Summary of the Year

In Fifth Grade, instructional time should focus on three critical areas:

1. Developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases
2. Extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations
3. Developing understanding of volume

CCSSM, p.33 – Grade 5 Overview

Required Fluency:

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

Fifth Grade Major Emphasis Clusters

Number and Operations in Base Ten
- Understand the place value system.
- Perform operations with multi-digit whole numbers and with decimals to hundredths.

Number and Operations - Fractions
- Use equivalent fractions as a strategy to add and subtract fractions.
- Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Measurement and Data
- Geometric Measurement: understand concepts of volume and relate volume to multiplication and to addition.

Unit Sequence

1st Quarter: Whole Number Place Value & Operations; Volume; Understanding Multiplication & Division of Fractions

Students will build on their work from fourth grade using various strategies based on place value to multiply and divide multi-digit whole numbers. Students will only be scored on four digit by one digit in first quarter. They will continue to use these different strategies (i.e. area model, base ten model, array, etc.) throughout the year to solidify their understanding until the standard algorithm is applied in the fourth quarter. Students will experience finding volume of rectangular prisms and understand concepts related to volume. Notation for finding volume will develop from these experiences. Students will understand the relationship between fractions and division and use multiplicative relationships to solve problems. They will begin by solving *equal sharing* problems with answers that are mixed numbers and then solve problems with answers that are fractions less than 1. Students will represent their solutions with equations, with an emphasis on linking addition and multiplication and reflecting a multiplicative understanding of fractions. After *equal sharing* problems, students will solve *multiple groups* problems where the number of groups is a whole number and the number in each group is a fraction less than 1 or a mixed number. Emphasis should be on student strategies that use multiplicative relationships to solve these problems. Students will then solve open number sentences that focus on the relationship between fractions and whole numbers, for example: 8 x ⅜ =? ? X ¾ = 15 ? X 1 ¼ = 25

2nd Quarter: Place Value & Operations with Decimals

Students will draw on their experiences with place value from grades two through four with whole number patterns and will be able to generalize those patterns in decimal numbers, namely the power of ten. As students work word problems with measurements in the metric system, where the same patterns occur, they begin to appreciate the value and meaning of decimals. Students will continue to develop their fluency with multi-digit multiplication. They continue building their strategies for multi-digit division. Students will add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Continued on next page…

Unit Sequence continued

3rd Quarter: Operations with Fractions

Students will add and subtract fractions and mixed numbers with like and unlike denominators with their understanding of equivalency, visual models, benchmark fractions, estimation, and equations. Students will extend their understanding of multiplication to multiply fractions and mixed numbers (fraction by a whole number or fraction by a fraction). They will extend their understanding of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Students will explain multiplication as resizing by comparing factors of related products and examining whether fractions will increase or decrease when you multiply by a fraction greater than or less than 1. Students will solve real-world problems involving area, multiplication of fractions and mixed numbers, and division with unit fractions. They continue building their strategies for multi-digit multiplication and division, and in 4th quarter, students will solidify fluency and apply the standard algorithm to multi-digit multiplication.

4th Quarter: Operations with Fractions; Geometry & Coordinate Plane

Students will continue to add and subtract fractions and mixed numbers with like and unlike denominators with their understanding of equivalency, visual models, benchmark fractions, estimation, and equations. Students will continue to multiply fractions and mixed numbers (fraction by a whole number or fraction by a fraction) and divide unit fractions by whole numbers and whole numbers by unit fractions. Students will explain multiplication as resizing by comparing factors of related products and examining whether fractions will increase or decrease when you multiply by a fraction greater than or less than 1. Students will solve real-world problems involving area, multiplication of fractions and mixed numbers, and division with unit fractions. Students will solidify fluency and apply the standard algorithm to multi-digit multiplication. Students will graph points on the coordinate grid and use them to solve real-world and mathematical problems. They will evaluate numerical patterns based on given rules and graph the ordered pairs on the coordinate plane. Students will interpret coordinate values in the context of the situation. They will understand the attributes of two-dimensional shapes and categories of shapes and will classify two-dimensional figures based on hierarchies of shapes. Students demonstrate fluency with multi-digit multiplication and will continue building their strategies for multi-digit division.

Standards for Mathematical Practice

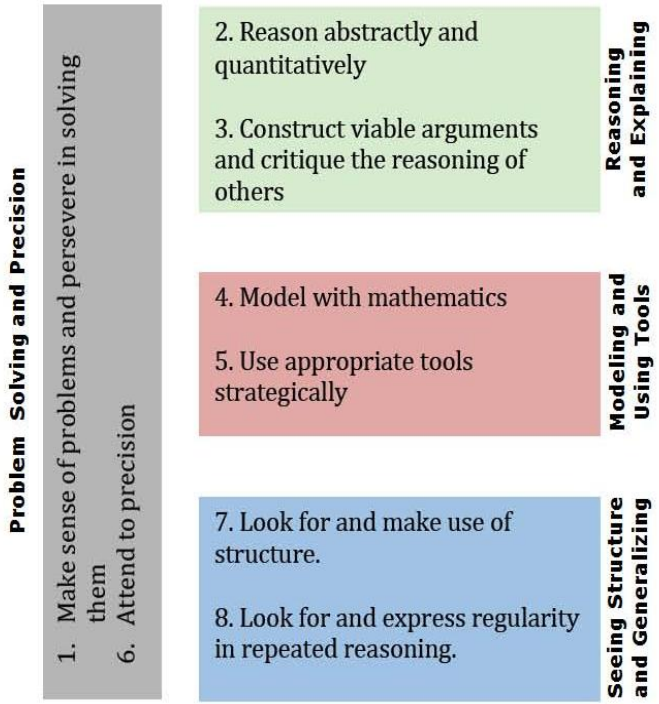
The Standards for Mathematical Practice describe ways that students should engage with the content standards. These practices are essential to understanding and implementing the mathematical subject material. Content standards that begin with the word "understand" are often especially good opportunities to connect the practices to content. (CCSSM p.6-8)

Below you will find the Mathematical Practice Standards and a related student friendly "I can" statement.

Mathematically Proficient Students…

1. Make sense of problems and persevere in solving them.
   - I can find ways to solve the problem and ask "Does this make sense?".
2. Reason abstractly and quantitatively.
   - I can use numbers and words to help me make sense of problems.
3. Construct viable arguments and critique the reasoning of others.
   - I can explain my thinking and consider the mathematical thinking of others.
4. Model with mathematics.
   - I can recognize math in everyday life and use math I know to solve problems.
5. Use appropriate tools strategically.
   - I can use math tools and know when to use them.
6. Attend to precision.
   - I can work carefully, check my work, and be clear when I share my ideas.
7. Look for and make use of structure.
   - I can see and understand how numbers and shapes are organized and put together as parts and wholes.
8. Look for and express regularity in repeated reasoning.
   - I can notice when calculations are repeated. Then, I can find more efficient ways to solve the problem.

Structure for the Standards for Mathematical Practice



The practices have been arranged in pairs to show which may naturally appear together when students are engaged in certain types of tasks or with certain mathematics content. SMP 1 & 6 are overarching in the sense that if students are truly engaged in 'solving' tasks that are 'problems' to them, they will need to make sense of problems and have perseverance, and refine their thinking and their ability to communicate about the mathematics, which is part of attending to precision.

Visit the Mathematical Practices Resources Page for additional classroom resources, explanations, examples, and videos of the practices in action.

Content Emphases by Cluster

The content emphases in the standards at the cluster level are provided because curriculum, instruction, and assessment at each grade must reflect the focus and emphasis of the standards.

- Not all of the content in a given grade is emphasized equally in the standards.
- The list of content standards for each grade is not a flat, one-dimensional checklist.
- Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness.
- Intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.
- Assessments will strongly focus where the standards strongly focus.

Therefore, to make the emphases in the standards more transparent and useful, the clusters have been designated as **Major, Supporting** and **Additional**. Some clusters that are not major emphases in themselves are designed to *support* and strengthen areas of major emphasis, while other clusters that may not connect tightly or explicitly to the major work of the grade are called *additional*.

PARCC Model Content Frameworks for Mathematics p.13-14

Major Clusters Areas of intensive focus, where students need fluent understanding and application of the core concepts *(approximately 70% of instructional time)*	**Supporting Clusters** Rethinking and linking; areas where material is being covered, but in a way that applies to core understandings *(approximately 20% of instructional time)*	**Additional Clusters** Expose students to other subjects, though at a distinct level of depth and intensity *(approximately 10% of instructional time)*
Number and Operations in Base Ten • Understand the place value system. • Perform operations with multi-digit whole numbers and with decimals to hundredths. Number and Operations - Fractions • Use equivalent fractions as a strategy to add and subtract fractions. • Apply and extend previous understandings of multiplication and division to multiply and divide fractions. Measurement and Data • Geometric Measurement: understand concepts of volume and relate volume to multiplication and to addition.	Measurement and Data • Represent and interpret data. *(The standard in this cluster provides an opportunity for solving real-world problems with operations on fractions, connecting directly to both Number and Operations – Fractions clusters.)* • Convert like measurement units within a given measurement system. *(Work in these standards supports computation with decimals. For example, converting 5 cm to .05m involves computation with decimals to hundredths.)*	Operations and Algebraic Thinking • Write and interpret numerical expressions. • Analyze patterns and relationships. Geometry • Graph points on the coordinate plane to solve real-world and mathematical problems. • Classify two-dimensional figures into categories based on their properties.

For further information regarding the content emphases by cluster visit: www.engageny.org/resource/math-content-emphases/

Year Long Pacing of the Common Core State Standards (p. 1 of 6)

Shading indicates standards for instruction each quarter

Approximate Instructional time distribution: 70% to **Major Clusters** 20 % to **Supporting Clusters** 10% to **Additional Clusters**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Operations and Algebraic Thinking				
Write and interpret numerical expressions.				
These standards will not be taught in isolated lessons, but will be addressed during Number Talks and Problem Solving discussion and notation.				
5.OA.1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.				
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.*				
Analyze patterns and relationships.				
5.OA.3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*				

Year Long Pacing of the Common Core State Standards (p. 2 of 6)

Shading indicates standards for instruction each quarter

Approximate Instructional time distribution: 70% to **Major Clusters** 20 % to **Supporting Clusters** 10% to **Additional Clusters**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Number and Operations in Base Ten				
Understand the place value system.				
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.				
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.				
5.NBT.3. Read, write, and compare decimals to thousandths.				
a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).				
b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.				
5.NBT.4. Use place value understanding to round decimals to any place.				
Perform operations with multi-digit whole numbers and with decimals to hundredths.				
5.NBT.5. Fluently multiply multi-digit whole numbers using the standard algorithm.				
Minimum expectation: Standard algorithm is not expected to be applied until 4th quarter.				
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.	4 digit by 1 digit			
5.NBT.7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.				

Year Long Pacing of the Common Core State Standards (p. 3 of 6)

Shading indicates standards for instruction each quarter

Approximate Instructional time distribution: 70% to **Major Clusters** 20 % to **Supporting Clusters** 10% to **Additional Clusters**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Number and Operations - Fractions (continued on next page)				
Use equivalent fractions as a strategy to add and subtract fractions.				
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.*			■	■
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.				
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?*	■			
5.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.				
a. Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)*			■	■
b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	■		■	■

Year Long Pacing of the Common Core State Standards (p. 4 of 6)

Shading indicates standards for instruction each quarter

Approximate Instructional time distribution: 70% to **Major Clusters** 20 % to **Supporting Clusters** 10% to **Additional Clusters**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Number and Operations - Fractions				
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.				
5.NF.5. Interpret multiplication as scaling (resizing), by:				
a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.				
b. Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.				
5.NF.6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.				
5.NF.7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.				
a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.*				
b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.*				
c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*				

Year Long Pacing of the Common Core State Standards (p. 5 of 6)

Shading indicates standards for instruction each quarter

Approximate Instructional time distribution: 70% to **Major Clusters** 20 % to **Supporting Clusters** 10% to **Additional Clusters**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Measurement and Data				
Convert like measurement units within a given measurement system.				
5.MD.1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.				
Represent and interpret data.				
5.MD.2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*				
Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.				
5.MD.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.				
a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.				
b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.				
5.MD.4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.				
5.MD.5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.				
a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.				
b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ 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.				
c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.				

Year Long Pacing of the Common Core State Standards (p. 6 of 6)

Shading indicates standards for instruction each quarter

Approximate Instructional time distribution: 70% to **Major Clusters** 20 % to **Supporting Clusters** 10% to **Additional Clusters**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Geometry				
Graph points on the coordinate plane to solve real-world and mathematical problems.				
5.G.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).				
5.G.2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.				
Classify two-dimensional figures into categories based on their properties.				
5.G.3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*				
5.G.4. Classify two-dimensional figures in a hierarchy based on properties.				