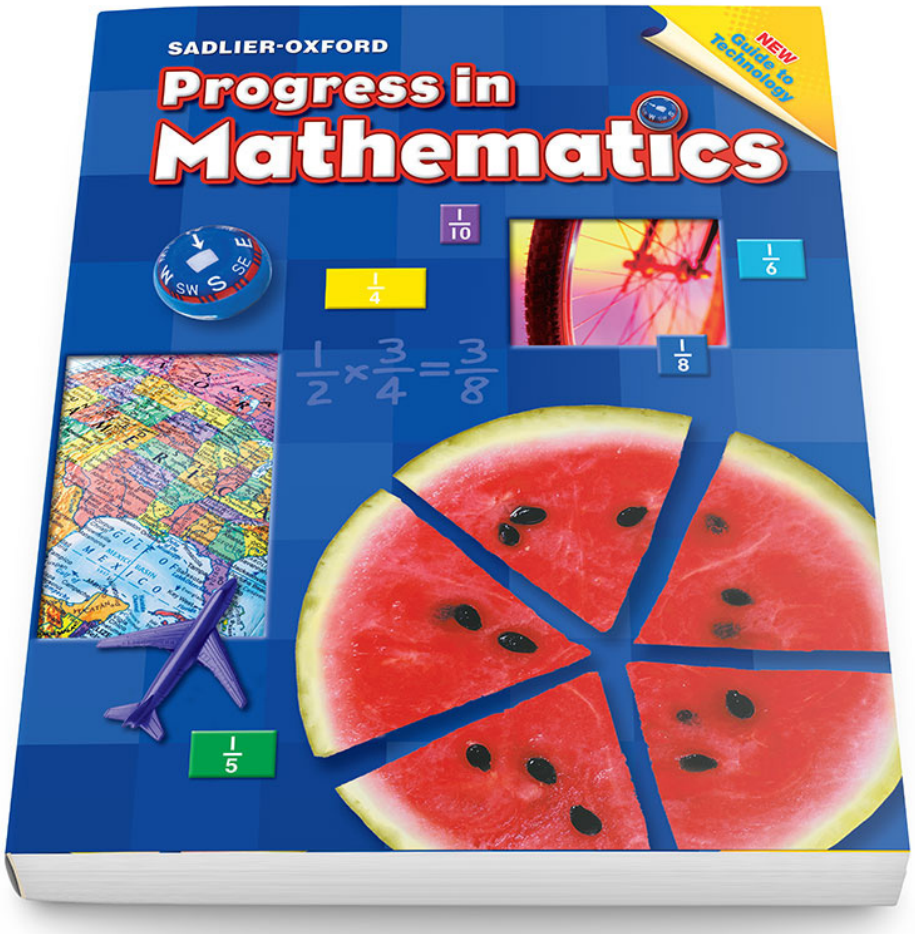
Progress in Mathematics

Correlation to the New York State
Next Generation Mathematics Learning Standards (2017)

Grade 5



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NY-5.OA OPERATIONS AND ALGEBRAIC THINKING

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
Write and interpret numerical expressions.	
NY-5.OA.1 Apply the order of operations to evaluate numerical expressions. e.g., • 6 + 8 ÷ 2 • (6 + 8) ÷ 2 Note: Exponents and nested grouping symbols are not included.	**Chapter 3 Division** 3-14 Order of Operations—pp. 122–123 *3-14A Variables and Expressions—Online
NY-5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. e.g., Express the calculation "add 8 and 7, then multiply by 2" as (8 + 7) × 2. Recognize that 3 × (18,932 + 921) is three times as large as 18,932 + 921, without having to calculate the indicated sum or product.	**Chapter 2 Multiplication** 2-2 Properties of Multiplication—pp. 68–69 **Chapter 3 Division** *3-14A Variables and Expressions—Online **Chapter 14 More Concepts in Algebra** 14-1 Algebraic Expressions and Equations—pp. 440–441 14-2 Properties of Equality—pp. 442–443
Analyze patterns and relationships.	
NY-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. e.g., 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.	**Chapter 14 More Concepts in Algebra** *14-13B Sequences—Online *14-13C Compare Sequences—Online 14- 14 Function Tables—pp. 466–467

NY-5.NBT NUMBER AND OPERATIONS IN BASE TEN

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
Understand the place value system.	
NY-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 $\frac{1}{10}$ of what it represents in the place to its left.	**Chapter 1 Place Value, Addition, and Subtraction** 1-1 What Is a Billion?—pp. 30–31 1-2 Place Value to Billions—pp. 32–33 1-3 Expanded Form—pp. 34–35 *1-3A Powers of Ten—Online 1-4 Thousandths—pp. 36–37 *1-4A Decimals and Expanded Form—Online 1-5 Decimals Greater Than One—pp. 38–39 **Chapter 8 Decimals: Addition and Subtraction** 8-2 Decimals and Place Value—pp. 270–271
NY-5.NBT.2 Use whole-number exponents to denote powers of 10. 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.	**Chapter 1 Place Value, Addition, and Subtraction** *1-3A Powers of Ten—Online **Chapter 2 Multiplication** 2-3 Mental Math Special Factors—pp. 70–71 2-4 Patterns in Multiplication—pp. 72–73 **Chapter 9 Decimals: Multiplication and Division** 9-1 Multiply by 10, 100, and 1000—pp. 294–295 9-6 Divide by 10, 100, and 1000—pp. 304–305
NY-5.NBT.3 Read, write, and compare decimals to thousandths.	
NY-5.NBT.3a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form. e.g., • $47.392 = 4 \times 10 + 7 \times 1 + 3 \times \frac{1}{10} + 9 \times \frac{1}{100} + 2 \times \frac{1}{1000}$ • $47.392 = (4 \times 10) + (7 \times 1) + (3 \times \frac{1}{10}) + (9 \times \frac{1}{100}) + (2 \times \frac{1}{1000})$ • $47.392 = (4 \times 10) + (7 \times 1) + (3 \times 0.1) + (9 \times 0.01) + (2 \times 0.001)$	**Skills Update** Place Value to Thousands—p. 1 **Chapter 1 Place Value, Addition, and Subtraction** 1-4 Thousandths—pp. 36–37 *1-4A Decimals and Expanded Form—Online 1-5 Decimals Greater Than One—pp. 38–39 **Chapter 8 Decimals: Addition and Subtraction** 8-2 Decimals and Place Value—pp. 270–271

NY-5.NBT NUMBER AND OPERATIONS IN BASE TEN

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
NY-5.NBT.3b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	**Chapter 1 Place Value, Addition, and Subtraction** 1-6 Compare and Order Numbers—pp. 40–41 **Chapter 8 Decimals: Addition and Subtraction** 8-1 Decimal Sense (Critical Thinking)—pp. 268–269
NY-5.NBT.4 Use place value understanding to round decimals to any place.	**Chapter 1 Place Value, Addition, and Subtraction** 1-7 Rounding Numbers: Rounding Decimals—pp. 42–43 **Chapter 8 Decimals: Addition and Subtraction** 8-4 Estimate Decimal Sums (rounding)—pp. 274–275 8-7 Estimate Decimal Differences (rounding)—pp. 280–281 **Chapter 9 Decimals: Multiplication and Division** 9-2 Estimate Decimal Products (rounding)—pp. 296–297 9-10 Estimate with Money: Rounding to the Nearest Cent—p. 313
Perform operations with multi-digit whole numbers and with decimals to hundredths.	
NY-5.NBT.5 Fluently multiply multi-digit whole numbers using a standard algorithm.	**Chapter 2 Multiplication** 2-6 Zeros in the Multiplicand—pp. 76–77 2-7 Multiply Two Digits—pp. 78–79 2-8 Multiply Three Digits—pp. 80–81 2-9 Zeros in the Multiplier—pp. 82–83
NY-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. *continued*	**Chapter 3 Division** 3-1 Understanding Division—pp. 96–97 3-2 Division Patterns—pp. 98–99 3-3 Three-Digit Quotients—pp. 100–101 3-5 Zeros in the Quotient—pp. 104–105 3-6 Short Division—pp. 106–107 *3-9A Use Arrays to Divide—Online 3-10 Teens as Divisors—pp. 114–115 *continued*

NY-5.NBT NUMBER AND OPERATIONS IN BASE TEN

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
Notes on and/or: • Students should be taught to use strategies based on place value, the properties of operations, and the relationship between multiplication and division; however, when solving any problem, students can choose any strategy. • Students should be taught to use equations, rectangular arrays, and area models; however, when illustrating and explaining any calculation, students can choose any strategy.	*3-10A Use Strategies to Divide—Online 3-11 Two-Digit Divisors—pp. 116–117
NY-5.NBT.7 Using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between operations: • add and subtract decimals to hundredths; • multiply and divide decimals to hundredths. Relate the strategy to a written method and explain the reasoning used. Notes on and/or: Students should be taught to use concrete models and drawings; as well as strategies based on place value, properties of operations, and the relationship between operations. When solving any problem, students can choose to use a concrete model or a drawing. Their strategy must be based on place value, properties of operations, or the relationship between operations. Note: Division problems are limited to those that allow for the use of concrete models or drawings, strategies based on properties of operations, and/or the relationship between operations (e.g., 0.25 ÷ 0.05). Problems should not be so complex as to require the use of an algorithm (e.g., 0.37 ÷ 0.05).	**Chapter 8 Decimals: Addition and Subtraction** *8-2A Use Models to Add Decimals—Online *8-2B Mental Math Add Decimals—Online 8-3 Add Decimals—pp. 272–273 8-4 Estimate Decimal Sums—pp. 274–275 8-5 Add More Decimals—pp. 276–277 *8-5A Use Models to Subtract Decimals—Online 8-6 Subtract Decimals—pp. 278–279 8-8 Subtract More Decimals—pp. 282–283 **Chapter 9 Decimals: Multiplication and Division** 9-1 Multiply by 10, 100, and 1000—pp. 294–295 *9-2A Multiply Decimals—Online 9-3 Multiply Decimals by Whole Numbers—pp. 298–299 *9-3A Model Multiplying Two Decimals—Online 9-4 Multiply Decimals by Decimals—pp. 300–301 9-5 Zeros in the Product—pp. 302–30 9-6 Divide by 10, 100, and 1000—pp. 304–305 *9-6A Model Dividing a Decimal by a Whole Number—Online 9-7 Divide Decimals by Whole Numbers—pp. 306–307 9-8 Zeros in Division—pp. 308–309 *9-8A Model Dividing a Decimal by a Decimal—Online *9-8B Divide Decimals—Online

NY-5.NF NUMBER AND OPERATIONS—FRACTIONS

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
Use equivalent fractions as a strategy to add and subtract fractions.	
NY-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. e.g., • $\frac{1}{3} + \frac{2}{9} = \frac{3}{9} + \frac{2}{9} = \frac{5}{9}$ • $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$	**Chapter 5 Fractions: Addition and Subtraction** *5-1A Add Fractions with Unlike Denominators—Online 5-2 Add Fractions Unlike Denominators—pp. 166–167 5-3 Add Three Fractions—pp. 168–169 5-4 Add Mixed Numbers—pp. 170–171 5-5 Rename Mixed Number Sums—pp. 172–173 *5-6A Subtract Fractions with Unlike Denominators—Online 5-7 Subtract Fractions Unlike Denominators—pp. 176–177 5-8 More Subtraction of Fractions—pp. 178–179 *5-8A Subtract Fractions and Whole Numbers from Mixed Numbers—Online 5-9 Subtract Mixed Numbers—pp. 180–181 5-10 Subtraction with Renaming—pp. 182–183 5-11 More Renaming in Subtraction—pp. 184–185
NY-5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. e.g., 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. e.g., Recognize an incorrect result $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$ by observing that $\frac{3}{7} < \frac{1}{2}$	**Chapter 5 Fractions: Addition and Subtraction** 5-1 Rename Fraction Sums Like Denominators—pp. 164–165 5-2 Add Fractions Unlike Denominators—pp. 166–167 5-3 Add Three Fractions—pp. 168–169 5-4 Add Mixed Numbers—pp. 170–171 5-5 Rename Mixed Number Sums—pp. 172–173 5-6 Rename Differences Like Denominators—pp. 174–175 5-7 Subtract Fractions Unlike Denominators—pp. 176–177 5-8 More Subtraction of Fractions—pp. 178–179 5-9 Subtract Mixed Numbers—pp. 180–181 *5-9A Use Benchmark Fractions—Online 5-10 Subtraction with Renaming—pp. 182–183 5-11 More Renaming in Subtraction—pp. 184–185 *continued*

NY-5.NF NUMBER AND OPERATIONS—FRACTIONS

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
	5-12 Estimate Sums and Differences of Mixed Numbers—pp. 186–187 5-13 Problem Solving Strategy: Work Backward—pp. 188–189
NY-5.NF.3 Interpret a fraction as division of the numerator by the denominator ($\frac{a}{b} = a \div b$). e.g., 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 $\frac{3}{4}$. Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers. e.g., using visual fraction models or equations to represent the problem. e.g., 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?	**Chapter 6 Fractions: Multiplication and Division** *6-7A Interpret the Remainder—Online
NY-5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.	
NY-5.NF.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 $a \times q \div b$. e.g., Use a visual 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 $\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$.	**Chapter 6 Fractions: Multiplication and Division** 6-1 Multiply Fractions—pp. 198–199 6-2 Multiply Fractions by Fractions—pp. 200–201 *6-2A Use Properties to Multiply Fractions and Whole Numbers—Online 6-3 Multiply Fractions and Whole Numbers—pp. 202–203

NY-5.NF NUMBER AND OPERATIONS—FRACTIONS

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
NY-5.NF.4b Find the area of a rectangle with fractional side lengths by tiling it with rectangles 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.	**Chapter 12 Metric Measurement, Area, and Volume** *12-5A Find Areas of Rectangles and Squares—Online
NY-5.NF.5 Interpret multiplication as scaling (resizing).	
NY-5.NF.5a Compare the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. e.g., In the case of $10 \times \frac{1}{2} = 5$, 5 is half of 10 and 5 is 10 times larger than $\frac{1}{2}$.	**Chapter 6 Fractions: Multiplication and Division** *6-2B Scaling Fractions—Online
NY-5.NF.5b 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). Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number. Relate the principle of fraction equivalence $\frac{a}{b} = \frac{a}{b} \times \frac{n}{n}$ to the effect of multiplying $\frac{a}{b}$ by 1. e.g., • Explain why $4 \times \frac{3}{2}$ is greater than 4. • Explain why $4 \times \frac{1}{2}$ is less than 4. • $\frac{1}{3}$ is equivalent to $\frac{2}{6}$ because $\frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$.	**Chapter 6 Fractions: Multiplication and Division** *6-2B Scaling Fractions—Online

NY-5.NF NUMBER AND OPERATIONS—FRACTIONS

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
NY-5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers. e.g., using visual fraction models or equations to represent the problem.	**Chapter 6 Fractions: Multiplication and Division** 6-2 Multiply Fractions by Fractions—pp. 200–201 6-3 Multiply Fractions and Whole Numbers—pp. 202–203 6-4 Multiply Fractions Using the GCF—pp. 204–205 6-5 Rename Mixed Numbers as Fractions—pp. 206–207 6-6 Multiply Fractions and Mixed Numbers—pp. 208–209 6-7 Multiply Mixed Numbers—pp. 210–211 *6-10B Word Problems Involving Fractions—Online
NY-5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.	
NY-5.NF.7a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. e.g., 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 $\frac{1}{12} \times 4 = \frac{1}{3}$.	**Chapter 6 Fractions: Multiplication and Division** *6-10A Division with a Unit Fraction—Online 6-12 Divide Fractions by Whole Numbers—pp. 220–221
NY-5.NF.7b Interpret division of a whole number by a unit fraction, and compute such quotients. e.g., Create a story context for $4 \div \frac{1}{5}$ and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div \frac{1}{5} = 20$ because $20 \times \frac{1}{5} = 4$.	**Chapter 6 Fractions: Multiplication and Division** 6-8 Division of Fractions—pp. 212–213 6-10 Divide Whole Numbers by Fractions—pp. 216–217 *6-10A Division with a Unit Fraction—Online

NY-5.NF NUMBER AND OPERATIONS—FRACTIONS

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
NY-5.NF.7c Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions. e.g., using visual fraction models and equations to represent the problem. e.g., How much chocolate will each person get if 3 people share $\frac{1}{2}$ lb. of chocolate equally? How many $\frac{1}{3}$-cup servings are in 2 cups of raisins? Note: Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement until grade 6 (NY-6. NS.1).	**Chapter 6 Fractions: Multiplication and Division** 6-10 Divide Whole Numbers by Fractions—pp. 216–217 *6-10A Division with a Unit Fraction—Online *6-10B Word Problems Involving Fractions—Online 6-12 Divide Fractions by Whole Numbers—pp. 220–221

NY-5.MD MEASUREMENT AND DATA

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
Convert like measurement units within a given measurement system.	
NY-5.MD.1 Convert among different-sized standard measurement units within a given measurement system when the conversion factor is given. Use these conversions in solving multi-step, real world problems. Notes: • All conversion factors will be given. • Grade 5 expectations for decimal operations are limited to work with decimals to hundredths.	**Chapter 11 Measurement Topics** 11-1 Relate Customary Units of Length—pp. 358–359 11-2 Relate Customary Units of Capacity—pp. 360–361 11-3 Relate Customary Units of Weight—pp. 362–363 11-7 Compute with Customary Units—pp. 370–371 **Chapter 12 Metric Measurement, Area, and Volume** 12-1 Metric Measurement—pp. 382–383 12-2 Relate Metric Units of Length—pp. 384–385 12-3 Relate Metric Units of Capacity—pp. 386–387 12-4 Relate Metric Units of Mass—pp. 388–389

NY-5.MD MEASUREMENT AND DATA

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
Represent and interpret data.	
NY-5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. e.g., Given different measurements of liquid in identical beakers, make a line plot to display the data and find the total amount of liquid in all of the beakers.	**Chapter 7 Statistics and Probability** 7-7 Line Plots—pp. 250–251 **Chapter 12 Metric Measurement, Area, and Volume** *12-12A Line Plots—Online
Geometric measurement: understand concepts of volume and relate volume to multiplication and addition.	
NY-5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.	
NY-5.MD.3a Recognize that 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.	**Chapter 12 Metric Measurement, Area, and Volume** 12-10 Cubic Measure—pp. 400–401 12-11 Volume—pp. 402–403
NY-5.MD.3b Recognize that 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.	**Chapter 12 Metric Measurement, Area, and Volume** 12-11 Volume—pp. 402–403 12-12 Estimate Volume—pp. 404–405
NY-5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in., cubic ft., and improvised units.	**Chapter 12 Metric Measurement, Area, and Volume** 12-11 Volume—pp. 402–403 12-12 Estimate Volume—pp. 404–405

NY-5.MD MEASUREMENT AND DATA

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
NY-5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	
NY-5.MD.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.	**Chapter 12 Metric Measurement, Area, and Volume** 12-11 Volume—pp. 402–403 *12-11A Find Volume—Online 12-12 Estimate Volume—pp. 404–405
NY-5.MD.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.	**Chapter 12 Metric Measurement, Area, and Volume** 12-11 Volume—pp. 402–403 *12-11A Find Volume—Online
NY-5.MD.5c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	**Chapter 12 Metric Measurement, Area, and Volume** *12-11B Separate Solid Figures—Online

NY-5.G GEOMETRY

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
Graph points on the coordinate plane to solve real-world and mathematical problems.	
NY-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.	**Chapter 14 More Concepts in Algebra** 14-13 The Coordinate Plane—pp. 464–465 *14-13A Using Coordinate Graphs—Online

continued

NY-5.G GEOMETRY

Grade 5 Content Standards	*Progress in Mathematics*, Grade 5
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.	
NY-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.	**Chapter 14 More Concepts in Algebra** *14-13A Using Coordinate Graphs—Online 14-15 Functions and Coordinate Graphs—pp. 468–469
Classify two-dimensional figures into categories based on their properties.	
NY-5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. e.g., All rectangles have four right angles and squares are rectangles, so all squares have four right angles. Note: The inclusive definition of a trapezoid will be utilized, which defines a trapezoid as "A quadrilateral with at least one pair of parallel sides."	**Skills Update** Identify Polygons—p. 13 **Chapter 10 Geometry** 10-1 Measure and Draw Angles—pp. 324–325 10-2 Identify Angles—pp. 326–327 10-3 Polygons—pp. 328–329 10-4 Congruent and Similar Figures—pp. 330–331 10-5 Triangles—pp. 332–333 10-6 Quadrilaterals—pp. 334–335 *10-6A Classify Quadrilaterals—Online
NY-5.G.4 Classify two-dimensional figures in a hierarchy based on properties.	**Chapter 10 Geometry** *10-6A Classify Quadrilaterals—Online