade, students fluently compute products of whole numbers using the standard algorithm. Underlying this algorithm are the properties of operations and the base-ten system. Division strategies in fifth grade involve breaking the dividend apart into like base-ten units and applying the distributive property to find the quotient place by place, starting from the highest place. (Division can also be viewed as finding an unknown factor: the dividend is the product, the divisor is the known factor, and the quotient is the unknown factor.) Students continue their fourth grade work on division, extending it to computation of whole number quotients with dividends of up to four digits and two-digit divisors. Estimation becomes relevant when extending to two-digit divisors. Even if students round appropriately, the resulting estimate may need to be adjusted.



(Progressions for the CCSSM, Number and Operation in Base Ten, CCSS Writing Team, April 2011, page 16)

Computation algorithm. A set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly.

Computation strategy. Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another.

This standard refers to fluency which means accuracy (correct answer), efficiency (a reasonable amount of steps), and flexibility (using strategies such as the distributive property or breaking numbers apart also using strategies according to the numbers in the problem, 26 x 4 may lend itself to (25 x 4) + 4 where as another problem might lend itself to making an equivalent problem 32 x 4 = 64 x 2)). This standard builds upon students' work with multiplying numbers in third and fourth grade. In fourth grade, students developed understanding of multiplication through using various strategies.

While the standard algorithm is mentioned, alternative strategies are also appropriate to help students develop conceptual understanding. The size of the numbers should NOT exceed a three-digit factor by a two-digit factor.

Examples of alternative strategies:

There are 225 dozen cookies in the bakery. How many cookies are there?

Student 1	Student 2	Student 3

225 x 12 I broke 12 up into 10 and 2. 225 x 10 = 2,250 225 x 2 = 450 2,250 + 450 = 2,700	225 x 12 I broke up 225 into 200 and 25. 200 x 12 = 2,400 I broke up 25 into 5 x 5, so I had 5 x 5 x 12 or 5 x 12 x 5. 5 x 12 = 60. 60 x 5 = 300 I then added 2,400 and 300 2,400 + 300 = 2,700.	I doubled 225 and cut 12 in half to get 450 x 6. I then doubled 450 again and cut 6 in half to get 900 x 3. 900 x 3 = 2,700.

Draw an array model for 225 x 12….200 x 10, 200 x 2, 20 x 10, 20 x 2, 5 x 10, 5 x 2

225 x 12

	200	20	5
10	2,000	200	50
2	400	40	10

2,000
400
200
40
50
+ 10
2,700

5.NBT.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.

This standard references various strategies for division. Division problems can include remainders. Even though this standard leads more towards computation, the connection to story contexts is critical. Make sure students are exposed to problems where the divisor is the number of groups and where the divisor is the size of the groups. 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: There are 1,716 students participating in Field Day. They are put into teams of 16 for the competition. How many teams get created? If you have left over students, what do you do with them?

Student 1	Student 2
1,716 divided by 16 There are 100 16's in 1,716. 1,716 – 1,600 = 116 I know there are at least 6 16's. 116 – 96 = 20 I can take out at least 1 more 16. 20 - 16 = 4 There were 107 teams with 4 students left	1,716 divided by 16 There are 100 16's in 1,716. Ten groups of 16 is 160. That's too big. Half of that is 80, which is 5 groups. I know that 2 groups of 16's is 32. I have 4 students left over.

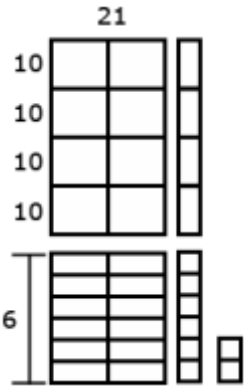
1716 -1600	100
116 -80	5
36 -32	2
4	

over. If we put the extra students on different teams, 4 teams will have 17 students.	
Student 3 1,716 ÷ 16 = I want to get 1,716 I know that 100 16's equals 1,600 I know that 5 16's equals 80 1,600 + 80 = 1,680 Two more groups of 16's equals 32, which gets us to 1,712 I am 4 away from 1,716 So we had 100 + 6 + 1 = 107 teams Those other 4 students can just hang out	Student 4 How many 16's are in 1,716? We have an area of 1,716. I know that one side of my array is 16 units long. I used 16 as the height. I am trying to answer the question what is the width of my rectangle if the area is 1,716 and the height is 16. 100 + 7 = 107 R 4 100 | 7 16 | 100 x 16 = 1,600 | 7 x 16 =112 1,716 - 1,600 = 116 | 116 - 112 = 4

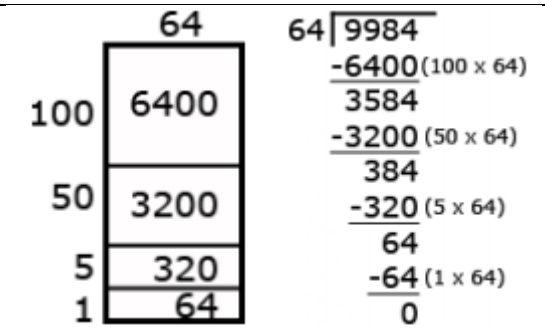
Example:
Using expanded notation 2682 ÷ 25 = (2000 + 600 + 80 + 2) ÷ 25
Using understanding of the relationship between 100 and 25, a student might think ~
• I know that 100 divided by 25 is 4 so 200 divided by 25 is 8 and 2000 divided by 25 is 80.
• 600 divided by 25 has to be 24.
• Since 3 x 25 is 75, I know that 80 divided by 25 is 3 with a reminder 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.



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

The order of operations is introduced in third grade and is continued in fourth. This standard calls for students to evaluate expressions with parentheses ( ), brackets [ ] and braces { }. In upper levels of mathematics, evaluate means to substitute for a variable and simplify the expression. However at this level students are to only simplify the expressions because there are no variables.

Example:
Evaluate the expression 2{5[12 + 5(500 - 100) + 399]}
Students should have experiences working with the order of first evaluating terms in parentheses, then brackets, and then braces.
The first step would be to subtract 500 – 100 = 400. Then multiply 400 by 5 = 2,000.
Inside the bracket, there is now [12 + 2,000 + 399]. That equals 2,411.
Next multiply by the 5 outside of the bracket. 2,411 x 5 = 12,055.
Next multiply by the 2 outside of the braces. 12,055 x 2= 24,110.

Mathematically, there cannot be brackets or braces in a problem that does not have parentheses. Likewise, there cannot be braces in a problem that does not have both parentheses and brackets.

This standard builds on the expectations of third grade where students are expected to start learning the conventional order. Students need experiences with multiple expressions that use grouping symbols throughout the year to develop understanding of when and how to use parentheses, brackets, and braces. First, students use these symbols with whole numbers. Then the symbols can be used as students add, subtract, multiply and divide decimals and fractions.
Example:
- (26 + 18) ÷ 4 Solution: 11
- {[2 x (3+5)] – 9} + [5 x (23-18)] Solution: 32
- 12 – (0.4 x 2) Solution: 11.2
- (2 + 3) x (1.5 – 0.5) Solution: 5
- 6- (½+⅓) Solution: 5⅙
- {80 ÷ [2 x (3 ½ + 1 ½)]} + 100 Solution: 108

To further develop students' understanding of grouping symbols and facility with operations, students place grouping symbols in equations to make the equations true or they compare expressions that are grouped differently.
Example:
- 15 - 7 – 2 = 10 → 15 - (7 – 2) = 10

- 3 x 125 ÷ 25 + 7 = 22 → [3 x (125 ÷ 25)] + 7 = 22
- 24 ÷ 12 ÷ 6 ÷ 2 = 2 x 9 + 3 ÷ ½ → 24 ÷ [(12 ÷ 6) ÷ 2] = (2 x 9) + (3 ÷ ½)
- Compare 3 x 2 + 5 and 3 x (2 + 5)
- Compare 15 – 6 + 7 and 15 – (6 + 7)

In fifth grade, students work with exponents only dealing with powers of ten (5.NBT.2). Students are expected to evaluate an expression that has a power of ten in it.
Example:
3 {2 + 5 [5 + 2 x 10^4] + 3}

In fifth grade students begin working more formally with expressions. They write expressions to express a calculation, e.g., writing 2 x (8 + 7) to express the calculation "add 8 and 7, then multiply by 2." They also evaluate and interpret expressions, e.g., using their conceptual understanding of multiplication to interpret 3 x (18932 x 921) as being three times as large as 18932 + 921, without having to calculate the indicated sum or product. Thus, students in Grade 5 begin to think about numerical expressions in ways that prefigure their later work with variable expressions (e.g., three times an unknown length is 3 x L).

In Grade 5, this work should be viewed as exploratory rather than for attaining mastery; for example, expressions should not contain nested grouping symbols, and they should be no more complex than the expressions one finds in an application of the associative or distributive property, e.g., (8 + 27) + 2 or (6 x 30) (6 x 7). Note however that the numbers in expressions need not always be whole numbers.
(Progressions for the CCSSM, Operations and Algebraic Thinking, CCSS Writing Team, April 2011, page 32)

5.OA.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.

This standard refers to expressions. Expressions are a series of numbers and symbols (+, -, x, ÷) without an equals sign. Equations result when two expressions are set equal to each other
(2 + 3 = 4 + 1).

Example: 4(5 + 3) is an expression. When we compute 4(5 + 3) we are evaluating the expression. The expression equals 32. 4(5 + 3) = 32 is an equation.

This standard calls for students to verbally describe the relationship between expressions without actually calculating them. This standard calls for students to apply their reasoning of the four operations as well as place value while describing the relationship between numbers. The standard does not include the use of variables, only numbers and signs for operations.

Example:
Write an expression for the steps "double five and then add 26."

Student
(2 x 5) + 26

Describe how the expression 5(10 x 10) relates to 10 x 10.

Student
The expression 5(10 x 10) is 5 times larger than the expression 10 x 10 since I know that I that 5(10 x 10)

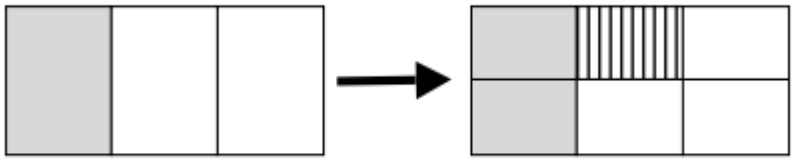
means that I have 5 groups of (10 x 10).

5.NF.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.NF.1 builds on the work in fourth grade where students add fractions with like denominators. In fifth grade, the example provided in the standard 2/3 + ¾ has students find a common denominator by finding the product of both denominators. This process should come after students have used visual fraction models (area models, number lines, etc.) to build understanding before moving into the standard algorithm describes in the standard The use of these visual fraction models allows students to use reasonableness to find a common denominator prior to using the algorithm.

For example, when adding 1/3 + 1/6, Grade 5 students should apply their understanding of equivalent fractions and their ability to rewrite fractions in an equivalent form to find common denominators.

Example: ⅓+ ⅙



1/3 is the same as 2/6

I drew a rectangle and shaded 1/3. I knew that if I cut every third in half then I would have sixths. Based on my picture, ⅓ equals 2/6. Then I shaded in another ⅙ with stripes. I ended up with an answer of 3/6, which is equal to 1/2.

On the contrary, based on the algorithm that is in the example of the Standard, when solving ⅓+ ⅙, multiplying 3 and 6 gives a common denominator of 18. Students would make equivalent fractions 6/18 + 3/18 = 9/18 which is also equal to one-half. Please note that while multiplying the denominators will always give a common denominator, this may not result in the smallest denominator.

Students should apply their understanding of equivalent fractions 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:

$$\frac{2}{5}+\frac{7}{8}=\frac{16}{40}+\frac{35}{40}=\frac{51}{40}$$

$$3\frac{1}{4}-\frac{1}{6}=3\frac{3}{12}-\frac{2}{12}=3\frac{1}{12}$$

Fifth grade students will need to express both fractions in terms of a new denominator with adding unlike denominators. For example, in calculating 2/3 + 5/4 they reason that if each third in 2/3 is subdivided into fourths and each fourth in 5/4 is subdivided into thirds, then each fraction will be a sum of unit fractions

with denominator 3 x 4 = 4 x 3 + 12:

$$\frac{2}{3}+\frac{5}{4}=\frac{2\times 4}{3\times 4}+\frac{5\times 3}{4\times 3}=\frac{8}{12}+\frac{15}{12}=\frac{23}{12}.$$

It is not necessary to find a least common denominator to calculate sums of fractions, and in fact the effort of finding a least common denominator is a distraction from understanding adding fractions. (Progressions for the CCSSM, Number and Operation – Fractions, CCSS Writing Team, August 2011, page 10)

Example: Present students with the problem 1/3 + 1/6. Encourage students to use the clock face as a model for solving the problem. Have students share their approaches with the class and demonstrate their thinking using the clock model.

5.NF.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.

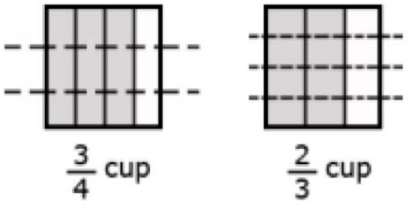
This standard refers to number sense, which means students' understanding of fractions as numbers that lie between whole numbers on a number line. Number sense in fractions also includes moving between decimals and fractions to find equivalents, also being able to use reasoning such as 7/8 is greater than ¾ because 7/8 is missing only 1/8 and ¾ is missing ¼ so 7/8 is closer to a whole Also, students should use benchmark fractions to estimate and examine the reasonableness of their answers. Example here such as 5/8 is greater than 6/10 because 5/8 is 1/8 larger than ½(4/8) and 6/10 is only 1/10 larger than ½ (5/10)

Example: Your teacher gave you 1/7 of the bag of candy. She also gave your friend 1/3 of the bag of candy. If you and your friend combined your candy, what fraction of the bag would you have? Estimate your answer and then calculate. How reasonable was your estimate?

Student 1
1/7 is really close to 0. 1/3 is larger than 1/7, but still less than ½. If we put them together we might get close to ½.
1/7 + 1/3 = 3/21 + 7/21 = 10/21. The fraction does not simplify. I know that 10 is half of 20, se 10/21 is a little less than ½.
Another example: 1/7 is close to 1/6 but less than 1/6, and 1/3 is equivalent to 2/6, so I have a little less than 3/6 or ½.

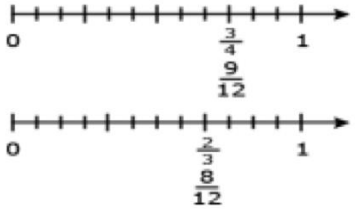
Example:
Jerry was making two different types of cookies. One recipe needed ¾ cup of sugar and the other needed 2/3 cup of sugar. How much sugar did he need to make both recipes?

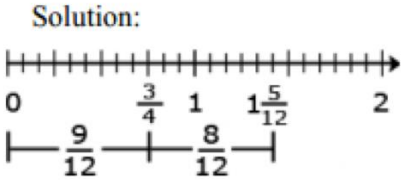
- Mental estimation:
  A student may say that Jerry needs more than 1 cup of sugar but less than 2 cups. An explanation may compare both fractions to ½ and state that both are larger than ½ so the total must be more than 1. In addition, both fractions are slightly less than 1 so the sum cannot be more than 2.
- Area model



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

- Linear model



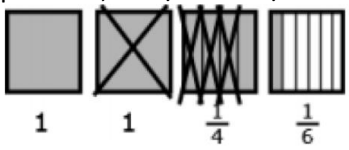


Example: Using a bar diagram

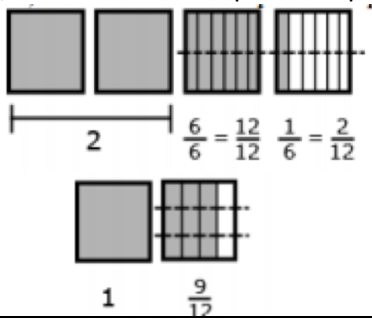
- Sonia had 2 1/3 candy bars. She promised her brother that she would give him ½ of a candy bar. How much will she have left after she gives her brother the amount she promised?
- If Mary ran 3 miles every week for 4 weeks, she would reach her goal for the month. The first day of the first week she ran 1 ¼ 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 3 miles. Then he or she would add 1/6 more. Thus 1 ¼ miles + 1/6 of a mile is what Mary need to run during that week.

Example: Using an area model to subtract

- 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 1/6 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 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?
How much milk did they drink altogether?

$$\frac{3}{5} - \frac{1}{10} = \frac{6}{10} - \frac{1}{10} = \frac{5}{10}$$

Solution:

$$\frac{3}{5} - \frac{1}{10} = \frac{6}{10} - \frac{1}{10} = \frac{5}{10}$$

$$\frac{3}{5} + \frac{5}{10} = \frac{6}{10} + \frac{5}{10} = \frac{11}{10}$$

This is how much milk Javier drank. Together they drank 1 1/10 quarts of milk.

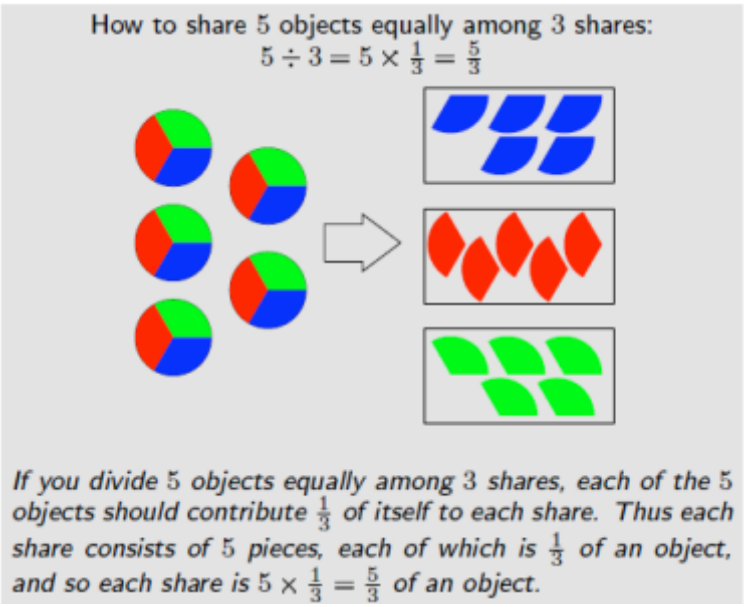
This solution is reasonable because Ellie drank more than ½ quart and Javier drank ½ quart so together they drank slightly more than one quart.

Students make sense of fractional quantities when solving word problems, estimating answers mentally to see if they make sense.

Example: Ludmilla and Lazarus each have a lemon. They need a cup of lemon juice to make hummus for a party. Ludmilla squeezes 1/2 a cup from hers and Lazarus squeezes 2/5 of a cup from his. How much lemon juice do they have? Is it enough? Students estimate that there is almost but not quite one cup of lemon juice, because 2/5 < 1/2. They calculate 1/2 + 2/5 = 9/10, and see this as 1/10 less than 1, which is probably a small enough shortfall that it will not ruin the recipe. They detect an incorrect result such as 2/5 + 2/5 = 3/7 by noticing that 3/7 < 1/2.
(Progressions for the CCSSM, Number and Operation – Fractions, CCSS Writing Team, August 2011, pg. 11)

5.NF.3	Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ 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?

Fifth grade student should connect fractions with division, understanding that 5 ÷ 3 = 5/3. Students should explain this by working with their understanding of division as equal sharing.



(Progressions for the CCSSM, Number and Operation – Fractions, CCSS Writing Team, August 2011, pg. 11)

Students should also create story contexts to represent problems involving division of whole numbers.

Example: If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? This can be solved in two ways. First, they might partition each pound among the 9 people, so that each person gets 50 x 1/9 = 50/9 pounds. Second, they might use the equation 9 x 5= 45 to see that each person can be given 5 pounds, with 5 pounds remaining. Partitioning the remainder gives 5 5/9 pounds for each person.
(Progressions for the CCSSM, Number and Operation – Fractions, CCSS Writing Team, August 2011, pg. 11)

This standard calls for students to extend their work of partitioning a number line from third and fourth grade. Students need ample experiences to explore the concept that a fraction is a way to represent the division of two quantities. 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.”

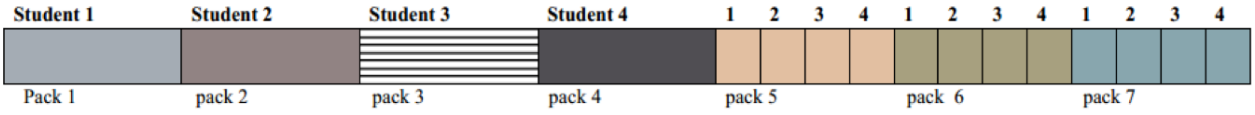
Examples: Ten team members are sharing 3 boxes of cookies. How much of a box will each student get? When working this problem, a student should recognize that the 3 boxes are being divided into 10 groups, so s/he is seeing the solution to the following equation, 10 x n = 3 (10 groups of some amount is 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 ½ boxes of pencils.

Example:
Your teacher gives 7 packs of paper to your group of 4 students. If you share the paper equally, how much paper does each student get?



Each student receives 1 whole pack of paper and ¼ of the each of the 3 packs of paper. So each student gets 1 ¾ packs of paper.

M : Major Content S: Supporting Content A : Additional Content

21st Century Career Ready Practices

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

MIF Lesson Structure

	LESSON STRUCTURE	RESOURCES	COMMENTS
PRE TEST	**Chapter Opener** Assessing Prior Knowledge *The Pre Test serves as a diagnostic test of readiness of the upcoming chapter*	**Teacher Materials** Quick Check Pretest (Assessm't Bk) Recall Prior Knowledge **Student Materials** Student Book (Quick Check); Copy of the Pre Test; Recall prior Knowledge	Recall Prior Knowledge (RPK) can take place just before the pre-tests are given and can take 1-2 days to front load prerequisite understanding Quick Check can be done in concert with the RPK and used to repair student misunderstandings and vocabulary prior to the pre-test ; Students write Quick Check answers on a separate sheet of paper Quick Check and the Pre Test can be done in the same block *(See Anecdotal Checklist; Transition Guide)* Recall Prior Knowledge – Quick Check – Pre Test
DIRECT ENGAGEMENT	**Direct Involvement/Engagement** Teach/Learn *Students are directly involved in making sense, themselves, of the concepts – by interacting the tools, manipulatives, each other, and the questions*	**Teacher Edition** 5-minute warm up Teach; Anchor Task **Technology** Digi **Other** Fluency Practice	• The Warm Up activates prior knowledge for each new lesson • Student Books are CLOSED; Big Book is used in Gr. K • Teacher led; Whole group • Students use concrete manipulatives to explore concepts • A few select parts of the task are explicitly shown, but the majority is addressed through the hands-on, constructivist approach and questioning • Teacher facilitates; Students find the solution
GUIDED LEARNING	**Guided Learning and Practice** Guided Learning	**Teacher Edition** Learn **Technology** Digi **Student Book** Guided Learning Pages Hands-on Activity	Students-already in pairs /small, homogenous ability groups; Teacher circulates between groups; Teacher, anecdotally, captures student thinking **Small Group w/Teacher circulating among groups** Revisit Concrete and Model Drawing; Reteach Teacher spends majority of time with struggling learners; some time with on level, and less time with advanced groups Games and Activities can be done at this time

INDEPENDENT PRACTICE	**Independent Practice** *A formal formative assessment*	**Teacher Edition** Let's Practice **Student Book** Let's Practice **Differentiation Options** All: Workbook Extra Support: Reteach On Level: Extra Practice Advanced: Enrichment	**Let's Practice** determines readiness for Workbook and small group work and is used as formative assessment; Students not ready for the Workbook will use Reteach. The Workbook is continued as Independent Practice. Manipulatives **CAN** be used as a communications tool as needed. Completely Independent On level/advance learners should finish all workbook pages.
ADDITIONAL PRACTICE	**Extending the Lesson**	Math Journal Problem of the Lesson Interactivities Games	
	Lesson Wrap Up	Problem of the Lesson Homework (Workbook , Reteach, or Extra Practice)	Workbook or Extra Practice Homework is only assigned when students fully understand the concepts (as additional practice) Reteach Homework (issued to struggling learners) should be checked the next day
POST TEST	**End of Chapter Wrap Up and Post Test**	**Teacher Edition** Chapter Review/Test Put on Your Thinking Cap **Student Workbook** Put on Your Thinking Cap **Assessment Book** Test Prep	Use Chapter Review/Test as "review" for the End of Chapter Test Prep. Put on your Thinking Cap prepares students for novel questions on the Test Prep; Test Prep is graded/scored. The Chapter Review/Test can be completed • Individually (e.g. for homework) then reviewed in class • As a 'mock test' done in class and doesn't count • As a formal, in class review where teacher walks students through the questions Test Prep is completely independent; scored/graded Put on Your Thinking Cap (green border) serve as a capstone problem and are done just before the Test Prep and should be treated as Direct Engagement. By February, students should be doing the Put on Your Thinking Cap problems on their own.

TRANSITION LESSON STRUCTURE (No more than 2 days)

- **Driven by Pre-test results, Transition Guide**
- **Looks different from the typical daily lesson**

Transition Lesson – Day 1 **Objective:**	
CPA Strategy/Materials	**Ability Groupings/Pairs (by Name)**
Task(s)/Text Resources	**Activity/Description**

Pacing Guide

Activity	NJSLS	Estimated Time (# of block)	Lesson Notes
Pre-Test 1	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6	½ block	
Chapter Opener 1/Recall Prior Knowledge 1	4.NBT.2, 4.NBT.3	1 block	
1.1 Numbers to 10,000,000	5.NBT.1	2 blocks	*After discussing each Learn Activity, have students formulate their own questions and then select other students to answer them. *Count by ten thousands and hundred thousands *Use pace value charts to show numbers *Read and write in standard form and word form
1.2 Place Value	5.NBT.1	1 block	*To help students identify and write the value of a digit in a number, have them write the digit and then write zeros for each place to the right of the digit. *Identify the place value of any digit in numbers *Read and write in expanded form
1.3 Comparing Numbers to 10,000,000	5.NBT.1	1 block	*Challenge students in this lesson by having them compare a 6 digit number with a 7 digit number *Compare and order numbers *Identify and complete a number pattern *Find a rule
1.4 Rounding and Estimating (Optional)	4.NBT.3	2 blocks	*Display a poster showing the two methods of estimating sums and differences. *Round numbers to the nearest thousand *Locate numbers on a number line *Use rounding to check work *Use related multiplication facts to estimate quotients
Module 5.NBT.1-2	5.NBT.1-2		Use Supplement Module 5.NBT.1-2 as needed
Chapter Review	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 4.OA.5	1/2 block	
Chapter Test/Review 1 + Test Prep Open Ended	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 4.OA.5	½ block	Click here for Chapter Test/Review with included Test Prep Questions
Authentic Assessment #1	4.NBT.5	½ block	

Pre-Test 2	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 5.OA.1	½ block	
Chapter Opener 2/Recall Prior Knowledge 2	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6	1 block	
2.1 Using a Calculator	OMIT	OMIT	
2.2 Multiplying by Tens, Hundreds and Thousands	5.NBT.1, 5.NBT.2, 5.NBT.5	3 blocks	*After students multiply using 10,100, and 1,000 have then see the relationship between the multiples *Multiply numbers by 10,100 or 1,000 using patterns *Multiply numbers up to 4 digits by 10, 100 and 1,000 *Use rounding to estimate products
2.3 Multiplying by Powers of 10	5.NBT.2	1 block	*Multiply whole numbers by 10 squared or 10 cubed
2.4 Multiplying by 2-Digit Numbers	5.NBT.5, 5.OA.1	2 blocks	*Before multiplying, have students estimate first to give them an idea of what their answer should be *Multiply a 2-,3- or 4-digit number by a 2-digit number
2.5 Dividing by Tens, Hundreds and Thousands	5.NBT.1, 5.NBT.6	3 blocks	*Divide numbers by 10,100 or 1,000 using patterns *Divide numbers up to 4 digits by 10, 100 and 1,000 *Use rounding to estimate quotients
Authentic Assessment #2	5.NBT.1	½ block	
2.6 Dividing by 2-Digit Numbers	5.NBT.6	2 blocks	*Divide a 2-,3- or 4-digit number by a 2-digit number
2.7 Order of Operations	5.OA.1	1 block	*Use order of operations to simplify an expression *Evaluate numerical expressions with parentheses, brackets and braces
2.8 Real-World Problems: Multiplication and Division	5.NBT.5, 5.NBT.6, 5.OA.1, 5.OA.2	2 blocks	*Use efficient strategies to solve multi-step problems *Express and interpret a product or quotient appropriately
Chapter Review	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 4.OA.5	1/2 block	
Chapter Test/Review 2 + Test Prep Open Ended	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 4.OA.5	½ block	Click here for Chapter Test/Review with included Test Prep Questions
Mini Assessment #1	5.OA.1, 5.OA.2	½ block	Click here for Chapter Test/Review with included Test Prep Questions
Authentic Assessment #3	5.NBT.5	½ block	

Pre-Test 3	4.NF.1, 4.NF.6, 4.OA.4, 5.NF.1. 5.NF.2, 5.NF.3	½ block	
Chapter Opener 3/Recall Prior Knowledge 3	3.NF.2, 4.NF.1, 4.NF.3, 4.NF.6, 4.OA.4, 5.NF.1, 5.NF.3	1 block	
3.1 Adding Unlike Fractions	5.NF.1, 5.NF.2	1 block	*Challenge students to see that a fraction with a numerator and a denominator that are close to each other has a value close to 1 *Add two unlike fractions where one denominator is not a multiple of the other *Estimate sums of fractions
3.2 Subtracting Unlike Fractions	5.NF.1, 5.NF.2	1 block	*Subtract two unlike fractions where one denominator is not a multiple of the other *Estimate differences of fractions
Mini Assessment #2	5.NF.1, 5.NF.2	½ block	Click here for Chapter Test/Review with included Test Prep Questions
3.3 Fractions, Mixed Numbers and Division Expressions	5.NF.3	1 block	*Help students to make generalizations about the relationships between fractions and division expressions. *Understand and apply the relationships between fractions, mixed numbers and division expressions
3.4 Expressing Fractions, Division Expressions, and Mixed Numbers as Decimals	5.NF.3	1 block	*Express fractions, mixed numbers and division expressions as decimals
3.5 Adding Mixed Numbers	5.NF.1	1 block	*Add mixed numbers with or without renaming *Estimate sums of mixed numbers
3.6 Subtracting Mixed Numbers	5.NF.1	1 block	*Students should realize that subtracting the fractional part of mixed numbers is the same as subtracting fractions *Subtract mixed numbers with or without renaming *Estimate differences of mixed numbers
3.7 Real-World Problems: fractions and Mixed Numbers	5.NF.1, 5.NF.2	1 block	*Solve real-world problems involving fractions and mixed numbers
Chapter Review	4.OA.4, 4.NF.1, 4.NF.6, 5.NF.1, 5.NF.2, 5.NF.3	½ block	
Chapter Test/Review 3 + Test Prep Open Ended	4.NF.1, 4.NF.6, 5.NF.1, 5.NF.2, 5.NF.3	½ block	Click here for Chapter Test/Review with included Test Prep Questions
Authentic Assessment #4 (optional)	5.NF.1, 5.NF.2	½ block	

Resources for Special Needs and English Language Learners

Chapter 1

Additional Support

For English Language Learners

Select activities that reinforce the chapter vocabulary and the connections among these words, such as having students

- create a student-made dictionary that includes terms, definitions, and examples organized by chapter
- answer yes/no questions about terms and definitions
- point out examples of vocabulary terms throughout each chapter
- discuss the Chapter Wrap Up, encouraging students to use the chapter vocabulary

For Extra Support

Select activities that go back to the appropriate stage of the Concrete-Pictorial-Abstract spectrum, such as having students

- create their own symbols to stand for each place value and then use them to show numbers and translate their self-generated symbols into standard form
- tell stories using greater numbers
- keep a list of greater numbers and how they are used in their daily lives, such as in textbooks and on television
- pick seven numbers from a set of index cards with one digit on each, and make the greatest or least number possible

See also pages 17 and 21.

Chapter 2

Additional Support

For English Language Learners

Select activities that reinforce the chapter vocabulary and the connections among these words, such as having students

- create a student-made dictionary that includes terms, definitions, and examples organized by chapter
- answer multiple-choice questions about terms and definitions
- discuss the Chapter Wrap Up, encouraging students to use the chapter vocabulary

For Extra Support

Select activities that go back to the appropriate stage of the Concrete-Pictorial-Abstract spectrum, such as having students

- use manipulatives such as base-ten models and counters to make arrays and models of multiplication and division
- draw pictures to illustrate multiplication and division stories
- create and solve multiplication and division word problems using those in the chapter as models
- identify clue words in problems to help determine if the solution involves multiplication or division

If necessary, review Chapter 1 (Whole Numbers)

For Advanced Learners

See suggestions on pages 52, 69 and 105–106.

Chapter 3

Additional Support

For English Language Learners

Select activities that reinforce the chapter vocabulary and the connections among these words, such as having students

- add to the student-made dictionary that includes terms, definitions, and examples organized by chapter
- create and practice vocabulary with flash cards that have terms on one side and examples on the other
- share stories about when they have seen or how they have used fractions in their own lives
- discuss the Chapter Wrap Up, encouraging students to use the chapter vocabulary

For Extra Support

Select activities that go back to the appropriate stage of the Concrete-Pictorial-Abstract spectrum, such as having students

- use fraction strips to model how to add and subtract fractions and mixed numbers
- create new fraction stories using the stories throughout the chapter as models
- use their own words to explain different procedures that they learn throughout the chapter
- solve selected fraction stories in three different ways: using fraction strips, pictures, and numbers

If necessary, review Chapter 2 (Whole Number Multiplication and Division)

For Advanced Learners

See suggestions on pages 145 and 157.

Pacing Calendar

Please complete the pacing calendar based on the suggested pacing.

SEPTEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	**2**
3	**4**	**5**	**6**	**7**	**8**	**9**
10	**11**	**12**	***13***	**14**	***15***	**16**
17	***18***	**19**	**20**	**21**	**22**	**23**
24	**25**	**26**	**27**	**28**	**29**	**30**

OCTOBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	**2**	**3**	***4***	**5**	**6**	**7**
8	**9**	**10**	**11**	***12***	**13**	**14**
15	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	**28**
29	**30**	**31**				

NOVEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Unit 1 Math Background

Chapter 1: Whole Numbers
Addition and subtraction skills are introduced earlier in Math in Focus®: Singapore Math than in many elementary programs. Children should know their basic addition and subtraction facts by the end of Grade 1 and should be competent with multi-digit addition and subtraction by the end of Grade 2. These skills are extended in Grades 3 and 4, using greater numbers.

Chapter 2: Multiplication and Division of Whole Numbers
Exploring equal groups leads up to multiplication and division concepts in Grade 2. The basic multiplication and division facts are modeled and committed to memory in Grades 2 and 3. Grades 3 and 4 focus on multiplying and dividing multi-digit numbers, using both place value blocks and place-value chips to aid understanding.

Chapter 3: Number and Operations: Fractions
Fraction concepts are introduced gradually, with abundant pictorial support. Understanding grows from fractions of a whole (with an emphasis on unit fractions) to fractions of a set and comparing fractions to addition and subtraction of like and unlike fractions.

Transition Guide References:

Chapter 1: Whole Numbers				
Transition Topic: Whole Numbers and Place Value				
Grade 5 Chapter 1 Pre Test Items	**Grade 5 Chapter 1 Pre-Test Item Objective**	**Additional Support for the Objective: Grade 4 Reteach**	**Additional Support for the Objective: Grade 4 Extra Practice**	**Grade 4 Teacher Edition Support**
Items 1; 5–8	Write numbers to 100,000 in standard form, word form, and expanded form.	4A pp. 1–7	Lesson 1.1	4A Chapter 1 Lesson 1
Items 2, 9–10, 18	Compare and order numbers to 100,000.	4A pp. 15–18	Lesson 1.2	4A Chapter 1 Lesson 2

Chapter 2: Whole Number Multiplication and Division				
Transition Topic: Multiplication and Division of Whole Numbers				
Grade 5 Chapter 2 Pre Test Items	**Grade 5 Chapter 2 Pre Test Item Objective**	**Additional Support for the Objective: Grade 4 Reteach**	**Additional Support for the Objective: Grade 4 Extra Practice**	**Grade 4 Teacher Edition Support**
Items 1, 6	Write numbers to 100,000 in standard form, word form, and expanded form.	Support for this objective is included in Chapter 1.		4A Chapter 1 Lesson 1
Items 2, 3, 14–19	Estimate products and quotients.	Support for this objective is included in Chapter 1.		4A Chapter 2 Lesson 1
Items 5, 12	Round numbers to estimate sums, differences, products, and quotients. Estimate to check that an answer is reasonable.	Support for this objective is included in Chapter 1.		4A Chapter 2 Lesson 1
Item 9	Use different methods to multiply whole numbers up to 4-digits by one-digit and two-digit numbers with or without regrouping.	4A pp. 49–63	Lessons 3.1 and 3.2	4A Chapter 3 Lesson 1 and 2
Items 10–11	Divide up to a 4 digit number by a one digit number with regrouping, and with or without remainders.	4A pp. 69–77	Lessons 3.3 and 3.4	4A Chapter 3 Lesson 4

Chapter 3: Fractions and Mixed Numbers				
Transition Topic: Number and Operations: Fractions				
Grade 5 Chapters 3 Pre-Test Items	**Grade 5 Chapters 3 Pre-Test Item Objective**	**Additional Support for the Objective: Grade 4 Reteach**	**Additional Support for the Objective: Grade 4 Extra Practice**	**Grade 4 Teacher Edition Support**
Chapter 3 Items 1–7, 8–10	Find equivalent fractions.	4A pp. 151–157, 159, 162–163	Lesson 6.1	4A Chapter 6 Lesson 1
Chapter 3 Items 12–13	Add unlike fractions.	4A pp. 153–155, 157–158	Lesson 6.1	4A Chapter 6 Lesson 1
Chapter 3 Items 14–15	Subtract unlike fractions.	4A pp. 160–166	Lesson 6.2	4A Chapter 6 Lesson 2
	Write a mixed number for a model.	4A pp. 167–170	Lesson 6.3	4A Chapter 6 Lesson 3
	Draw models to represent mixed numbers.	4A pp. 167, 169	Lesson 6.3	4A Chapter 6 Lesson 3
	Write an improper fraction for a model.	4A pp. 171–176	Lesson 6.4	4A Chapter 6 Lesson 4
Chapter 3 Item 11	Express improper fractions as mixed numbers, and mixed numbers as improper fractions.	4A pp. 177–184	Lesson 6.4	4A Chapter 6 Lesson 4
	Use a bar model to represent a fraction of a set.	4A pp. 195–197	Lesson 6.7	4A Chapter 6 Lesson 8
Chapter 3 Items 16–17	Express a fraction as a decimal and a decimal as a fraction	4B pp. 51–56	Lesson 7.5	4B Chapter 7 Lessons 1 and 2

PARCC Assessment Evidence/Clarification Statements

NJSLS	Evidence Statement	Clarification	Math Practices
5.NBT.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.	i) Tasks have "thin context"1 or no context. ii) Tasks involve the decimal point in a substantial way (e.g., by involving, for example, a comparison of a tenths digit to a thousandths digit or a tenths digit to a tens digit)	MP.2, MP.7
5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	i) Expressions have depth no greater than two, e.g., 3×[5 + (8 ÷ 2)] is acceptable but 3×[5 + (8 ÷ {4−2})] is not.	MP.7
5.OA.2-1	Write simple expressions that record calculations with numbers. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7).		MP.7
5.OA.2-2	Interpret numerical expressions without evaluating them. For example, recognize that 3 x (18932 + 921) is three times as large as 18932 + 921 without having to calculate the indicated sum or product.		MP.7
5.NF.1-1	Add two fractions with unlike denominators, or subtract two fractions with unlike denominators, 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.)	i) Tasks have no context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Tasks do not include mixed numbers. iv) Tasks may involve fractions greater than 1 (including fractions equal to whole numbers). v) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.	MP.6, MP.7
5.NF.1-2	Add three fractions with no two denominators equal by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum of fractions with like denominators. For example, 1/2 + 1/3 + 1/4 = (3/6 + 2/6) + 1/4 = 5/6 + 1/4 = 10/12 + 3/12 = 13/12 or alternatively 1/2 + 1/3 + 1/4 = 6/12 + 4/12 + 3/12 = 13/12.	i) Tasks have no context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Tasks do not include mixed numbers. iv) Tasks may involve fractions greater than 1 (including fractions equal to whole numbers). v) Prompts do not provide visual fraction models; students may at their discretion	MP.6, MP.7

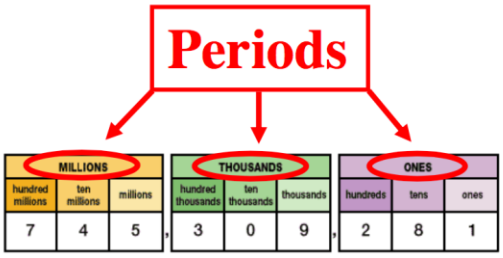
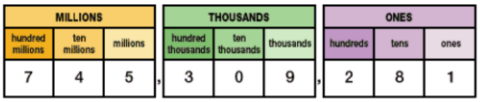
		draw visual fraction models as a strategy.	
5.NF.1-3	Compute the result of adding two fractions and subtracting a third, where no two denominators are equal, by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 1/2 + 1/3 – 1/4 or 7/8 – 1/3 + 1/2.	i) Tasks have no context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Subtraction may be either the first or second operation. The fraction being subtracted must be less than both the other two. iv) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.	
5.NF.1-4	Add two mixed numbers with unlike denominators, expressing the result as a mixed number, by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum with like denominators. For example, 3 1/2 + 2 2/3 = (3 + 2) + (1/2 + 2/3) = 5 + (3/6 + 4/6) = 5 + 7/6 = 5 + 1 + 1/6 = 6 1/6.	i) Tasks have no context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Subtraction may be either the first or second operation. The fraction being subtracted must be less than both the other two. iv) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy	MP.6, MP.7
5.NF.1-5	Subtract two mixed numbers with unlike denominators, expressing the result as a mixed number, by replacing given fractions with equivalent fractions in such a way as to produce an equivalent difference with like denominators.	i) Tasks have no context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Subtraction may be either the first or second operation. The fraction being subtracted must be less than both the other two.	MP.6, MP.7
5.NF.2-1	Solve word problems involving addition and subtraction of fractions referring to the same whole, in cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.	i) The situation types are those shown in Table 2, p. 9 of the OA Progression document, sampled equally. ii) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.	MP.1, MP.4, MP.5
5.NF.2-2	Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers to word problems involving	i) The situation types are those shown in Table 2, p. 9 of the OA Progression document, sampled equally. ii) Prompts do not provide visual fraction	MP.2, MP.5, MP.7

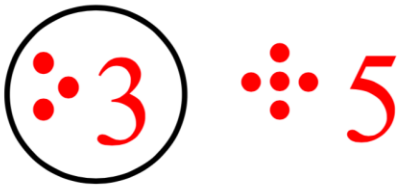
	addition and subtraction of fractions referring to the same whole in cases of unlike denominators. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.	models; students may at their discretion draw visual fraction models as a strategy.	
5.NF.A.Int.1	Solve word problems involving knowledge and skills articulated in 5.NF.A	i) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.	MP.1, MP.4, MP.5
5.NF.3-1	Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b).	i) Tasks do not have a context.	MP.2
5.NF.3-2	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?	i) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy. ii) Note that one of the italicized examples in standard 5.NF.3 is a two-prompt problem.	MP.1, MP.4, MP.5

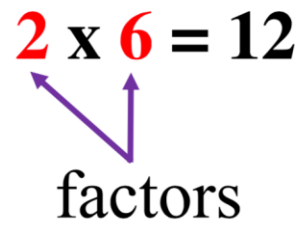
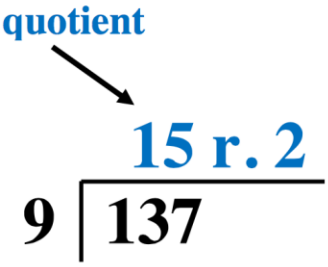
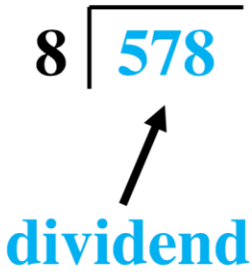
Connections to the Mathematical Practices

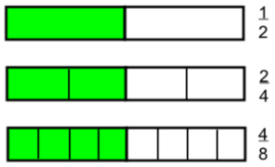
1	**Make sense of problems and persevere in solving them**
	Mathematically proficient students in fifth grade should solve problems by applying their understanding of operations with whole numbers, decimals, and fractions including mixed numbers. They solve problems related to volume and measurement conversions. Students seek the meaning of a problem and look for efficient ways to represent and solve it. They may check their thinking by asking themselves, "What is the most efficient way to solve the problem?", "Does this make sense?", and "Can I solve the problem in a different way?".
2	**Reason abstractly and quantitatively**
	In fifth grade, students should recognize that a number represents a specific quantity. They connect quantities to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. Students write simple expressions that record calculations with numbers and represent or round numbers using place value concepts.
3	**Construct viable arguments and critique the reasoning of others**
	In fifth grade, mathematically proficient students may construct arguments using concrete referents, such as objects, pictures, and drawings. They explain calculations based upon models and properties of operations and rules that generate patterns. They demonstrate and explain the relationship between volume and multiplication. They refine their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" They explain their thinking to others and respond to others' thinking.
4	**Model with mathematics**
	In fifth grade, students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. Fifth graders should evaluate their results in the context of the situation and whether the results make sense. They also evaluate the utility of models to determine which models are most useful and efficient to solve problems.
5	**Use appropriate tools strategically**
	Mathematically proficient fifth graders consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use unit cubes to fill a rectangular prism and then use a ruler to measure the dimensions. They use graph paper to accurately create graphs and solve problems or make predictions from real world data.
6	**Attend to precision**
	Fifth graders should continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning. Students use appropriate terminology when referring to expressions, fractions, geometric figures, and coordinate grids. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, when figuring out the volume of a rectangular prism they record their answers in cubic units.
7	**Look for and make use of structure**
	Mathematically proficient fifth grade students look closely to discover a pattern or structure. For instance, students use properties of operations as strategies to add, subtract, multiply and divide with whole numbers, fractions, and decimals. They examine numerical patterns and relate them to a rule or a graphical representation.
8	**Look for and express regularity in repeated reasoning**
	Fifth graders should use repeated reasoning to understand algorithms and make generalizations about patterns. Students connect place value and their prior work with operations to understand algorithms to fluently multiply multi-digit numbers and perform all operations with decimals to hundredths. Students explore operations with fractions with visual models and begin to formulate generalizations.

Visual Vocabulary

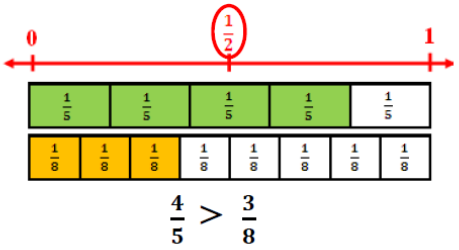
Visual Definition **The terms below are for teacher reference only and are not to be memorized by students.** Teachers should first present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or use them with words, models, pictures, or numbers.
CHAPTER 1
standard form — **354,973** — A number written with one digit for each place value.
word form — **The word form of 234 is two hundred, thirty-four.** — A way of using words to write a number.
expanded form — **347.392 =** $3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$ — A way to write numbers that shows the place value of each digit.
period —  — In a large number, periods are groups of 3 digits separated by commas or by spaces.
place value —  — The value of the place of a digit in a number.

greater than	 $5 > 3$	Greater than is used to compare two numbers when the first number is larger than the second number.
less than	 $3 < 5$	Less than is used to compare two numbers when the first number is smaller than the second number.
rounding	$45.357 \rightarrow 45.4$	To strategy to find about how much or how many by expressing a number closest to ten, hundred, thousand, or tenth, hundredth, thousandth, etc.
estimate	Close to 1 Close to 1 $\frac{3}{4} + \frac{5}{6} \approx 2$ is approximately equal to	A number close to an exact amount, an estimate tells *about* how much.
CHAPTER 2		
product	$5 \times 3 = 15$	The answer to a multiplication problem.

factor		The whole numbers that are multiplied to get a product.
base of an exponent		The number that is raised to a power. In 10^4 , 10 is the base and 4 is the exponent. 10 is raised to the power of 4. (10^4 = 10 x 10 x 10 x 10 = 10,000)
exponent	 10 x 10 x 10 x 10 = 10,000	The number that tells the number of times the base is multiplied by itself.
quotient		The result of the division of one quantity by another.
dividend		A quantity to be divided.
divisor		The quantity by which another quantity is to be divided.

remainder	remainder 15 r. 2 9 ⟌ 137	The number that is left over after a whole number is divided equally by another.
expression	6 + 3 - 1 no equal sign	A mathematical phrase without an equal sign.
CHAPTER 3		
multiple	**12 is a multiple of 3 (and of 4) because 3 x 4 = 12**	A product of a given whole number and any other whole number.
least common multiple	**6, 12, 18, 24, 30, 36, 42…** **8, 16, 24, 32, 40, 48, 56…** **LCM = 24**	LCM. The smallest common multiple of a set of two or more numbers.
common denominator	**12 is a common denominator for $\frac{2}{3}$ and $\frac{3}{4}$**	For two or more fractions, a common denominator is a common multiple of the denominators.
equivalent fractions		Fractions that have the same value.

benchmark fractions



Fractions that are commonly used for estimation. A benchmark fraction helps you compare two fractions.

common numerator

4 is a common numerator for:

$\frac{4}{5}$ and $\frac{2}{3}$

For two or more fractions, a common numerator is a common multiple of the numerators.

common multiple

4, 8, 12, 16, 20, 24, 28, 32, 36…
6, 12, 18, 24, 30, 36, 42…

Common Multiples of 4 and 6:
12, 24, 36…

Any common multiple of two or more numbers.

denominator

The quantity below the line in a fraction. It tells the number of equal parts into which a whole is divided.

mixed number

$1\frac{5}{8}$ $4\frac{3}{4}$

A number that has a whole number (not 0) and a fraction.

Potential Student Misconceptions

Chapter 1:

- Some students may not recognize when zeroes are needed when translating numbers from word form to standard form. To help, have students use a place value chart to write each digit, including zeros, in the correct place. (Lesson 1.1)
- Some students, when finding a rule, will look for the difference between only two numbers in a series. Encourage students to make sure the rule works with *several* numbers in a series before they determine a rule. (Lesson 1.3)
- Some students may not be able to determine the endpoints for a number line when rounding numbers. Explain to students that when rounding to the nearest thousand, the number line begins at the thousand that is in the number they are rounding, and ends at the next thousand up. So if students are rounding 12,773 to the nearest thousand, the number line begins with 12,000 and ends with 13,000. (Lesson 1.4)

Chapter 2:

- When using a calculator, remind students to carefully enter numbers and operation signs; enter numbers in correct order for subtraction and division; and always press the "Clear" button before entering a new calculation. (Lesson 2.1)
- When estimating a product, check that students are rounding each factor to the correct place. Remind students to round each number to the greatest place before estimating the product. (Lesson 2.2)
- Students may not write enough zeros in their answers. Remind students that when multiplying by 10^3, you need to write 3 zeros to the right of any zeros that are already in the number. (Lesson 2.3)
- When multiplying multi-digit numbers, students may forget to add the regrouped numbers as they multiply each place. Suggest that students circle each number they write above the original number when regrouping. Then they can cross it out after they have added it. (Lesson 2.4)
- Some students may carelessly drop too may zeros in the dividend. Remind students to count the number of zeros in the divisor, and only drop that number of zeros in the dividend. (Lesson 2.5)
- Some students may not understand the importance of the order of operations. Using the correct order of operations results in a correct answer. Not using the correct order will result in an incorrect answer. (Lesson 2.6)
- When solving real world problems, students may choose the wrong operations. You may choose to discuss each problem, guiding students to decide which steps and operations they will use and explain why, before they begin. (Lesson 2.8)

Chapter 3:

- A common error students make when adding unlike fractions, is to add both the numerators and the denominators. Remind students that they must find equivalent fractions with like denominators before adding the numerators. (Lesson 3.1)
- Remind students that the fraction bar means "divided by"; so, when given a fraction to divide, they do not transpose the numerator into the divisor and the denominator into the dividend. (Lesson 3.3)
- Some students may not realize that they have to divide the perimeter of a square by 4 to find the length of each side. Have students draw a picture of a square, and outline the perimeter. (Lesson 3.4)
- Students may forget to add the whole number part of the sum of the fractions, to the whole numbers in the mixed numbers. As a reminder, have students circle the whole number when they change the improper fraction into a mixed number. (Lesson 3.5)
- When subtracting mixed numbers, students may subtract the first numerator from the second numerator, rather than renaming the minuend as an equivalent fraction with a greater numerator. Have students circle each numerator before subtracting and compare them, to make sure the first numerator is greater than the second numerator. (Lesson 3.6)

- Some students may think that because they see the word “less” in a problem they have to subtract. Have students draw a picture to show the problem. Take this opportunity to remind students that key words and phrases are clues and not a substitute for decoding what a problem asks. (Lesson 3.7)

Teaching Multiple Representations

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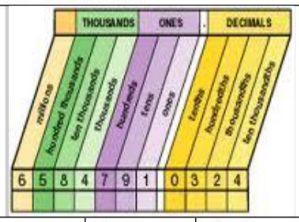

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<tr><th>Thousands</th><th>Hundreds</th><th>Tens</th><th>Ones</th><th>Tenths</th><th>Hundredths</th><th>Thousandths</th></tr>
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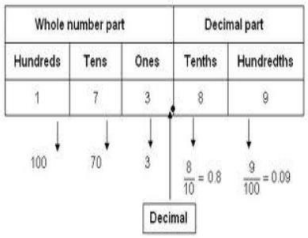

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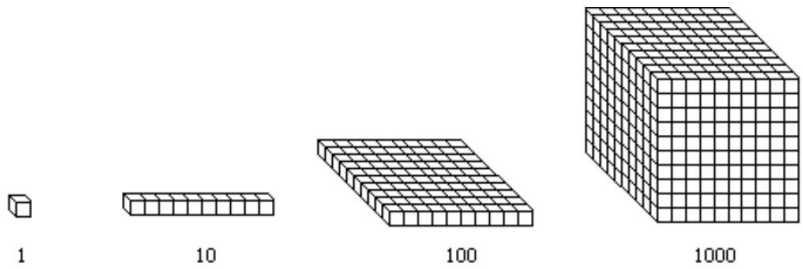

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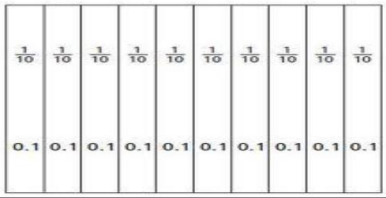
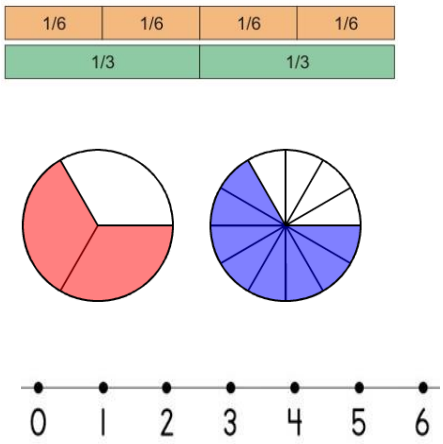
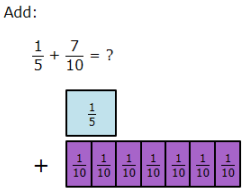
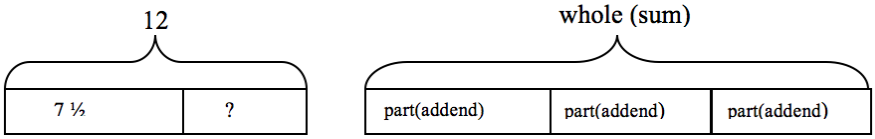
<tr><td>Fractional Strips</td><td>


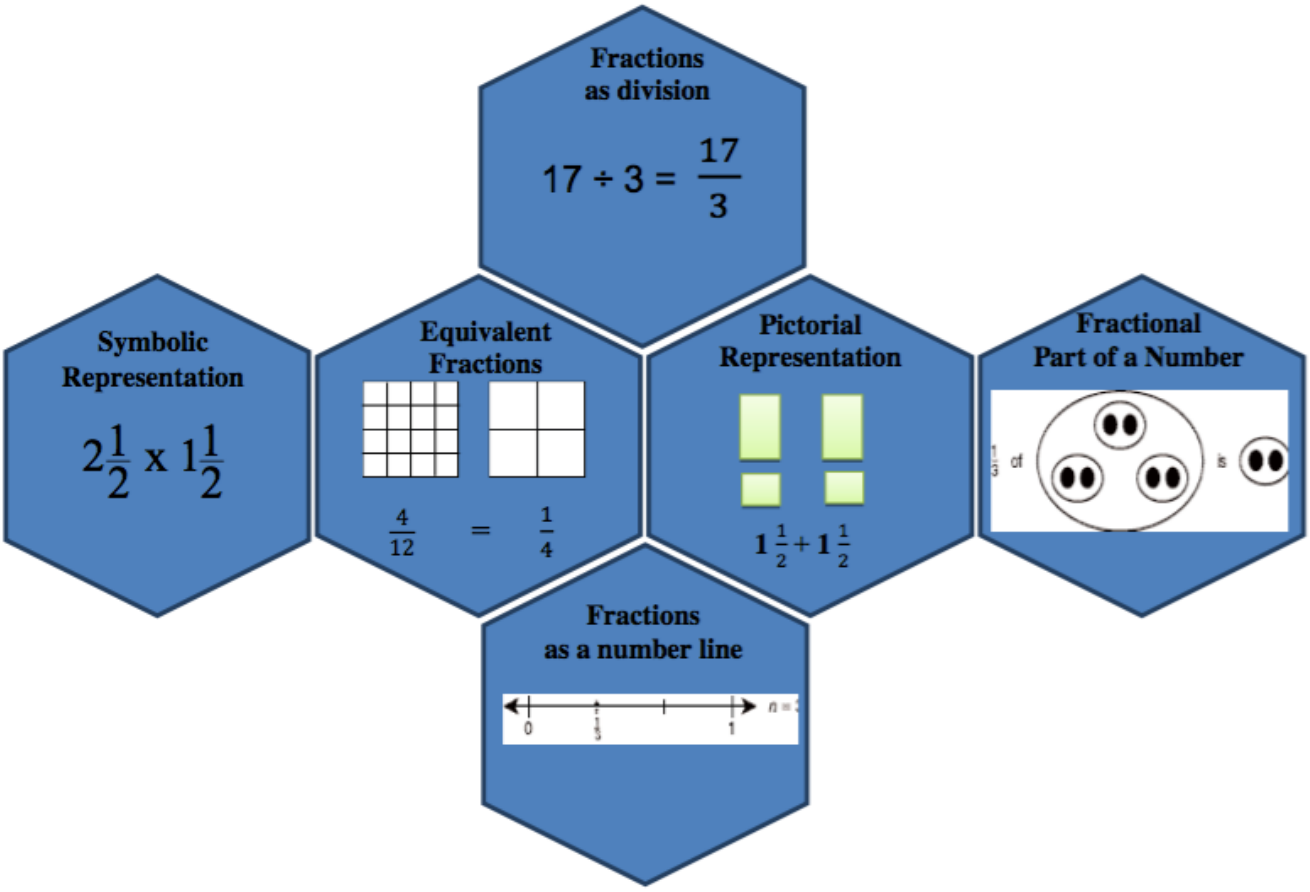
</td></tr>
<tr><th colspan="2">Abstract Representations</th></tr>
<tr><td>Powers of Tens</td><td>$100 = 10 \times 10 = 10^2$</td></tr>
</table>

<table>
<tr><th colspan="2">Concrete and Pictorial Representations</th></tr>
<tr><td>Equal Partitioning and Unitizing
Using Visual Fraction Models
• Fraction Strips
• Fraction Circles
• Number line</td><td> 


</td></tr>
<tr><td>Bar Model
  </td><td>Leticia read 7 ½ books for the read-a-thon. She wants to read 12 books in all. How many more books does she have to read?
 

12 - 7 ½ = ? or 7 ½ + ? = 12 so Leticia needs to read 4 ½ more books.</td></tr>
<tr><td>Equivalent Fractions</td><td>For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)</td></tr>
<tr><td>Benchmark Fractions</td><td>1/2, 1/3, 1/4, 1/5, 1/6. 1/8, 1/10</td></tr>
</table>

Multiple Representation of Fractions



Assessment Framework

Unit 1 Assessment / Authentic Assessment Framework			
Assessment	**NJSLS**	**Estimated Time**	**Format**
Pre Test 1	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6	40 minutes	Individual
Authentic Assessment #1	4.NBT.5	25 minutes	Individual
Chapter Test/Review 1 + TP	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 4.OA.5	40 minutes	Individual
Authentic Assessment #2	5.NBT.1	25 minutes	Individual
Pre Test 2	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 5.OA.1	40 minutes	Individual
Chapter Test/Review 2 + TP	4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 4.OA.5	40 minutes	Individual
Authentic Assessment #3	5.NBT.5	25 minutes	Individual
Mini Assessment 1	5.OA.1-2	20 minutes	Individual
Pre Test 3	4.NF.1, 4.NF.6, 4.OA.4, 5.NF.1. 5.NF.2, 5.NF.3	40 minutes	Individual
Chapter Test/Review 3 + TP	4.OA.4, 4.NF.1, 4.NF.6, 5.NF.1, 5.NF.2, 5.NF.3	40 minutes	Individual
Mini Assessment 2	5.NF.1-2	20 minutes	Individual
Authentic Assessment #4	5.NF.1, 5.NF.2	25 minutes	Individual

	PLD	**Genesis Conversion**
Rubric Scoring	PLD 5	100
	PLD 4	89
	PLD 3	79
	PLD 2	69
	PLD 1	59

Performance Tasks – Authentic Assessments

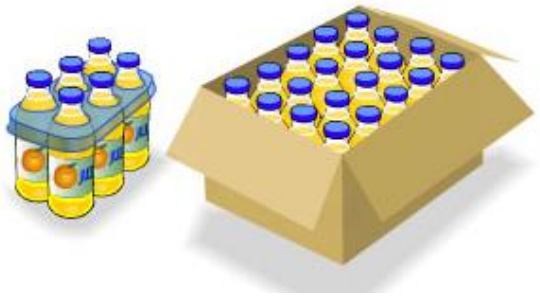
Authentic Assessment #1

Name:_____

Ordering Juice Drinks

Julian makes and sells juice drinks. The juice drinks are sold in six-packs and boxes.

A six-pack has 6 juice drinks and costs $2.
A box has 20 juice drinks and costs $7.



The Friendly Corner Store placed this order:

24 juice drinks packaged in six-packs
200 juice drinks packaged in boxes

Fill in the blanks to complete the order receipt.

Show all work and explain how you arrived at your answer.

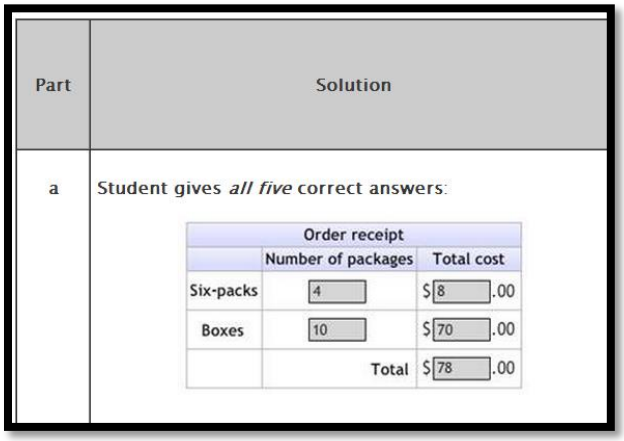
Order Receipt		
	Number of Packages	**Total Cost**
Six Pack		
Boxes		
	Total:	

Performance Task Scoring Rubric: Ordering Juice Drinks

4.NBT.5: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Mathematical Practices: 1 & 2

SOLUTION:



Part	Solution
a	Student gives *all five* correct answers:

Order receipt

	Number of packages	Total cost
Six-packs	4	$8.00
Boxes	10	$70.00
	Total	$78.00

Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command	Level 1: No Command
Student gives all 5 correct answers. Clearly constructs and communicates a complete response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction relationship Response includes an **efficient** and logical progression of steps.	**Student gives all 5 correct answers.** Clearly constructs and communicates a complete response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction • relationship between multiplication and division Response includes a **logical** progression of steps	**Student gives all 4 correct answers.** Constructs and communicates a complete response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction • relationship between multiplication and division Response includes a **logical but incomplete** progression of steps. Minor calculation errors.	**Student gives 3 correct answers.** Constructs and communicates an incomplete response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction • relationship between multiplication and division Response includes an **incomplete or Illogical** progression of steps.	**Student gives less than 3 correct answers.** The student shows no work or justification.

Authentic Assessment #2 – Kipton's Scale

Name:_____

a. Kipton has a digital scale. He puts a marshmallow on the scale and it reads 7.2 grams. How much would you expect 10 marshmallows to weigh? Why?

b. Kipton takes the marshmallows off the scale. He then puts on 10 jellybeans and then scale reads 12.0 grams. How much would you expect 1 jellybean to weigh? Why?

c. Kipton then takes off the jellybeans and puts on 10 brand-new pink erasers. The scale reads 312.4 grams. How much would you expect 1,000 pink erasers to weigh? Why?

Authentic Assessment #2 Scoring Rubric: Kipton's Scale

5.NBT.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.

Mathematical Practices: 2, 6, and 7

SOLUTION:

a. **72 grams**
b. **1.2 grams**
c. **31,240 grams**

Level 5: Distinguished Command	**Level 4: Strong Command**	**Level 3: Moderate Command**	**Level 2: Partial Command**	**Level 1: No Command**
All parts correct Clearly constructs and communicates a complete response based on explanations/reasoning using : • "ten times" or 1/10 relationships • place value • moving right or left across the places Response includes an **efficient** and logical progression of steps.	All parts correct but explanation contains minor errors Clearly constructs and communicates a complete response based on explanations/reasoning using: • "ten times" or 1/10 relationships • place value • moving right or left across the places Response includes a **logical** progression of steps	One part incorrect Constructs and communicates a complete response based on explanations/reasoning using: • "ten times" or 1/10 relationships • place value • moving right or left across the places Response includes a **logical but incomplete** progression of steps. Minor calculation errors.	Two parts incorrect Constructs and communicates an incomplete response based on explanations/reasoning using: • "ten times" or 1/10 relationships • place value • moving right or left across the places Response includes an **incomplete or Illogical** progression of steps.	No parts correct The student shows no work or justification.

Authentic Assessment #3

Name:_____

5th Grade Pizza Fundraiser

Solve and show all work.

A. The fifth grade at your school is selling pizza kits for a fundraiser. There are 112 fifth grade students. Each student has a goal to sell 15 pizza kits. How many pizza kits will fifth grade sell if every student sells 15 pizza kits?

B. Each pizza kits sells for twelve dollars. What is the total, if every student sells fifteen pizza kits?

C. For each pizza kit sold, fifth grade earns three dollars for their fundraiser. How much money will fifth grade earn if every student sells fifteen pizza kits?

Performance Task Scoring Rubric: 5th Grade Pizza Fundraiser

5.NBT.5: Fluently multiply multi-digit whole numbers using the standard algorithm.

Mathematical Practices: 1

SOLUTION: A. 1680 kits B. $ 20,160 C. $ 5,040				
Level 5: Distinguished Command	**Level 4: Strong Command**	**Level 3: Moderate Command**	**Level 2: Partial Command**	**Level 1: No Command**
Student gives all 3 correct answers. Clearly constructs and communicates a complete response based on explanations/reasoning. Solves multi-step unscaffolded word problems involving multiplication and multiplies three-digit by two-digit whole numbers using the standard algorithm. Performs exact and approximate multiplications and divisions by mentally applying place value strategies when appropriate. Response includes an **efficient** and logical progression of steps.	**Student gives all 3 correct answers.** Clearly constructs and communicates a complete response based on explanations/reasoning. Solves two-step unscaffolded word problems involving multiplication and multiplies three-digit by two-digit whole numbers using the standard algorithm. Performs exact and approximate multiplications and divisions by mentally applying place value strategies when appropriate. Response includes a **logical** progression of steps	**Student gives all 2 correct answers.** Constructs and communicates a complete response based on explanations/reasoning. Solves two-step scaffolded word problems involving multiplication of a three-digit by a one-digit whole number. Response includes a **logical but incomplete** progression of steps. Minor calculation errors.	**Student gives 1 correct answers.** Constructs and communicates an incomplete response based on explanations/reasoning . **Solves one-step word problems involving multiplication.** Response includes an **incomplete or Illogical** progression of steps.	**Student gives no correct answers.** The student shows no work or justification.

Authentic Assessment #4 – Stuffed with Pizza

Name:_____

Stuffed with Pizza

Tito and Luis are stuffed with pizza! Tito ate one-fourth of a cheese pizza. Tito ate three-eighths of a pepperoni pizza. Tito ate one-half of a mushroom pizza. Luis ate five-eighths of a cheese pizza. Luis ate the other half of the mushroom pizza. All the pizzas were the same size. Tito says he ate more pizza than Luis because Luis did not eat any pepperoni pizza. Luis says they each ate the same amount of pizza. Who is correct? Show all your mathematical thinking.

Authentic Assessment #4 Scoring Rubric: Stuffed with Pizza

5.NF. 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.NF. 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.

Mathematical Practices: 1, 3, and 6

SOLUTION: Luis is correct because 1/4+3/8+1/2 = 5/8+1/2				
Level 5: Distinguished Command	**Level 4: Strong Command**	**Level 3: Moderate Command**	**Level 2: Partial Command**	**Level 1: No Command**
Clearly constructs and communicates a complete response based on explanations/reasoning using : • Equivalent Fractions and Mixed Numbers • Representation of Fractional Notation • Properties of Operations using Fractions Response includes an **efficient** and logical progression of steps.	Clearly constructs and communicates a complete response based on explanations/reasoning using: • Equivalent Fractions and Mixed Numbers • Representation of Fractional Notation • Properties of Operations using Fractions Response includes a **logical** progression of steps	Constructs and communicates a complete response based on explanations/reasoning using: • Equivalent Fractions and Mixed Numbers • Representation of Fractional Notation • Properties of Operations using Fractions Response includes a **logical but incomplete** progression of steps. Minor calculation errors.	Constructs and communicates an incomplete response based on explanations/reasoning using: • Equivalent Fractions and Mixed Numbers • Representatio n of Fractional Notation • Properties of Operations using Fractions Response includes an **incomplete or Illogical** progression of steps.	The student shows no work or justification.

NJDOE 3rd -5th Grade Mathematics Revisions

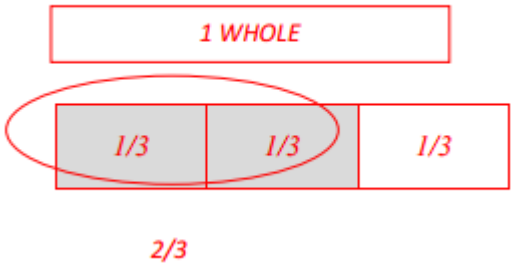
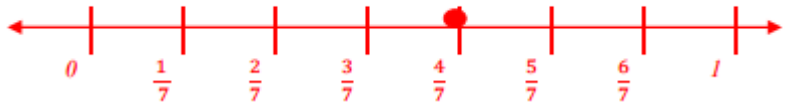
Grade level	*Standard*	*Revised Standard*
3	3.OA.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.	3.OA.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as 5 × 7.
3	3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.	3.OA.2 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 and/or represent a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.
3	3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b	3.NF.1 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. *Ex. b = 3* 
3	3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. b. Represent a fraction a/b on a number line	3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the

	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.	number a/b on the number line. *Ex. a = 4; b = 7* 
3	3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).
4	4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two - column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36),	4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, mm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...
5	5.MD.5b. 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	5.MD.5b 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
5	5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.