Grade 6 Mathematics Curriculum Guide

Grade Level/Course Title: Grade 6	Trimester 1	Academic Year: 2015-2016

Grade Level Mathematics Focus:
In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division, and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

Essential Questions for this Unit:
1. How can students develop understanding of the use of variables in mathematical expressions, write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems?
2. How can students understand that expressions in different forms can be equivalent, and use the properties of operations to rewrite expressions in equivalent forms?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 1: **(Aug.-Oct.)** **Read, Write and Evaluate Number and Algebraic Expressions**	6.NS.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. *For example, express 36 + 8 as 4 (9 + 2).*	• Prime factorization • Bubble Method • LCM • GCF • Decomposition • Common factors • Distributive property • Area models	**6.NS.4** [SRB] pg. 12,80 Greatest Common Factor (GCF) [SRB] pg. 78 Least Common Multiple (LCM) EM Lessons 9.1, 9.2, & 9.5 Prime Numbers and Factorization [CP] Prime Factoring to find the LCM and GCF [L] Factoring with Whole Numbers [L] LCM - Bubble Method Language [GMR] Factoring Expressions (ONLY pgs1-4)[L] Distributive Property – An Introduction [L] Illustrative Mathematics- Bake Sale
	6.EE.1	Write and evaluate numerical expressions that involve whole-number exponents.	• Powers and exponents • Multiply /divide by powers of ten	**6.EE.1** [SRB] p.6 Exponential Notation Multiplying by Multiples of Ten [L] EngageNY Mod. 4, Lesson 5 & 6 [L]]
	6.NS.3	Fluently add, subtract, multiply and divide multi-digit decimals using the standard algorithm for each operation.	• Generic rectangle/area model • Number line division • Number line • Bar model • Repeated subtraction • Partial quotients	**6.NS.3** EM Lessons 2.3, 2.5, 2.6, 2.8 Adding Decimals by Decomposition [L] Subtracting Decimals Using Decomposition [L] Multiplying Decimals [L] Dividing Decimals [L]

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Unit 1: **(Aug.-Oct.)** **Read, Write and Evaluate Number and Algebraic Expressions (cont.)**	6.NS.2	Fluently divide multi-digit numbers using the standard algorithm	• Number line division • Bar model • Repeated subtraction • Partial quotients • Order of Operations • Use variable for a specific number or a set of numbers • Translate words into algebraic expressions • Translate algebraic expressions into words • Distributive property	**6.NS.2** Divisibility Rules [L] [SRB] pg. 22 Partial Quotients [SRB] p. 260 Interpreting a remainder EM Lesson 2.7 MM 432 Divisibility Dash Bar Models [CP] Division Algorithms [L] EngageNY Mod.4, Lesson 7&8 [L] **6.EE.2** [SRB] pgs. 240-243 Algebraic Expressions Variables [L] EM Lessons 3.1, 3.2, 3.3 Factoring Expressions (pgs. 5-7) [L] EngageNY Mod.4, Lesson 9 [L] Benefits of Student Talk [IV] **6.EE.2a/2b** Translating Expressions [L] Algebraic Expressions — Identifying Parts and Seeing Entities [L] EngageNY Mod. 4 Lessons 10 EngageNY Mod. 4 Lesson 15
	6.EE.2	Write, read, and evaluate expressions in which letters stand for numbers		
	6.EE.2a	Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*		
	6.EE.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. *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.*		

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2. How can students understand that expressions in different forms can be equivalent, and use the properties of operations to rewrite expressions in equivalent forms?
3. How can students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 1: (Aug.-Oct.) **Read, Write and Evaluate Number and Algebraic Expressions (cont.)**	6.EE.3	Apply the properties of operations to generate equivalent expressions. *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.*	• Review properties of operations • Equivalent expressions • Represent word problems with drawings, diagrams, and algebraic expressions • Bar models • Review repeated addition and multiplication • Review repeated subtraction and division • Substitute numbers to prove inequalities or equations true	**6.EE.3** [SRB] pg. 248-249 Distributive Property [SRB] pg. 104 Properties of Number EM Lesson 6.5, 9.2, 9.3 Multiple Methods for Multiple Learners [L] Multiplication Facts Made Easy [L] Math Fact Activities [L] Factoring Expressions (Pgs. 5-7) [L] Properties of Multiplication [L] EngageNY Module 4, Lesson 11, 12. **6.EE4** [SRB] 251-252 Systematic Solving of Equations MM 297-298 Solving Equations MM 289 Simplifying and Evaluating Expressions MM 205 Pan Balance Problems MM 300 Challenge: Balance a Mobile Activity One-Step Equations — Multiple Methods [L] EngageNY Mod. 4, Lesson 3 **6.EE.5** EM Lesson 6.8, 9.6 Solving Equations - Multiple Methods [L] Inequalities Sort [L]
	6.EE.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). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*		
	6.EE.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.		

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Essential Questions for this Unit:
1. How can students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense, and use these operations to solve problems?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 2: **(Oct.)** **Part(s) of a** **Whole or** **Group** **and a** **Comparison** **of Two** **Quantities** **(cont.)**	6.NS.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. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*	• Review multiplication of a fraction by a fraction, whole number and mixed number • "Invert and multiply" is multiplying the dividend and divisor by the reciprocal of the divisor. • Decomposition and removing the equivalent forms of 1 to simplify the problem • Bar model division • Decomposing to share out fractions • Dividing across • Number line division	**6.NS.1** [SRB] 91-93 Division of Fractions [SRB] pgs. 99-102 Different Types of Number [SRB] 319-320 Fraction & whole number topic EM Lesson 4.6, 6.1, 6.2 MM pgs. 180, 478 Fraction Capture; Game Master 80-81 Dividing by Decomposing Fractions [L] Modeling Division of a Fraction by a Fraction [L] Warm-Up Template (Word) [GMR] Simplifying Fractions Activity [L] Converting – Improper Fractions and Mixed Numbers [L] Multiplying Mixed Numbers [L] EngageNY Mod. 2 Lessons 3, 4, 5, 6. **BENCHMARK 1**

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Grade Level/Course Title: Grade 6	Trimester 2	Academic Year: 2015-2016

Grade Level Mathematics Focus:
In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division, and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

Essential Questions for this Unit:
1. How can reasoning about multiplication and division be used to solve ratio and rate problems about quantities?
2. How can viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and analyzing simple drawings that indicate the relative size of quantities, help students connect their understanding of multiplication and division with ratios and rates?
3. How can students expand the scope of problems for which they can use multiplication and division to solve problems, and make connections between concepts of ratios and fractions, in order to solve a wide variety of problems involving ratios and rates?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 3: (Nov.-Dec.) **Ratio and Rate Relationships**	6.RP.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *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."*	• Use ratio language to describe a ratio relationship • Understand unit rate • Ratio reasoning to convert measurement units	**6.RP.1** [SRB] pgs. 117-118 Ratios EM Lesson 8.6 Ratios Lesson 2 Representing Ratios with Objects and Area Models [L] EngageNY Mod. 1 Lessons 1, 2, 3. Illustrative Mathematics-Evaluating Ratio Statements
	6.RP.2	Understand the concept of a unit rate *a/b* associated with a ratio *a:b* with *b ≠ 0*, and use rate language in the context of a ratio relationship. *For ex., "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*		**6.RP.2** EM Lesson 8.2 Finding the Unit Rate [L] Lesson 1 Modeling Ratios with Activities [L] Lesson 4 Modeling Ratios with Double Number Lines[L] EngageNY Mod.1, Lesson 16, 17, 18. Illustrative Mathematics-Ticket Booth
	6.RP.3a (Part 1)	Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables **and use tables to compare ratios.**		**6.RP.3a** EM Lesson 8.3. EngageNY Mod. 1 Lessons 14, 15 Illustrative Mathematics-Bag of Marbles
	6.RP.3b	Solve unit rate problems including those involving unit pricing and constant speed. *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?*		**6.RP.3b** EM Lesson 8.4 Distance = Rate X Time: Focus on Student Talk [L] EngageNY Mod 1 Lessons 19, 20 Illustrative Mathematics-Data Transfer Illustrative Mathematics-Friends Meeting on Bicycles

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Essential Questions for this Unit:
1. How can students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and use equations (such as $3x = y$) to describe relationships between quantities?
2. How can students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers, and reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4: (Jan.-Feb.) Graphing on Number lines and the Coordinate Plane	6.RP.3c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	• Convert fractions to percent • Find percent of a quantity • Given a part and the percent find the whole • Convert measurement units • Temperature values • Above/below zero • Financial values • Credits/debits • Elevation values • Above/below sea level • Coordinate axes • Coordinate plane •	**6.RP.3c** EM Lesson 8.5, 8.7, 8.8 Fractions, Decimals, and Percent [L] (pg.6 review) Lesson 3 Representing Percentage Ratios Visually [L] EngageNY Mod. 1 Lessons 24, 25, 26. Illustrative Mathematics-Exam Scores Illustrative Mathematics-Overlapping Squares **6.RP.3d** [SRB] pg. 371 Converting with Measurement Systems EM Lesson 8.9 EngageNY Mod, 1 Lessons 21, 22, 23 Illustrative Mathematics-Speed Conversions Illustrative Mathematics-Unit Conversions **6.NS.5** EngageNY Mod. 3 Lessons 2, 3 Illustrative Mathematics-It's Warmer in Miami Illustrative Mathematics-Mile High **6.NS.6** EngageNY Mod. 3 Lessons 1 Illustrative Mathematics-Extending the Number Line
	6.RP.3d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		
	6.NS.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		
	6.NS.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		

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Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4: **(Jan.-.Feb.)** **Graphing on Number lines and the Coordinate Plane (cont.)**	6.NS.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	• The opposite of the opposite of a number • 0 is its own opposite • **Opposite** values/ directions • Ordered pairs signs determine their quadrant location • Reflections across one or both axes • Positioning ordered pairs in the proper quadrant • Absolute value of a number is its distance from zero or the magnitude of the number • Knowing that a smaller negative number is located to the right of a larger negative number	**6.NS.6a** EngageNY Module 3 Lessons 4, 5. Illustrative Mathematics-Integers on Number Line 2
	6.NS.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.		**6.NS.6b** Illustrative Mathematics-Reflecting Points Over Coordinate Axes **6.NS.6b, 6.NS.6c** EM Lessons 5.4, 5.5. EngageNY Module 3, Lessons 14, 15, 16, 17 MM pgs. 158, 417
	6.NS.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.		**6.NS.6c** Lesson 5.4 Coordinate Geometry MM pgs. 158, 417 Playing X and O Tic, Tac, Toe [G] EngageNY Module 3 Lessons 6, 7, 8. Illustrative Mathematics-Plotting Points on the Coordinate Plane
	6.NS.7	Understand ordering and absolute value of rational numbers.		**6.NS.7** [SRB] pg.94 Absolute Value Illustrative Mathematics-Above and Below Sea Level Illustrative Mathematics-Jumping Flea

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Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4: **(Jan.-.Feb.)** **Graphing on Number lines and the Coordinate Plane** **(cont.)**	6.NS.7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *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.*	• Order of rational numbers • Absolute value of a rational number	**6.NS.7a** EM Lesson 6.12 EngageNY Mod. 3 Lessons 9, 10 Illustrative Mathematics-Fractions on the Number Line Illustrative Mathematics-Integers on the Number Line **6.NS.7b** EngageNY Mod 3 Lesson 13 Illustrative Mathematics-Comparing Temperatures **6.NS.7c** EngageNY Mod 3 Lesson 11
	6.NS.7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3°C > –7°C to express the fact that –3°C is warmer than –7°C.*		
	6.NS.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. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt*		

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Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4: **(Jan.-Feb.)** **Graphing on** **Number lines** **and the** **Coordinate** **Plane** **(cont.)**	6.NS.7d	Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars*	• Distinguish between absolute value and statements of order • Four quadrants • Distance between points with same 1st or 2nd coordinates • Equivalent ratios • Create tables	**6.NS.7d** EngageNY Mod. 3 Lesson 12 **6.NS.8** EngageNY Mod 3 Lessons 18, 19 Illustrative Mathematics- Distances Between Points **6.RP.3a** EM Lessons 3.5, 3.6 EngageNY Mod 1 Lessons 14, 15 Illustrative Mathematics-Walk-a-thon 1
	6.NS.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		
	6.RP.3a (Part 2)	Make tables of equivalent ratios relating quantities with whole number measurements… **and plot the pairs of values on the coordinate plane.**		

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1. How can students know that the solutions of an equation are the values of the variables that make the equation true?
2. How can students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 4: **(Jan.-.Feb)** **Graphing on Number lines and the Coordinate Plane (cont.)**	6.EE.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. *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.*	• Dependent variable • Term • Independent variable • Describe general patterns in words • Use a variable for unknown quantities • Solve for the variable • Translate word problems into equations • Represent the expression or equation in tables and graphs	**6.EE.9** EngageNY Mod 4 Lessons 31, 32 Illustrative Mathematics-Chocolate Bars **BENCHMARK 2**

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2. How can students understand that expressions in different forms can be equivalent, and use the properties of operations to rewrite expressions in equivalent forms?
3. How can students know that the solutions of an equation are the values of the variables that make the equation true?
4. How can students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations?
5. How can students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and use equations (such as $3x = y$) to describe relationships between quantities?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 6: **(Mar.-Apr.)** **Expressions** **and** **Equations** **(cont.)**	6.EE.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. *For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = ½.*	• Constraint on an answer • Dependent variables • Independent variables • Writing Inequalities • Representing Inequalities on a number line	**6.EE.2c** MM 81 Special Cases for Formulas EngageNY Mod 4 Lessons 21, 22 **6.EE.6** EngageNY Mod 4 Lessons 18, 19 Illustrative Mathematics-Firefighter Allocation **6.EE.7** EM Lesson 9.6 Mobile Problems [SRB] 368-369 How to Balance a Mobile MM pg. 300 Challenge: Balance a Mobile Activity MM pg.76 True and Not True Special Cases Illustrative Mathematics-Morning Walk 1 Illustrative Mathematics-Fruit Salad **6.EE.8** Lesson 6.12 Inequalities MM pg. 211 Relation Symbols and Inequalities MM pg. 212 Graphing Compound Inequalities Illustrative Mathematics-Fishing Adventures 1 Illustrative Mathematics-Height Requirements
	6.EE.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.		
	6.EE.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		
	6.EE.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		

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Essential Questions for this Unit:
1. How can students build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume?
2. How can students find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles, and by using these methods, discuss, develop, and justify formulas for areas of triangles and parallelograms?
3. How can students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine?
4. How can students reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths?
5. How can students prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 5: **(March)** **Geometry**	6.G.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	• Names and properties of triangles and quadrilaterals • Decomposing polygons into triangles • Using coordinate pairs to calculate length of a line • Plotting & naming points • Coordinate plane use in constructing polygons	**6.G.1** [SRB] pgs. 214-217 Area of a Rectangle, Parallelogram, and Triangle EM Lessons 1.10, 9.1, 9.8, Illustrative Mathematics-Finding Area of Polygons EngageNY Mod 5 Lessons 1, 2, 3, 4, 5, 6 **6.G.2** [SRB] pgs. 220-221 Volume of Prisms EM Lesson 3.4, 9.9(Rectangular Prisms only). MM 312-13 Rectangular Prisms Volume: A Foundation in Unit Cubes [L] Rectangular Prisms EngageNY Mod 5 Lessons 11, 12 EngageNY Module 5, Lesson 13 Illustrative Mathematics-Computing Volume Progression 1 and 2 **6.G.3** EngageNY Mod 5 Lessons 7, 8, 9 Illustrative Mathematics-Polygons on the Coordinate Plane Illustrative Mathematics-Walking the Block
	6.G.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 $V = l\,w\,h$ and $V = b\,h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.		
	6.G.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.		

Grade 6 Mathematics Curriculum Guide

Grade Level/Course Title: Grade 6	Trimester 3	Academic Year: 2015-2016

Grade Level Mathematics Focus:
In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division, and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

Essential Questions for this Unit:
1. How can students develop understanding of the use of variables in mathematical expressions, write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems?
2. How can students understand that expressions in different forms can be equivalent, and use the properties of operations to rewrite expressions in equivalent forms?
3. How can students know that the solutions of an equation are the values of the variables that make the equation true?
4. How can students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations?
5. How can students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and use equations (such as $3x = y$) to describe relationships between quantities?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 6: **(March)** **Data, Data Analysis and Statistics**	6.G.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.	• Find surface area of 3D figures using nets • Solve volume and surface area problems through formulas	**6.G.4** [SRB] pgs. 225-226 Surface Area EngageNY Mod 5 Lessons 15,16,17,18, 19 Illustrative Mathematics-Nets for Pyramids and Prisms
	6.SP.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *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*		**6.SP.1** [SRB] pgs. 132-133 EM Lesson 1.12 Statistical Questions and Variability [L] EngageNY Module 6, Lesson 1 Illustrative Mathematics-Describing Statistical Questions
	6.SP.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		**6.SP.2** [SRB] pgs. 136-137 Statistical Landmarks EM Lesson 1.11 EngageNY Mod 6 Lesson 2 Illustrative Mathematics-Describing Distributions Illustrative Mathematics-Puppy Weights

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Essential Questions for this Unit:
1. How can students build on and reinforce their understanding of number, to begin to develop their ability to think statistically?
2. How can students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values, including that the median measures center in the sense that it is roughly the middle value, and the mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point?
3. How can students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability?
4. How can students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 6: **(May)** **Data, Data Analysis and Statistics** **(cont.)**	6.SP.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.	• Variability • Distribution • Center • Spread • Overall shape • Data landmarks • Clusters • Measure of center • Mean, median • Measure of variation • Interquartile • Dot plots • Box plots • Histograms • Box and Whiskers • Outliers • Distribution	**6.SP.3** [SRB] pg. 325-326 Landmark Shark EM Lesson 1.4, 1.5 MM 14 Defining the Mean Mean Part I [L] Mean Part II [L] Illustrative Mathematics-Is It Center or Is It Variability **6.SP.4** EM Lesson 1.2 EngageNY Mod. 6, Lesson 3, 4 EngageNY Mod 6 Lessons 14,16 Box Plots Demystified MM 9 Outliers and Gaps Comparing Data Displays [L]] Interpreting Data in Graphs [L] Illustrative Mathematics-Puzzle Times **6.SP.5a** EngageNY Mod 6 Lesson 5 EngageNY Mod. 6, Lessons 21,22
	6.SP.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.		
	6.SP.5a	Summarize numerical data sets in relation to their context, such as: Reporting the number of observations		

Grade 6 Mathematics Curriculum Guide

Grade Level/Course Title: Grade 6	Trimester 3	Academic Year: 2015-2016

Grade Level Mathematics Focus:
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Essential Questions for this Unit:
1. How can students build on and reinforce their understanding of number, to begin to develop their ability to think statistically?
2. How can students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values, including that the median measures center in the sense that it is roughly the middle value, and the mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point?
3. How can students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability?
4. How can students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected?

Unit (Time)	Standard	Standard Description	Content	Resources
Unit 6: **(May)** **Data, Data Analysis and Statistics (cont.)**	6.SP.5b	Summarize numerical data sets in relation to their context, such as describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	• Summarizing data sets • Mean • Median • Quantitative measures of center • Variability • Interquartile range • Mean absolute deviation • Describing an overall pattern • Describing striking deviations • Describing data distribution • Describing the context of the data collection	**6.SP.5b** EngageNY Mod 6 Lessons 12, 15
	6.SP.5c	Summarize numerical data sets in relation to their context, such as 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.		**6.SP.5c** EngageNY Mod 6 Lessons 7, 8, 9, 10, 11 Illustrative Mathematics-Math Homework Problems
	6.SP.5d	Summarize numerical data sets in relation to their context, such as 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		**6.SP.5d** **EngageNY Mod 6 Lesson 18** Illustrative Mathematics-Electoral College **BENCHMARK 3**