

Grade 6 Mathematics Curriculum Guide

Grade Level/Course Title: Grade 6	Trimester 1	Academic Year: 2013-2014
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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 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?
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)	CCSS	Standard Description	Content	Resources (Suggested Number of Days)
Unit 1 The Number System (40 days)	6.NS.2	Fluently divide multi-digit numbers using the standard algorithm.	<ul style="list-style-type: none"> • Partial Quotients (stacking) • Guess & Check • Decomposition to Fractions • Traditional • Bubble Method • List Multiples • Venn Diagram • List Factors • Decompose to Place Value • Partial Sums • Compensation • Area Model • Generic Rectangle • Partial Products • Fractions • Clear Decimals • Write as Fractions 	Lesson 1.1: Divide Multi-Digit Numbers (1 day) Dividing by Decomposing Fractions [L] Conceptualizing Division [L] Whole Number Operations [CP] Division - Divvy out Greater Numbers [L] Number Line Division [L] Order of Operations [L] Multiply and Divide by Powers of Ten (1 day) ➤ <i>lesson under development</i> Area Models [CP] Division Transitions (1 day) ➤ <i>lesson under development</i> Lesson 1.2: Prime Factorization (1 day) Prime Numbers and Factorization [CP] Divisibility Rules [L] Hundreds Chart [GMR] Sieve of Eratosthenes [CP] Lesson 1.3: Least Common Multiple (1 day) LCM - Bubble Method Language [GMR] LCM Through the Grades [L] Lesson 2.4: Simplify Fractions (1 day) Lesson 1.4: Greatest Common Factor (1 day) Lesson 1.5: Apply the Greatest Common Factor (1 day) Mid-Chapter Checkpoint (1 day)
	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.		
	6.NS.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.		
	6.NS.2	Fluently divide multi-digit numbers using the standard algorithm.		
	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.		

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Essential Questions for this Unit:				
<ol style="list-style-type: none"> 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? 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)	CCSS	Standard Description	Content	Resources (Suggested Number of Days)
Unit 1 continued The Number System (40 days)	6.NS.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	<ul style="list-style-type: none"> Partial Quotients (stacking) Guess & Check Decomposition to Fractions Traditional Bubble Method List Multiples Venn Diagram List Factors Decompose to Place Value Partial Sums Compensation Area Model Generic Rectangle Partial Products Fractions Clear Decimals Write as Fractions 	Lesson 1.6: Add and Subtract Decimals (1 day) Decimals [CP] Adding Decimals by Decomposition [L] Adding Whole Numbers and Decimals [L] Lesson 1.7: Multiply Decimals (1 day) Decimals [CP] Multiplying Decimals [L] Lesson 1.8: Divide Decimals by Whole Numbers (1 day) Conceptualizing Division [L] Dividing Decimals [L] Lesson 1.9: Divide with Decimals (1 day) Chapter 1 Review & Test (2 days)
	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.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.		
	6.NS.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperatures 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.		

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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?
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 1: continued The Number System (40 days)	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.	<ul style="list-style-type: none"> • Benchmark Fractions 0, 1, etc. • Simplify Using GCF • Divide by GCF • Common Denominators • Multiply Across • Array (area model) • Bar Model • Divide Across • Multiply by Reciprocal 	Adding and Subtracting Fractions (2 days) Converting Between Mixed Numbers and Improper Fractions (1 day) Lesson 2.1: Fractions and Decimals (1 day) Benchmark Fractions Activity [L] Lesson 2.2: Compare and Order Fractions and Decimals (1 day) Ordering Fractions, Decimals, and Percents [L] Lesson 2.3: Multiply Fractions (5 th grade standard) (1 day) Multiplying Mixed Numbers [L] Simplifying and Multiplying Fractions Sort [L] Mid-Chapter Checkpoint (1 day) Lesson 2.5: Model Fractions Division (Investigate) (1 day) Modeling Division of a Fraction by a Fraction [L] Modeling Division of a Whole Number by a Fraction [L] Lesson 2.6: Estimate Quotients (1 day) Lesson 2.7: Divide Fractions (1 day) Lesson 2.8: Model Mixed Number Division (Investigate) (1 day) Multiplying Mixed Numbers [L] Converting - Improper Fractions and Mixed Numbers [L] Lesson 2.9: Divide Mixed Numbers (1 day) Lesson 2.10: Fraction Operations (Problem Solving) (1 day) Chapter 2 Review & Test (2 days)
	6.NS.7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.		
	6.NS.7b	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.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.		

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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?
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 1: continued The Number System (40 days)	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.	<ul style="list-style-type: none"> • Bar Model • Equivalent Forms of 1 • Array • Cross Products • Common Denominators • Multiply by LCD • Multiply by Both Denominators • Graphing 	Lesson 3.1: Understand Positive and Negative Numbers (1/2 day) Number Line Worksheets [GMR] Lesson 3.2: Compare and Order Integers (1/2 day) Lesson 3.3: Rational Numbers and the Number Line (1/2 day) Lesson 3.4: Compare and Order Rational Numbers (1/2 day) Mid-Chapter Checkpoint (1 day) Lesson 3.5: Absolute Value (1/2 day) Lesson 3.6: Compare Absolute Values (1/2 day) Lesson 3.7: Rational Numbers and the Coordinate Plane (1 day) Lesson 3.8: Ordered Pair Relationships (1 day) Lesson 3.9: Distance on the Coordinate Plane (1 day) Lesson 3.10: The Coordinate Plane (Problem Solving) (1 day) Chapter 3 Review & Test (2 days)
	6.NS.7d	Distinguish comparisons of absolute value from statements about order.		
	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.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.		

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Grade Level/Course Title: Grade 6		Trimester 2		Academic Year: 2013-2014	
<p>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.</p>					
<p>Essential Questions for this Unit:</p> <ol style="list-style-type: none"> 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)	CCSS	Standard Description	Content	Resources	
Unit 2: Ratios and Rates (29 days)	6.RP.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.		Lesson 4.1: Model Ratios (Investigate) (1 day) Rates, Ratios, and Proportions [CP] Lesson 4.2: Ratios and Rates (2 days) Bar Models - Rate, Percent, Equations [L] Rate Problems Using Bar Models [L] Lesson 4.3: Equivalent Ratios and Multiplication Tables (1 day) Lesson 4.4: Use Tables to Compare Ratios (Problem Solving) (1 day) Lesson 4.5: Use Equivalent Ratios (Algebra) (2 days) Mid-Chapter Checkpoint (1 day) Lesson 4.6: Find Unit Rates (2 days) Lesson 4.7: Use Unit Rates (Algebra) (1 day) Lesson 4.8: Equivalent Ratios and Graphs (Algebra) (1 day) Chapter 4 Review & Test (2 days)	
	6.RP.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.			
	6.RP.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			

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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)	CCSS	Standard Description	Content	Resources
Unit 2: continued	6.RP.3b	Solve unit rate problems including those involving unit pricing and constant speed	<ul style="list-style-type: none"> • Bar model • Direct translation • Proportion • Decomposition 	Lesson 5.1: Model Percents (Investigate) (1 day) Bar Models [CP] Percents [CP] Bar Model Percent Equivalency [GMR] Bar Model Template - 5% [GMR] Bar Model Template - 10% [GMR]
	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)		Lesson 5.2: Write Percents as Fractions and Decimals (1 day) Bar Models - Percents and Fractions [L] Fractions, Decimals, and Percents [L]
	6.RP.3d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		Lesson 5.3: Write Percents as Decimals and Percents (1 day) Mid-Chapter Checkpoint (1 day) Lesson 5.4: Percent of a Quantity (1 day) Lesson 5.5: Percents (Problem Solving) (1 day) Lesson 5.6: Find the Whole from a Percent (2 days) Chapter 5 Review & Test (2 days) Lesson 6.1: Convert Units of Length (1 day) Lesson 6.2: Convert Units of Capacity (1 day) Lesson 6.3: Convert Units of Weight and Mass (1 day) Chapter 6 Review & Test (use Mid-Chapter Checkpoint for test) (2 days) Benchmark Assessment 1 to be given at the end of Unit 2
(29 days)				

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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)	CCSS	Standard Description	Content	Resources
Unit 3: Expressions and Equations (35 days)	6.EE.1	Write and evaluate numerical expressions involving whole-number exponents	<ul style="list-style-type: none"> • Decomposition • Bar Model 	Lesson 7.1: Exponents (1 day) Lesson 7.2: Evaluate Expressions Involving Exponents (1 day) Order of Operations [L] Lesson 7.3: Write Algebraic Expressions (1 day) Syntax - Expressions, Equations, and Inequalities [GMR] Variables [L] Lesson 7.4: Identify Parts of an Expression (1 day) Lesson 7.5: Evaluate Algebraic Expressions and Formulas (1 day) Simplifying Expressions [L] Mid-Chapter Checkpoint (1 day) Lesson 7.6: Use Algebraic Expressions (1 day) Lesson 7.7: Combine Like Terms (Problem Solving) (1 day) Combining Like Terms [L] Lesson 7.8: Generate Equivalent Expressions (2 days) Lesson 7.9: Identify Equivalent Expressions (1 day) Chapter 7 Review & Test (3 days) Lesson 8.1: Solutions of Equations (1 day) Expressions and Equations [CP] Lesson 8.8: Solutions of Inequalities (1 day) Lesson 8.2: Write Equations (2 days) Lesson 8.9: Write Inequalities (2 days)
	6.EE.2a	Write expressions that record operations with numbers and with letters standing for numbers.		
	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.		
	6.EE.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).		
	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.		

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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)	CCSS	Standard Description	Content	Resources (Suggested Number of Days)
<p>Unit 3: continued</p> <p>Expressions and Equations</p> <p>(35 days)</p>	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 equations.	<ul style="list-style-type: none"> • Decomposition • Direct Translation • Bar Model • Traditional • Substitution • Graphing 	<p>Equations in Two Variables (2 days)</p> <ul style="list-style-type: none"> ➤ <i>lessons under development</i> <p>Lesson 9.1: Independent and Dependent Variables</p> <p>Lesson 9.2: Equations and Tables</p> <p>Lesson 9.3: Analyze Relationships (Problem Solving)</p> <p>Mid-Chapter Checkpoint</p> <p>Lesson 9.4: Graph Relationships</p> <p>Lesson 9.5: Equations and Graphs</p> <p>Chapter 9 Review & Test (1 day)</p>

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<p>Essential Questions for this Unit:</p> <ol style="list-style-type: none"> 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? 				
<p>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.</p>				
Unit (Time)	CCSS	Standard Description	Content	Resources
Unit 3: continued Expressions and Equations (35 days)	6.EE.3	Apply the properties of operations to generate equivalent expressions.		Lesson 8.10: Graph Inequalities (1 day) Lesson 8.3: Model and Solve Addition Equations (Investigate) (2 days)
	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)		Equations with Algebra Tiles [L] Lesson 8.4: Solve Addition and Subtraction Equations (2 days)
	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.		One-Step Equations [L] One-Step Equations - Multiple Methods [L] Solving Equations - Multiple Methods [L] Solving Equations - Using Balance Scale, Decomposition, and Graphing [L] Equations - Multiple Representations and What We Know [L]
	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.		Lesson 8.5: Model and Solve Multiplication Equations (Investigate) (2 days) Lesson 8.6: Solve Multiplication and Division Equations (2 days) Lesson 8.7: Equations with Fractions (Problem Solving) (1 day)
	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.		Chapter 8 Review (use Mid-Chapter Checkpoint) (1 day) Chapter 8 Test (1 day)

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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?
6. How can students build on and reinforce their understanding of number, to begin to develop their ability to think statistically?
7. 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?
8. 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?
9. 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)	CCSS	Standard Description	Content	Resources
Unit 4: continued Geometry and Statistics (45 days)	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 $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	• Decomposition	Lesson 11.1: Three-Dimensional Figures and Nets (1 day) Lesson 11.2: Explore Surface Area (Investigate) (1 day) Surface Area [CP] Lesson 11.3: Surface Area of Prisms (Algebra) (1 day) Rectangular Prisms [L] Lesson 11.4: Surface Area of Pyramids (Algebra) (1 day) Mid-Chapter Checkpoint (1 day) Lesson 11.5: Fractions and Volume (Investigate) (1 day) Lesson 11.6: Volume of Rectangular Prisms (Algebra) (1 day) Volume [CP] Lesson 11.7: Geometric Measurements (Problem Solving) (1 day) Chapter 11 Review and Test (2 days)
	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.		
	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 by reporting the number of observations.		

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Essential Questions for this Unit:				
<ol style="list-style-type: none"> 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? 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? How can students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine? 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? How can students prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane? How can students build on and reinforce their understanding of number, to begin to develop their ability to think statistically? 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? 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? 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)	CCSS	Standard Description	Content	Resources
Unit 4: Geometry and Statistics (45 days)	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.	<ul style="list-style-type: none"> Count Squares Decompose to Simpler Shapes Traditional (formula) 	Lesson 10.1: Area of Parallelograms (Algebra) (1 day) Quadrilaterals [CP] Lesson 10.2: Explore Area of Triangles (Investigate) (1 day) Triangles [CP] Geometry Investigations [L] Lesson 10.3: Area of Triangles (Algebra) (1 day) Lesson 10.4: Explore Area of Trapezoids (Investigate) (1 day) Lesson 10.5: Area of Trapezoids (Algebra) (1 day) Mid-Chapter Checkpoint (1 day) Lesson 10.6: Area of Regular Polygons (1 day) Lesson 10.7: Composite Figures (1 day) Lesson 10.8: Changing Dimensions (Problem Solving) (1 day) Lesson 10.9: Figures on the Coordinate Plane (1 day) Chapter 10 Review and Test (2 days)
	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.		
	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.		

Grade 6 Mathematics Curriculum Guide

Grade Level/Course Title: Grade 6		Trimester 3	Academic Year: 2013-2014	
<p>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.</p>				
<p>Essential Questions for this Unit:</p> <ol style="list-style-type: none"> 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? 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? How can students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine? 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? How can students prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane? How can students build on and reinforce their understanding of number, to begin to develop their ability to think statistically? 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? 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? 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)	CCSS	Standard Description	Content	Resources
Unit 4: continued Geometry and Statistics (45 days)	6.SP.5b	Summarize numerical data sets in relation to their context, such as by describing the nature of the attribute under investigation, including how it was measured and its units of measurement.		Lesson 12.1: Recognize Statistical Questions (1 day) Lesson 12.2: Describe Data Collection (1 day) Lesson 12.3: Dot Plots and Frequency Tables (1 day) Lesson 12.4: Histograms (1 day) Mid-Chapter Checkpoint (1 day) Lesson 12.5: Mean as Fair Share and Balance Point (1 day) Lesson 12.6: Measures of Center (2 days) Lesson 12.7: Effects of Outliers (1 day) Lesson 12.8: Data Displays (Problem Solving) (1 day) Chapter 12 Review and Test (2 days)
	6.SP.5c	Summarize numerical data sets in relation to their context, such as by 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.5d	Summarize numerical data sets in relation to their context, such as by 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.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.		

Grade 6 Mathematics Curriculum Guide

Grade Level/Course Title: Grade 6	Trimester 3	Academic Year: 2013-2014
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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 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?
6. How can students build on and reinforce their understanding of number, to begin to develop their ability to think statistically?
7. 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?
8. 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?
9. 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)	CCSS	Standard Description	Content	Resources
Unit 4: continued Geometry and Statistics (45 days)	CC.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.		
	CC.6.SP.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.		
	6.SP.5c	Summarize numerical data sets in relation to their context, such as by 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.5d	Summarize numerical data sets in relation to their context, such as by 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.		