

Gateway Lab Charter School

Modification Report

Rationale for Adoption of Math in Focus 2020 Program

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1. The special instructional needs of the Gateway Lab School Community where 51% of student body has an IEP or 504 educational support (220/2021 school year). Students need concrete and visual instructional based educational aids and pedagogy to bridge the gap toward mathematical concepts and abstract thinking.
2. Math in Focus' stated instructional goals: "to ensure children's ability to achieve mastery of mathematics concepts, computational skills, problem-solving skills, and application of mathematics activities in daily life."
3. Math in Focus' research-based approach to their program from educational researchers including: Piaget, Dr. Jerome Bruner, and Richard Skemp. These researchers lend to the concrete-visual-abstract progression of the MIF program geared to child development at various stages, so germane to the GLS community of learners:

of "The most significant theory, which has been adopted for writing the Math in Focus series, is Bruner's theory on the representations of mathematical concepts according to different levels of children's thinking. The representation based on the concrete, pictorial, and abstract (CPA) is adopted in the whole series. Bruner's theory parallels Piaget's stages of development theory. Children at a certain age, in general, can only conceptualize mathematical concepts depending on their level of mental development. In this aspect, Bruner's idea was to emphasize concrete representation, which is in accord with some children's ability to understand mathematical concepts at the early stages. Research shows that children cannot depend too much on concrete representation, as they need to move on to the next level so that they can conceptualize abstract (complicated) situations using pictorial representation"

4. The 2020 Revised Edition of MIF is CCSS (Common Core State Standards) aligned in every chapter and activity in every grade. Further, it is aligned to the Essential Practices of Math Instruction from the CCSS and NCTM (National Council of Teachers of Mathematics). Artifacts of CCSS supplied.

Notes:

https://www.hmhco.com/~media/sites/home/education/global/pdf/white-papers/mathematics/elementary/math-in-focus/mif_underpinning_concept_lr.pdf

Math in Focus 2020 Comprehensive Alignment to CCSS: Grade 3

Key: Major ■, Supporting □, or Additional ○
Foundational ▲

Chapter 1: Numbers to 10,000

- 1.1 Counting to 10,000
- 1.2 Place Value
- 1.3 Comparing and Ordering Numbers
- 1.4 Rounding Numbers to the Nearest Ten.....3.NBT.A.1 ○
- 1.5 Rounding Numbers to the Nearest Hundred.....3.NBT.A.1 ○

Chapter 2: Addition Within 10,000

- 2.1 Addition Patterns.....3.OA.D.9 ■
- 2.2 Mental Addition.....3.OA.D.9 ▲
- 2.3 Adding Fluently Within 1,000.....3.NBT.A.2 ○
- 2.4 Adding Without Regrouping.....3.OA.D.8 ■
- 2.5 Adding with Regrouping.....3.OA.D.8 ■
- 2.6 Real-World Problems: Addition3.OA.D.8 ■, 3.NBT.A.1 ○

Chapter 3: Subtraction Within 10,000

- 3.1 Mental Subtraction.....3.OA.D.9 ▲
- 3.2 Subtracting Fluently Within 1,000.....3.NBT.A.2 ○
- 3.3 Subtracting Without Regrouping.....3.OA.D.8 ■
- 3.4 Subtracting with Regrouping.....3.OA.D.8 ■
- 3.5 Real-World Problems: Subtraction.....3.OA.D.8 ■, 3.NBT.A.1 ○

* Foundational standards are developed to mastery within each section as other concepts and skills are explored. These foundational standards may not be identified in the Teacher Edition but will be added in the future.

Chapter 4: Multiplication Tables

4.1 Multiplying by 6.....	3.OA.A.1 ■, 3.OA.A.4 ■, 3.OA.B.5 ■, 3.OA.C.7 ■
4.2 Multiplying by 7.....	3.OA.A.1 ■, 3.OA.A.4 ■, 3.OA.B.5 ■, 3.OA.C.7 ■
4.3 Multiplying by 8.....	3.OA.A.1 ■, 3.OA.A.4 ■, 3.OA.B.5 ■, 3.OA.C.7 ■
4.4 Multiplying by 9.....	3.OA.A.1 ■, 3.OA.A.4 ■, 3.OA.B.5 ■, 3.OA.C.7 ■
4.5 Multiplying by 11.....	3.OA.B.5 ■
4.6 Multiplying by 12.....	3.OA.B.5 ■
4.7 Multiplication Patterns.....	3.OA.D.9 ■
4.8 Dividing Using Multiplication Facts.....	3.OA.A.2 ■, 3.OA.A.4 ■, 3.OA.B.6 ■, 3.OA.C.7 ■

Chapter 5: Multiplication

5.1 Multiplying Using Models.....	3.OA.A.3 ■
5.2 Multiplying Without Regrouping.....	3.NBT.A.3 ○
5.3 Multiplying with Regrouping.....	3.NBT.A.3 ○

Chapter 6: Using Bar Models: The Four Operations

6.1 Real-World Problems: Multiplication.....	3.OA.A.3 ■
6.2 Real-World Problems: Division.....	3.OA.A.3 ■
6.3 Real-World Problems: Four Operations.....	3.OA.D.8 ■

Chapter 7: Fractions

7.1 Understanding Unit Fractions.....	3.NF.A.1 ■, 3.G.A.2 □
7.2 Fractions as Part of a Whole.....	3.NF.A.1 ■, 3.NF.A.2 ■, 3.NF.A.2a ■, 3.NF.A.2b ■, 3.NF.A.3c ■
7.3 Fractions as Part of a Set.....	3.G.A.2 □
7.4 Understanding Equivalent Fractions.....	3.NF.A.2 ■, 3.NF.A.2a ■, 3.NF.A.2b ■, 3.NF.A.3 ■, 3.NF.A.3a ■, 3.NF.A.3b ■
7.5 Comparing Fractions.....	3.NF.A.3d ■, 3.G.A.2 □

Chapter 8: Measurement

8.1 Mass: Kilograms and Grams.....	3.MD.A.2 ■
8.2 Liquid Volume: Liters and Milliliters.....	3.MD.A.2 ■
8.3 Real-World Problems: One-Step Problems.....	3.MD.A.2 ■

Chapter 9: Area and Perimeter

9.1 Area.....	3.MD.C.5 ■, 3.MD.C.5a ■, 3.MD.C.5b ■, 3.MD.C.6 ■
9.2 Square Units (cm ² and in ²).....	3.MD.C.6 ■
9.3 Square Units (m ² and ft ²).....	3.MD.C.6 ■
9.4 Perimeter and Area.....	3.MD.C.6 ■, 3.MD.C.7 ■, 3.MD.C.7a ■, 3.MD.C.7b ■, 3.MD.C.7c ■, 3.MD.C.7d ■, 3.MD.D.8 ○
9.5 More Perimeter.....	3.MD.D.8 ○

Chapter 10: Time

10.1 Telling Time.....	3.MD.A.1 ■
10.2 Converting Hours and Minutes.....	3.MD.A.1 ▲
10.3 Elapsed Time.....	3.MD.A.1 ■

Chapter 11: Graphs and Line Plots












11.1 Making Picture Graphs with Scales.....	3.MD.B.3 □
11.2 Making Bar Graphs with Scales.....	3.MD.B.3 □
11.3 Reading and Interpreting Bar Graphs.....	3.MD.B.3 □
11.4 Line Plots and Estimation.....	3.MD.B.4 □

Chapter 12: Angles, Lines, and Two-Dimensional Figures

12.1 Introducing Angles	
12.2 Introducing Perpendicular and Parallel Lines	
12.3 Polygons.....	3.G.A.1 □

CCSS	CCSS Descriptor	Section Number
3.OA.A.1 ■	Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each.	4.1, 4.2, 4.3, 4.4
3.OA.A.2 ■	Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ 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.	4.8
3.OA.A.3 ■	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	5.1, 6.1, 6.2
3.OA.A.4 ■	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.	4.1, 4.2, 4.3, 4.4, 4.8
3.OA.B.5 ■	Apply properties of operations as strategies to multiply and divide.	4.1, 4.2, 4.3, 4.4, 4.5, 4.6
3.OA.B.6 ■	Understand division as an unknown-factor problem.	4.8
3.OA.C.7 ■	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	4.1, 4.2, 4.3, 4.4, 4.8
3.OA.D.8 ■	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	2.4, 2.5, 2.6, 3.3, 3.4, 3.5, 6.3
3.OA.D.9 ■	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.	2.1, 2.2▲, 3.1▲, 4.7
3.NBT.A.1 ○	Use place value understanding to round whole numbers to the nearest 10 or 100.	1.4, 1.5, 2.6, 3.5
3.NBT.A.2 ○	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	2.3, 3.2
3.NBT.A.3 ○	Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.	5.2, 5.3
3.NF.A.1 ■	Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts;	7.1, 7.2

	understand a fraction a/b as the quantity formed by a parts of size $1/b$.	
3.NF.A.2 ■	Understand a fraction as a number on the number line; represent fractions on a number line diagram.	7.2, 7.4
3.NF.A.2a ■	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.	7.2, 7.4
3.NF.A.2b ■	Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.	7.2, 7.4
3.NF.A.3 ■	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.	7.4
3.NF.A.3a ■	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	7.4
3.NF.A.3b ■	Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$, $4/6 = 2/3$. Explain why the fractions are equivalent, e.g., by using a visual fraction model.	7.4
3.NF.A.3c ■	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.	7.2
3.NF.A.3d ■	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.	7.5
3.MD.A.1 ■	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	10.1, 10.2 ▲, 10.3
3.MD.A.2 ■	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	8.1, 8.2, 8.3
3.MD.B.3 □	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.	11.1, 11.2, 11.3
3.MD.B.4 □	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.	11.4
3.MD.C.5 ■	Recognize area as an attribute of plane figures and understand concepts of area measurement.	9.1

3.MD.C.5a 	A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.	9.1
3.MD.C.5b 	A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.	9.1
3.MD.C.6 	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	9.1, 9.2, 9.3, 9.4
3.MD.C.7 	Relate area to the operations of multiplication and addition.	9.4
3.MD.C.7a 	Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.	9.4
3.MD.C.7b 	Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.	9.4
3.MD.C.7c 	Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.	9.4
3.MD.C.7d 	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	9.4
3.MD.D.8 	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	9.4
3.G.A.1 	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	12.3
3.G.A.2 	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.	7.1, 7.3, 7.5

Math in Focus 2020 Comprehensive Alignment to CCSS: Grade 4

Key: Major ■, Supporting □, or Additional ○
Foundational ▲

Chapter 1: Working with Whole Numbers

- 1.1 Numbers to 100,000.....4.NBT.A.1 ■, 4.NBT.A.2 ■
- 1.2 Numbers to 1,000,000.....4.NBT.A.1 ■, 4.NBT.A.2 ■
- 1.3 Comparing and Ordering Numbers.....4.NBT.A.2 ■, 4.OA.C.5 ○
- 1.4 Adding and Subtracting Multi-Digit Numbers.....4.NBT.B.4 ■
- 1.5 Rounding and Estimating.....4.NBT.A.3 ■
- 1.6 Real-World Problems: Addition and Subtraction.....4.OA.A.3 ■

Chapter 2: Multiplication and Division

- 2.1 Multiplying by a 1-Digit or 2-Digit Number.....4.NBT.B.5 ■
- 2.2 Quotient and Remainder.....4.NBT.B.6 ■
- 2.3 Dividing by a 1-Digit Number.....4.NBT.B.6 ■
- 2.4 Real-World Problems: Multiplication and Division.....4.OA.A.2 ■, 4.OA.A.3 ■
- 2.5 Factors.....4.OA.B.4 □
- 2.6 Multiples.....4.OA.A.1 ■, 4.OA.B.4 □
- 2.7 Real-World Problems: The Four Operations.....4.OA.A.3 ■

* Foundational standards are developed to mastery within each section as other concepts and skills are explored. These foundational standards may not be identified in the Teacher Edition but will be added in the future.

Chapter 3: Fractions and Mixed Numbers

3.1 Equivalent Fractions.....	4.NF.A.1 ■
3.2 Comparing and Ordering Fractions.....	4.NF.A.2 ■
3.3 Adding and Subtracting Like Fractions.....	4.NF.B.3 ■, 4.NF.B.3a ■
3.4 Mixed Numbers.....	4.NF.B.3 ■, 4.NF.B.3b ■
3.5 Improper Fractions.....	4.NF.B.3 ■, 4.NF.B.3b ■
3.6 Renaming Improper Fractions and Mixed Numbers.....	4.NF.B.3b ■
3.7 Adding and Subtracting Mixed Numbers.....	4.NF.B.3 ■, 4.NF.B.3c ■
3.8 Multiplying Fractions and Whole Numbers.....	4.NF.B.4 ■, 4.NF.B.4a ■, 4.NF.B.4b ■
3.9 Real-World Problems: Fractions.....	4.NF.B.3d ■, 4.NF.B.4c ■, 4.MD.B.4 □

Chapter 4: Decimals

4.1 Understanding Tenths.....	4.NF.C.6 ■
4.2 Understanding Hundredths.....	4.NF.C.6 ■
4.3 Comparing and Ordering Decimals.....	4.NF.C.7 ■
4.4 Rounding Decimals.....	4.NBT.A.3▲
4.5 Fractions and Decimals.....	4.NF.C.5 ■, 4.NF.C.6 ■

Chapter 5: Conversion of Measurements

5.1 Length in Customary Units.....	4.MD.A.1 □
5.2 Weight and Volume in Customary Units.....	4.MD.A.1 □
5.3 Real-World Problems: Customary Units of Measure.....	4.MD.A.2 □
5.4 Length in Metric Units.....	4.MD.A.1 □
5.5 Mass and Volume in Metric Units.....	4.MD.A.1 □
5.6 Real-World Problems: Metric Units of Measure.....	4.MD.A.2 □
5.7 Time.....	4.MD.A.1 □

Chapter 6: Area and Perimeter

- 6.1 Area and Unknown Sides.....4.MD.A.3 □
- 6.2 Composite Figures.....4.MD.A.3 □
- 6.3 Real-World Problems: Area and Perimeter.....4.MD.A.3 □

Chapter 7: Angle and Line Segments

- 7.1 Understanding and Measuring Angles.....4.MD.C.5 ○, 4.MD.C.6 ○
- 7.2 Drawing Angles to 180° 4.G.A.1 ○, 4.MD.C.6 ○
- 7.3 Turns and Angle Measures.....4.MD.C.5a ○, 4.MD.C.5b ○
- 7.4 Finding Unknown Angles.....4.MD.C.7 ○
- 7.5 Drawing Perpendicular and Parallel Line Segments.....4.G.A.1 ○

Chapter 8: Polygons and Symmetry

- 8.1 Classifying Triangles.....4.G.A.2 ○
- 8.2 Classifying Polygons.....4.G.A.2 ○
- 8.3 Symmetric Shapes and Lines of Symmetry.....4.G.A.3 ○
- 8.4 Making Symmetric Shapes and Patterns.....4.G.A.3 ○

Chapter 9: Tables and Line Graphs

- 9.1 Making and Interpreting a Table
- 9.2 Using a Table.....4.NBT.B.4 ▲
- 9.3 Line Graphs

CCSS	CCSS Descriptor	Section Number
4.OA.A.1 ■	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	2.6
4.OA.A.2 ■	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	2.4
4.OA.A.3 ■	Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	1.6, 2.4, 2.7
4.OA.B.4 □	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	2.5, 2.6
4.OA.C.5 ○	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.	1.3
4.NBT.A.1 ■	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.	1.1, 1.2
4.NBT.A.2 ■	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	1.1, 1.2, 1.3
4.NBT.A.3 ■	Use place value understanding to round multi-digit whole numbers to any place.	1.5, 4.4▲
4.NBT.B.4 ■	Fluently add and subtract multi-digit whole numbers using the standard algorithm.	1.4, 9.2▲
4.NBT.B.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.	2.1
4.NBT.B.6 ■	Find whole-number quotients and remainders with up to four-digit dividends and one-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.	2.2, 2.3

4.NF.A.1 ■	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	3.1
4.NF.A.2 ■	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.	3.2
4.NF.B.3 ■	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.	3.3, 3.4, 3.5, 3.7
4.NF.B.3a ■	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	3.3
4.NF.B.3b ■	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.	3.4, 3.5, 3.6
4.NF.B.3c ■	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.	3.7
4.NF.B.3d ■	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	3.9
4.NF.B.4 ■	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number	3.8
4.NF.B.4a ■	Understand a fraction a/b as a multiple of $1/b$.	3.8
4.NF.B.4b ■	Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number.	3.8
4.NF.B.4c ■	Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.	3.9
4.NF.C.5 ■	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.	4.5
4.NF.C.6 ■	Use decimal notation for fractions with denominators 10 or 100.	4.1, 4.2, 4.5
4.NF.C.7 ■	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.	4.3

4.MD.A.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.	5.1, 5.2, 5.4, 5.5, 5.7
4.MD.A.2 □	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	5.3, 5.6
4.MD.A.3 □	Apply the area and perimeter formulas for rectangles in real world and mathematical problems.	6.1, 6.2, 6.3
4.MD.B.4 □	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.	3.9
4.MD.C.5 ○	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.	7.1
4.MD.C.5a ○	An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a "one-degree angle," and can be used to measure angles.	7.3
4.MD.C.5b ○	An angle that turns through n one-degree angles is said to have an angle measure of n degrees.	7.3
4.MD.C.6 ○	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	7.1, 7.2
4.MD.C.7 ○	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	7.4
4.G.A.1 ○	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	7.2, 7.5
4.G.A.2 ○	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	8.1, 8.2
4.G.A.3 ○	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	8.3, 8.4

Math in Focus 2020 Comprehensive Alignment to CCSS: Grade 5

Key: Major ■, Supporting □, or Additional ○
Foundational ▲

Chapter 1: Whole Numbers and the Four Operations

- 1.1 Numbers to 10,000,000.....5.NBT.A.1 ■
- 1.2 Multiplying by Tens, Hundreds, and Powers of Tens.....5.NBT.A.1 ■, 5.NBT.A.2 ■
- 1.3 Dividing by Tens, Hundreds, or Thousands.....5.NBT.A.1 ■, 5.NBT.A.2 ■
- 1.4 Multiplying and Dividing by 2-Digit Numbers Fluently.....5.NBT.B.5 ■, 5.NBT.B.6 ■
- 1.5 Order of Operations.....5.OA.A.1 ○, 5.OA.A.2 ○
- 1.6 Real-World Problems: Four Operations of Whole Numbers.....5.NBT.B.5 ▲, 5.NBT.B.6 ▲

Chapter 2: Fractions and Mixed Numbers

- 2.1 Fractions, Mixed Numbers, and Division Expressions.....5.NF.B.3 ■
- 2.2 Adding Unlike Fractions and Mixed Numbers.....5.NF.A.1 ■
- 2.3 Subtracting Unlike Fractions and Mixed Numbers.....5.NF.A.1 ■
- 2.4 Real-World Problems: Fractions and Mixed Numbers.....5.NF.A.2 ■

Chapter 3: Multiplying and Dividing Fractions and Mixed Numbers

- 3.1 Multiplying Fractions and Whole Numbers.....5.NF.B.4 ■, 5.NF.B.4a ■, 5.NF.B.5b ■
- 3.2 Multiplying Proper Fractions.....5.NF.B.4 ▲, 5.NF.B.4a ▲
- 3.3 Real-World Problems: Multiplying Proper Fractions.....5.NF.B.6 ■
- 3.4 Multiplying Improper Fractions.....5.NF.B.4b ■
- 3.5 Multiplying Mixed Numbers and Whole Numbers.....5.NF.B.4b ■, 5.NF.B.5 ■, 5.NF.B.5a ■
- 3.6 Real-World Problems: Multiplying Mixed Numbers.....5.NF.B.6 ■

*Foundational standards are developed to mastery within each section as other concepts and skills are explored. These foundational standards may not be identified in the Teacher Edition but will be added in the future.

3.7 Dividing Fractions and Whole Numbers.....	5.NF.B.7 ■, 5.NF.B.7a ■, 5.NF.B.7b ■
3.8 Real-World Problems: Multiplying and Dividing with Fractions.....	5.NF.B.7c ■

Chapter 4: Decimals

4.1 Understanding Thousandths.....	5.NBT.A.3 ■, 5.NBT.A.3a ■
4.2 Comparing, Ordering, and Rounding Decimals	5.NBT.A.3b ■, 5.NBT.A.4 ■
4.3 Decimals, Fractions, and Mixed Numbers.....	5.NBT.A.3 ▲, 5.NBT.A.3a ▲

Chapter 5: Four Operations of Decimals

5.1 Adding Decimals.....	5.NBT.B.7 ■
5.2 Subtracting Decimals.....	5.NBT.B.7 ■
5.3 Multiplying Decimals.....	5.NBT.B.7 ■
5.4 Multiplying Decimals by Tens, Hundreds, Thousands, and Powers of Tens.....	5.NBT.B.7 ■, 5.NBT.A.2 ■
5.5 Dividing Decimals.....	5.NBT.B.7 ■
5.6 Dividing Decimals by Tens, Hundreds, and Thousands.....	5.NBT.A.2 ■, 5.NBT.B.7 ■
5.7 Estimating Decimals	5.NBT.B.7 ■
5.8 Converting Metric Units.....	5.MD.A.1 □
5.9 Real-World Problems: Decimals.....	5.NBT.B.7 ■

Chapter 6: Volume

6.1 Building Solids Using Unit Cubes.....	5.MD.C.3 ■, 5.MD.C.3a ■
6.2 Understanding and Measuring Volume.....	5.MD.C.3b ■, 5.MD.C.4 ■
6.3 Real-World Problems: Volume of Rectangular Prisms.....	5.MD.C.5 ■, 5.MD.C.5a ■, 5.MD.C.5b ■
6.4 Real-World Problems: Volume of Composite Solids.....	5.MD.C.5c ■

Chapter 7: Line Plots and the Coordinate Plane

- 7.1 Making and Interpreting Line Plots.....5.MD.B.2 □
- 7.2 Graphing on a Coordinate Plane.....5.G.A.1 ○, 5.G.A.2 ○
- 7.3 Number Pattern and Graphs.....5.OA.B.3 ○

Chapter 8: Polygons

- 8.1 Classifying Triangles.....5.G.B.3 ○
- 8.2 Classifying Polygons.....5.G.B.4 ○

Chapter 9: Ratio

- 9.1 Finding Ratio
- 9.2 Equivalent Ratios
- 9.3 Comparing Three Quantities
- 9.4 Real World Problems: Ratio

Chapter 10: Percent

- 10.1 Percent
- 10.2 Fractions, Decimals, and Percents
- 10.3 Percent of a Quantity.....5.NF.B.4 ▲
- 10.4 Real World Problems: Percent.....5.NF.B.4 ▲

CCSS	CCSS Descriptor	Section Number
5.OA.A.1 ○	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	1.5
5.OA.A.2 ○	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. <i>For example, express the calculation "add 8 and 7, then multiply by 2" as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</i>	1.5
5.OA.B.3 ○	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. <i>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.</i>	7.3
5.NBT.A.1 ■	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	1.1, 1.2, 1.3
5.NBT.A.2 ■	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	1.2, 1.3, 5.4, 5.6
5.NBT.A.3 ■	Read, write, and compare decimals to thousandths.	4.1, 4.3 ▲
5.NBT.A.3a ■	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.	4.1, 4.3 ▲
5.NBT.A.3b ■	Compare two decimals based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	4.2
5.NBT.A.4 ■	Use place value understanding to round decimals to any place.	4.2
5.NBT.B.5 ■	Fluently multiply multi-digit whole numbers using the standard algorithm.	1.4, 1.6 ▲
5.NBT.B.6 ■	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	1.4, 1.6 ▲
5.NBT.B.7 ■	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.9

5.NF.A.1 ■	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{(ad + bc)}{bd}$.)</i>	2.2, 2.3
5.NF.A.2 ■	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$, by observing that $\frac{3}{7} < \frac{1}{2}$.</i>	2.4
5.NF.B.3 ■	Interpret a fraction as division of the numerator by the denominator ($\frac{a}{b} = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <i>For example, interpret $\frac{3}{4}$ as the result of dividing 3 by 4, noting that $\frac{3}{4}$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $\frac{3}{4}$. 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>	2.1
5.NF.B.4 ■	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.	3.1, 3.2▲, 10.3▲, 10.4▲
5.NF.B.4a ■	Interpret the product $(\frac{a}{b}) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. <i>For example, use a visual fraction model to show $(\frac{2}{3}) \times 4 = \frac{8}{3}$, and create a story context for this equation. Do the same with $(\frac{2}{3}) \times (\frac{4}{5}) = \frac{8}{15}$. (In general, $(\frac{a}{b}) \times (\frac{c}{d}) = \frac{(ac)}{(bd)}$.)</i>	3.1, 3.2▲
5.NF.B.4b ■	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	3.4, 3.5
5.NF.B.5 ■	Interpret multiplication as scaling (resizing), by:	3.5
5.NF.B.5a ■	Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.	3.5
5.NF.B.5b ■	Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $\frac{a}{b} = \frac{(n \times a)}{(n \times b)}$ to the effect of multiplying $\frac{a}{b}$ by 1.	3.1
5.NF.B.6 ■	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	3.3, 3.6
5.NF.B.7 ■	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.	3.7
5.NF.B.7a ■	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. <i>For example, create a story context for $(\frac{1}{3}) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(\frac{1}{3}) \div 4 = \frac{1}{12}$ because $(\frac{1}{12}) \times 4 = \frac{1}{3}$.</i>	3.7

5.NF.B.7b ■	Interpret division of a whole number by a unit fraction, and compute such quotients. <i>For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.</i>	3.7
5.NF.B.7c ■	Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. <i>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?</i>	3.8
5.MD.A.1 □	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	5.8
5.MD.B.2 □	Make a line plot to display a data set of measurements in fractions of a unit ($1/2$, $1/4$, $1/8$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>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.</i>	7.1
5.MD.C.3 ■	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.	6.1
5.MD.C.3a ■	A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.	6.1
5.MD.C.3b ■	A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.	6.2
5.MD.C.4 ■	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	6.2
5.MD.C.5 ■	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	6.3
5.MD.C.5a ■	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.	6.3
5.MD.C.5b ■	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.	6.3
5.MD.C.5c ■	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	6.4
5.G.A.1 ○	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel 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	7.2

	the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	
5.G.A.2 ○	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	7.2
5.G.B.3 ○	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.	8.1
5.G.B.4 ○	Classify two-dimensional figures in a hierarchy based on properties.	8.2

Math in Focus 2020 Comprehensive Alignment to CCSS: Course 1

Key: Major ■, Supporting □, or Additional ○

Chapter 1: Whole Numbers, Prime Numbers, and Prime Factorization

- 1.1 Prime Factorization.....6.NS.B.4 ○
- 1.2 Common Factors and Multiples.....6.NS.B.4 ○
- 1.3 Squares and Cubes.....6.EE.A.1 ■

Chapter 2: Number Lines and Negative Numbers

- 2.1 The Number Line.....6.NS.C.6 ■, 6.NS.C.6a ■, 6.NS.C.6c ■, 6.NS.C.7 ■, 6.NS.C.7a ■
- 2.2 Negative Numbers.....6.NS.C.5 ■, 6.NS.C.6 ■, 6.NS.C.6a ■, 6.NS.C.6c ■, 6.NS.C.7 ■, 6.NS.C.7a ■, 6.NS.C.7b ■
- 2.3 Absolute Value.....6.NS.C.7 ■, 6.NS.C.7c ■, 6.NS.C.7d ■

Chapter 3: Fractions and Decimals

- 3.1 Dividing Fractions6.NS.A.1 ■
- 3.2 Real-World Problems: Fractions.....6.NS.A.1 ■
- 3.3 Adding and Subtracting Decimals Fluently.....6.NS.B.3 ○
- 3.4 Multiplying Decimals Fluently.....6.NS.B.3 ○
- 3.5 Dividing Decimals Fluently.....6.NS.B.2 ○, 6.NS.B.3 ○
- 3.6 Real-World Problems: Decimals.....6.NS.B.3 ○

Chapter 4: Ratio

- 4.1 Comparing Two Quantities.....6.RP.A.1 ■, 6.RP.A.3d ■
- 4.2 Equivalent Ratios.....6.RP.A.3a ■
- 4.3 Real-World Problems: Ratios.....6.RP.A.3 ■

Chapter 5: Rates and Speed

5.1 Rates and Unit Rates.....	6.RP.A.2 ■, 6.RP.A.3 ■
5.2 Real-World Problems: Rates and Unit Rates.....	6.RP.A.3 ■, 6.RP.A.3b ■
5.3 Distance and Speed.....	6.RP.A.3 ■, 6.RP.A.3b ■
5.4 Average Speed.....	6.RP.A.3 ■, 6.RP.A.3b ■
5.5 Real-World Problems: Speed and Average Speed.....	6.RP.A.3 ■, 6.RP.A.3b ■

Chapter 6: Percent

6.1 Understanding Percent.....	6.RP.A.3c ■
6.2 Fractions, Decimals, and Percents.....	6.RP.A.3c ■
6.3 Percent of a Quantity.....	6.RP.A.3c ■
6.4 Real-World Problems: Percent.....	6.RP.A.3c ■

Chapter 7: Algebraic Expressions

7.1 Using Letters to Represent Numbers.....	6.EE.A.2 ■, 6.EE.A.2a ■, 6.EE.A.2b ■
7.2 Evaluating Algebraic Expressions.....	6.EE.A.2 ■, 6.EE.A.2c ■
7.3 Simplifying Algebraic Expressions.....	6.EE.A.3 ■, 6.EE.A.4 ■
7.4 Expanding and Factoring Algebraic Expressions.....	6.EE.A.3 ■, 6.EE.A.4 ■
7.5 Real-World Problems: Algebraic Expressions.....	6.EE.B.6 ■

Chapter 8: Equations and Inequalities

8.1 Solving Algebraic Equations.....	6.EE.B.5 ■
8.2 Writing Linear Equations.....	6.EE.B.7 ■, 6.EE.C.9 ■, 6.RP.A.3a ■
8.3 Real-World Problems: Equations.....	6.EE.B.6 ■, 6.EE.B.7 ■
8.4 Solutions of Simple Inequalities.....	6.EE.B.5 ■, 6.EE.B.8 ■
8.5 Real-World Problems: Inequalities.....	6.EE.B.6 ■, 6.EE.B.8 ■

Chapter 9: The Coordinate Plane

- 9.1 Points on a Coordinate Plane.....6.NS.C.6 ■, 6.NS.C.6b ■, 6.NS.C.6c ■, 6.G.A.3 □
- 9.2 Lengths of Line Segments.....6.G.A.3 □
- 9.3 Real-World Problems: Graphing.....6.NS.C.8 ■, 6.EE.A.2a 6.EE.C.9 ■

Chapter 10: Area of Polygons

- 10.1 Area of Triangles.....6.G.A.1 □, 6.EE.A.2c ■
- 10.2 Area of Parallelograms and Trapezoids.....6.G.A.1 □, 6.EE.A.2c ■
- 10.3 Area of Other Polygons.....6.G.A.1 □, 6.EE.A.2c ■

Chapter 11: Surface Area and Volume of Solids

- 11.1 Prisms and Pyramids.....6.G.A.4 □
- 11.2 Surface Area of Solids.....6.G.A.4 □, 6.EE.A.2c ■
- 11.3 Volume of Rectangular Prisms.....6.G.A.2 □, 6.EE.A.2c ■
- 11.4 Real-World Problems: Surface Area and Volume.....6.G.A.2 □, 6.G.A.4 □, 6.EE.A.2c ■

Chapter 12: Introduction to Statistics

- 12.1 Collecting and Tabulating Data.....6.SP.A.1 ○, 6.SP.B.5a ○, 6.SP.B.5b ○
- 12.2 Dot Plots.....6.SP.A.2 ○, 6.SP.B.4 ○
- 12.3 Histograms.....6.SP.B.4 ○

Chapter 13: Measures of Central Tendency and Variability

- 13.1 Mean.....6.SP.A.1 ○, 6.SP.A.3 ○, 6.SP.B.5a ○, 6.SP.B.5c ○
- 13.2 Median.....6.SP.A.2 ○, 6.SP.A.3 ○, 6.SP.B.5a ○, 6.SP.B.5c ○
- 13.3 Mode.....6.SP.A.2 ○, 6.SP.A.3 ○, 6.SP.B.5a ○
- 13.4 Interpreting Quartiles and Interquartile Range.....6.SP.A.2 ○, 6.SP.B.5c ○
- 13.5 Box Plots and Mean Absolute Deviation.....6.SP.A.2 ○, 6.SP.B.4 ○, 6.SP.B.5c ○
- 13.6 Real-World Problems: Measures of Central Tendency and Variability.....6.SP.A.3 ○, 6.SP.B.5d ○

CCSS	CCSS Descriptor	Section Number
6.RP.A.1 ■	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <i>For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."</i>	4.1
6.RP.A.2 ■	Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. <i>For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $\frac{3}{4}$ cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."</i>	5.1
6.RP.A.3 ■	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	4.3, 5.1, 5.2, 5.3, 5.4, 5.5
6.RP.A.3a ■	Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	4.2, 8.2
6.RP.A.3b ■	Solve unit rate problems including those involving unit pricing and constant speed. <i>For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?</i>	5.2, 5.3, 5.4, 5.5
6.RP.A.3c ■	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole, given a part and the percent.	6.1, 6.2, 6.3, 6.4
6.RP.A.3d ■	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	4.1
6.NS.A.1 ■	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, create a story context for $(\frac{2}{3}) \div (\frac{3}{4})$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(\frac{2}{3}) \div (\frac{3}{4}) = \frac{8}{9}$ because $\frac{3}{4}$ of $\frac{8}{9}$ is $\frac{2}{3}$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally? How many $\frac{3}{4}$-cup servings are in $\frac{2}{3}$ of a cup of yogurt? How wide is a rectangular strip of land with length $\frac{3}{4}$ mi and area $\frac{1}{2}$ square mi?</i>	3.1, 3.2
6.NS.B.2 ○	Fluently divide multi-digit numbers using the standard algorithm.	3.5
6.NS.B.3 ○	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	3.3, 3.4, 3.5, 3.6
6.NS.B.4 ○	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. <i>For example, express $36 + 8$ as $4(9 + 2)$.</i>	1.1, 1.2
6.NS.C.5 ■	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	2.2

6.NS.C.6 ■	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates	2.1, 2.2, 9.1
6.NS.C.6a ■	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.	2.1, 2.2
6.NS.C.6b ■	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	9.1
6.NS.C.6c ■	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	2.1, 2.2, 9.1
6.NS.C.7 ■	Understand ordering and absolute value of rational numbers.	2.1, 2.2, 2.3
6.NS.C.7a ■	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.</i>	2.1, 2.2
6.NS.C.7b ■	Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</i>	2.2
6.NS.C.7c ■	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i>	2.3
6.NS.C.7d ■	Distinguish comparisons of absolute value from statements about order. <i>For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.</i>	2.3
6.NS.C.8 ■	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	9.3
6.EE.A.1 ■	Write and evaluate numerical expressions involving whole-number exponents.	1.3
6.EE.A.2 ■	Write, read, and evaluate expressions in which letters stand for numbers.	7.1, 7.2
6.EE.A.2a ■	Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation "Subtract y from 5" as $5 - y$.</i>	7.1
6.EE.A.2b ■	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.</i>	7.1

6.EE.A.2c ■	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). <i>For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.</i>	7.2, 9.3, 10.1, 10.2, 10.3, 11.2, 11.3, 11.4
6.EE.A.3 ■	Apply the properties of operations to generate equivalent expressions. <i>For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.</i>	7.3, 7.4
6.EE.A.4 ■	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). <i>For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.</i>	7.3, 7.4
6.EE.B.5 ■	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	8.1, 8.4
6.EE.B.6 ■	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	7.5, 8.3, 8.5
6.EE.B.7 ■	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.	8.2, 8.3
6.EE.B.8 ■	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	8.4, 8.5
6.EE.C.9 ■	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. <i>For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.</i>	8.2, 9.3
6.G.A.1 □	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	10.1, 10.2, 10.3
6.G.A.2 □	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	11.3, 11.4
6.G.A.3 □	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	9.1, 9.2

6.G.A.4 □	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	11.1, 11.2, 11.4
6.SP.A.1 ○	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. <i>For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.</i>	12.1
6.SP.A.2 ○	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	12.2, 13.1, 13.2, 13.3, 13.4, 13.5
6.SP.A.3 ○	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	13.1, 13.2, 13.3, 13.6
6.SP.B.4 ○	Display numerical data in plots on a number line, including dot plots, histograms, and box plots	12.2, 12.3, 13.5
6.SP.B.5 ○	Summarize numerical data sets in relation to their context, such as by:	
6.SP.B.5a ○	Reporting the number of observations.	12.1, 13.1, 13.2, 13.3
6.SP.B.5b ○	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	12.1
6.SP.B.5c ○	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	13.1, 13.2, 13.4, 13.5
6.SP.B.5d ○	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	13.6

Math in Focus 2020 Comprehensive Alignment to CCSS: Course 2

Key: Major ■, Supporting □, or Additional ○

Chapter 1: Rational Numbers

1.1 Representing Rational Numbers on a Number Line.....	7.NS.A.1 ■, 7.NS.A.2b ■
1.2 Writing Rational Numbers as Decimals.....	7.NS.A.2d ■
1.3 Adding Integers.....	7.NS.A.1a ■, 7.NS.A.1b ■, 7.NS.A.1d ■
1.4 Subtracting Integers.....	7.NS.A.1c ■, 7.NS.A.1d ■
1.5 Multiplying and Dividing Integers.....	7.NS.A.2a ■, 7.NS.A.2b ■
1.6 Order of Operations with Integers.....	7.NS.A.3 ■, 7.EE.B.3 ■
1.7 Operations with Fractions and Mixed Numbers.....	7.NS.A.1 ■, 7.NS.A.2 ■, 7.NS.A.3 ■, 7.EE.B.3 ■
1.8 Operations with Decimals.....	7.NS.A.1d ■, 7.NS.A.2c ■, 7.EE.B.3 ■

Chapter 2: Algebraic Expressions

2.1 Adding Algebraic Terms.....	7.EE.A.1 ■
2.2 Subtracting Algebraic Terms.....	7.EE.A.1 ■
2.3 Simplifying Algebraic Expressions.....	7.EE.A.1 ■
2.4 Expanding Algebraic Expressions.....	7.EE.A.1 ■
2.5 Factoring Algebraic Expressions.....	7.EE.A.1 ■
2.6 Writing Algebraic Expressions.....	7.EE.A.2 ■
2.7 Real-World Problems: Algebraic Reasoning.....	7.EE.A.3 ■, 7.EE.A.4 ■

Chapter 3: Algebraic Equations and Inequalities

3.1 Identifying Equivalent Equations.....	7.EE.A.1 ■
3.2 Solving Algebraic Equations	7.EE.B.4 ■
3.3 Real-World Problems: Algebraic Equations.....	7.EE.B.4a ■
3.4 Solving Algebraic Inequalities.....	7.EE.B.4 ■
3.5 Real-World Problems: Algebraic Inequalities.....	7.EE.B.4b ■

Chapter 4: Proportion and Percent of Change

4.1 Identifying Direct Proportion.....	7.RP.A.1 ■, 7.RP.A.2 ■, 7.RP.A.2a ■, 7.RP.A.2b ■, 7.RP.A.2c ■
4.2 Representing Direct Proportion Graphically.....	7.RP.A.2 ■, 7.RP.A.2a ■, 7.RP.A.2b ■, 7.RP.A.2c ■, 7.RP.A.2d ■
4.3 Real-World Problems: Direct Proportion.....	7.RP.A.2 ■, 7.RP.A.2b ■, 7.RP.A.2c ■
4.4 Identifying Inverse Proportion.....	7.RP.A.2 ■, 7.RP.A.2a ■, 7.RP.A.2b ■, 7.RP.A.2c ■, 7.RP.A.2d ■
4.5 Percent Increase and Decrease.....	7.RP.A.3 ■
4.6 Real-World Problems: Percent Increase and Decrease.....	7.RP.A.3 ■

Chapter 5: Angle Properties and Straight Lines

5.1 Complementary, Supplementary, and Adjacent Angles.....	7.G.B.5 ○
5.2 Angles That Share a Vertex.....	7.G.B.5 ○
5.3 Alternate Interior, Alternate Exterior, and Corresponding Angles.....	7.G.B.5 ○
5.4 Interior and Exterior Angles.....	7.G.B.5 ○

Chapter 6: Geometric Construction

6.1 Constructing Triangles.....	7.G.A.2 ○
6.2 Scale Drawings and Lengths.....	7.G.A.1 ○
6.3 Scale Drawings and Areas.....	7.G.A.1 ○

Chapter 7: Circumference, Area, Volume, and Surface Area

7.1 Radius, Diameter, and Circumference of a Circle.....	7.G.B.4 ○
7.2 Area of a Circle.....	7.G.B.4 ○
7.3 Real-World Problems: Circles.....	7.G.B.4 ○
7.4 Area of Composite Figures.....	7.G.B.6 ○
7.5 Volume of Prisms.....	7.G.A.3 ○, 7.G.B.6 ○
7.6 Real-World Problems: Surface Area and Volume.....	7.G.B.6 ○

Chapter 8: Statistics and Probability

8.1 Random Sampling Methods.....	7.SP.A.1 ○
8.2 Making Inferences About Populations.....	7.SP.A.2 □, 7.SP.B.3 ○, 7.SP.B.4 ○
8.3 Defining Outcomes, Events, and Sample Space.....	7.SP.C.7a □
8.4 Finding Probability of Events.....	7.SP.C.5 □, 7.SP.C.7 □, 7.SP.C.7a □
8.5 Approximating Probability and Relative Frequency.....	7.SP.C.6 □
8.6 Developing Probability Models.....	7.SP.C.7 □, 7.SP.C.7a □, 7.SP.C.7b □

Chapter 9: Probability of Compound Events

9.1 Compound Events.....	7.SP.C.8a □, 7.SP.C.8b □
9.2 Probability of Compound Events.....	7.SP.C.8 □
9.3 Independent Events.....	7.SP.C.8 □, 7.SP.C.8c □
9.4 Dependent Events.....	7.SP.C.8 □

CCSS	CCSS Descriptor	Section Number
7.RP.A.1 ■	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. <i>For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.</i>	4.1
7.RP.A.2 ■	Recognize and represent proportional relationships between quantities.	4.1, 4.2, 4.3, 4.4
7.RP.A.2a ■	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.	4.1, 4.2, 4.4
7.RP.A.2b ■	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	4.1, 4.2, 4.3, 4.4
7.RP.A.2c ■	Represent proportional relationships by equations. <i>For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$.</i>	4.1, 4.2, 4.3, 4.4
7.RP.A.2d ■	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.	4.2, 4.4
7.RP.A.3 ■	Use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i>	4.5, 4.6
7.NS.A.1 ■	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.	1.1, 1.7
7.NS.A.1a ■	Describe situations in which opposite quantities combine to make 0. <i>For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.</i>	1.3
7.NS.A.1b ■	Understand $p + q$ as the number located a distance $ q $ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.	1.3
7.NS.A.1c ■	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	1.4
7.NS.A.1d ■	Apply properties of operations as strategies to add and subtract rational numbers.	1.3, 1.4, 1.8
7.NS.A.2 ■	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	1.7

7.NS.A.2a ■	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	1.5
7.NS.A.2b ■	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.	1.1, 1.5
7.NS.A.2c ■	Apply properties of operations as strategies to multiply and divide rational numbers.	1.8
7.NS.A.2d ■	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	1.2
7.NS.A.3 ■	Solve real-world and mathematical problems involving the four operations with rational numbers.	1.6, 1.7
7.EE.A.1 ■	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	2.1, 2.2, 2.3, 2.4, 2.5, 3.1
7.EE.A.2 ■	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."	2.6
7.EE.B.3 ■	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $1/10$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is 27 $\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.	1.6, 1.7, 1.8, 2.7
7.EE.B.4 ■	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	2.7, 3.2, 3.4
7.EE.B.4a ■	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?	3.3
7.EE.B.4b ■	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.	3.5
7.G.A.1 ○	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	6.2, 6.3

7.G.A.2 ○	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	6.1
7.G.A.3 ○	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	7.5
7.G.B.4 ○	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	7.1, 7.2, 7.3
7.G.B.5 ○	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	5.1, 5.2, 5.3, 5.4
7.G.B.6 ○	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	7.4, 7.5, 7.6
7.SP.A.1 □	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	8.1
7.SP.A.2 □	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</i>	8.2
7.SP.B.3 ○	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. <i>For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.</i>	8.2
7.SP.B.4 ○	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. <i>For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.</i>	8.2
7.SP.C.5 □	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	8.4
7.SP.C.6 □	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. <i>For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</i>	8.5
7.SP.C.7 □	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	8.4, 8.6

7.SP.C.7a <input type="checkbox"/>	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i>	8.3, 8.4, 8.6
7.SP.C.7b <input type="checkbox"/>	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i>	8.6
7.SP.C.8 <input type="checkbox"/>	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	9.2, 9.4
7.SP.C.8a <input type="checkbox"/>	Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	9.1
7.SP.C.8b <input type="checkbox"/>	Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.	9.1
7.SP.C.8c <input type="checkbox"/>	Design and use a simulation to generate frequencies for compound events. <i>For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?</i>	9.3

Key: Major ■, Supporting □, or Additional ○
Foundational ▲

Chapter 1: The Real Number System

- 1.1 Introducing Irrational Numbers.....8.NS.A.1 □, 8.NS.A.2 □
- 1.2 Introducing the Real Number System.....8.NS.A.2 □
- 1.3 Introducing Significant Digits.....8.NS.A.1 ▲

Chapter 2: Exponents

- 2.1 Exponential Notation.....8.EE.A.1 ■
- 2.2 The Product and the Quotient of Powers.....8.EE.A.1 ■
- 2.3 The Power of a Power.....8.EE.A.1 ■
- 2.4 The Power of a Product and the Power of a Quotient.....8.EE.A.1 ■
- 2.5 Zero and Negative Exponents.....8.EE.A.1 ■
- 2.6 Real-World Problems: Squares and Cubes.....8.EE.A.2 ■

Chapter 3: Scientific Notation

- 3.1 Understanding Scientific Notation.....8.EE.A.3 ■
- 3.2 Adding and Subtracting in Scientific Notation.....8.EE.A.4 ■
- 3.3 Multiplying and Dividing in Scientific Notation.....8.EE.A.3 ■

*Foundational standards are developed to mastery within each section as other concepts and skills are explored. These foundational standards may not be identified in the Teacher Edition but will be added in the future.

Chapter 4: Linear Equations and Inequalities

4.1 Solving Linear Equations With One Variable.....	8.EE.C.7 ■, 8.EE.C.7b ■
4.2 Identifying the Number of Solutions to a Linear Equation.....	8.EE.C.7 ■, 8.EE.C.7a ■
4.3 Understanding Linear Equations With Two Variables.....	8.EE.C.7 ■, 8.EE.C.7b ■
4.4 Solving for a Variable in a Two-Variable Linear Equation.....	8.EE.C.7 ■, 8.EE.C.7b ■
4.5 Solving Linear Inequalities With One Variable.....	8.EE.C.7 ▲, 8.EE.C.7b ▲

Chapter 5: Lines and Linear Equations

5.1 Finding and Interpreting Slopes of Lines.....	8.EE.B.6 ■
5.2 Understanding Slope-Intercept Form.....	8.EE.B.6 ■
5.3 Writing Linear Equations.....	8.EE.B.6 ■
5.4 Sketching Graphs of Linear Equations.....	8.EE.B.6 ■
5.5 Real-World Problems: Linear Equations	8.EE.B.5 ■

Chapter 6: Systems of Linear Equations

6.1 Introduction to Systems of Linear Equation.....	8.EE.C.8 ■, 8.EE.C.8a ■
6.2 Solving Systems of Linear Equations Using Algebraic Methods.....	8.EE.C.8 ■, 8.EE.C.8b ■
6.3 Real-World Problems: Systems of Linear Equations	8.EE.C.8 ■, 8.EE.C.8c ■
6.4 Solving Systems of Linear Equations by Graphing.....	8.EE.C.8 ■, 8.EE.C.8a ■
6.5 Inconsistent and Dependent Systems of Linear Equations	8.EE.C.8 ■, 8.EE.C.8b ■

Chapter 7: Functions

7.1 Understanding Relations and Functions.....	8.F.A.1 ■
7.2 Representing Functions.....	8.F.A.1 ■
7.3 Understanding Linear and Nonlinear Functions.....	8.F.A.3 ■, 8.F.B.4 ■, 8.F.B.5 ■
7.4 Comparing Two Functions.....	8.F.A.2 ■

Chapter 8: The Pythagorean Theorem

8.1 Understanding the Pythagorean Theorem and Plane Figures.....	8.G.B.6 ■, 8.G.B.7 ■
8.2 Understanding the Distance Formula.....	8.G.B.8 ■
8.3 Understanding the Pythagorean Theorem and Solids.....	8.G.B.7 ■

Chapter 9: Geometric Transformations

9.1 Translations.....	8.G.A.3 ■
9.2 Reflections.....	8.G.A.3 ■
9.3 Rotations.....	8.G.A.3 ■
9.4 Dilations.....	8.G.A.3 ■
9.5 Comparing Transformations.....	8.G.A.1 ■, 8.G.A.1a ■, 8.G.A.1b ■, 8.G.A.1c ■

Chapter 10: Congruence and Similarity

10.1 Understanding and Applying Congruent Figures	
10.2 Understanding and Applying Similar Figures.....	8.G.A.5 ■
10.3 Relating Congruent and Similar Figures to Geometric Transformations.....	8.G.A.2 ■, 8.G.A.4 ■

Chapter 11: Volume and Surface Area

11.1 Recognizing Cylinders, Cones, Spheres, and Pyramids.....	8.G.C.9 ○
11.2 Finding Volumes and Surface Areas of Cylinders.....	8.G.C.9 ○
11.3 Finding Volumes and Surface Areas of Pyramids and Cones.....	8.G.C.9 ○
11.4 Finding Volumes and Surface Areas of Spheres.....	8.G.C.9 ○
11.5 Real World Problems: Composite Solids.....	8.G.C.9 ○