Grade 6 Mathematics

In sixth grade, students will use multiplication and division to solve problems about ratio and rate. Students will build on knowledge of multiplication and division to divide fractions by fractions. Computing with multi-digit numbers fluently will assist in finding common factors and multiples. Students will be extending their knowledge of ordering whole numbers to all rational numbers which will include negative numbers. They will be using pairs of numbers including negative numbers to locate and plot points on a graph. Students will be writing, interpreting, and using expressions and equations that correspond to a given situation, evaluate expressions and use expressions and formulas to solve problems. Properties of operations will be used to rewrite equivalent forms. This would include solving one-variable equations and inequalities and being able to represent and analyze quantitative relationships between dependent and independent variables. Building on and reinforcing their understanding of numbers, students begin to develop their ability to think statistically (understanding distribution). Solving real-world and mathematical problems involving area, surface area, and volume will be taught.

Supplemental materials/resources available: (in addition to the Practice Worksheets, Homework Practice Worksheets, Skills Practice Worksheets, Enrich activities, and common assessments))

Performance tasks measure the students' ability to integrate knowledge and skills across multiple topics, which helps in the preparation for college and future careers.
Are You Ready? Practice worksheets can be used to address individual needs before beginning the chapter. The Diagnostic Test can be used to test skills needed foe success in the upcoming chapter. Use the Chapter Pretest before each chapter to gauge the students' skill levels and as a quick check of the upcoming chapter's concepts to determine pacing.
The Extended-Response Test contains performance-assessment tasks and includes a scoring rubric.

There are six units outlined, all built around the Common Core. Although there is a timeframe suggested for the execution of each unit, adjustments can be made for purposes of customization and differentiation.

Content: Unit 1: Ratios and Proportional Relationships / The Number System (Glencoe Chapters 3 then 2)	**Duration:** 7 weeks
Essential Question:	How can mathematical ideas be represented? How can estimating be helpful? When is it better to use a fraction, decimal or a percent? How can you use mathematics to describe change and model real-world situations?
Skill:	Chapter 3: • Add and subtract decimals • Estimate the product of decimals and judge the reasonableness of the results. • Estimate and find product of decimals and whole numbers. • Multiply decimals by decimals. • Multiply decimals by powers of 10. • Solve problems by using the "Look for a pattern" strategy. • Find quotients of problems involving multi-digit divisors. • Estimate the quotients of decimals and judge the reasonableness of the results. • Divide decimals by whole numbers. • Divide decimals by decimals. • Fluently divide multi-digit numbers using the standard algorithm. • Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. Chapter 2: • Write decimals as fractions or mixed numbers and vice versa • Use models to illustrate the meaning of percents. • Write percents as fractions and vice versa • Write percents as decimals and decimals as percents • Write percents greater than 100% and less than 1% as fractions and as decimals. • Solve problems by using a simpler problem. • Compare and order fractions, decimals and percents. • Estimate the percent of a number. • Use percents to solve problems. • Find the percent of a number • Solve percent problems involving finding the whole or part.
Instructional/Engagement Activities	Unit Project Preview: **People Everywhere (Page 2 Glencoe Math)** You can use the U.S. Census to compare different characteristics of states' populations. Vocabulary Activities Graphic Novel to help students learn about using fractions in a real-world situation.

	21st Century Career Activities Key Concept Check Building on Essential Question exercises. Reflection using a graphic organizer
Assessment:	Are You Ready? Review Worksheets Diagnostic Testing Chapter Pretest Mid-Chapter Checks Formative Assessments Common Assessments: Glencoe Chapters 3 and 2 Tests (Summative)
Resources:	Chapters 3 and 2: Glencoe Math Course 1 (6th Grade) Are You Ready? Review Worksheets Inquiry Lab Activities Problem Solving Investigations Practice Pages, Reteach Pages, Enrich Pages
Standards:	Chapter 3: 6.NS.2: Fluently divide multi-digit numbers using the standard algorithm. 6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. Chapter 2: 6.RP.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. 6.RP.3c: Find a percent of a quantity as a rate per 100, solve problems involving finding the whole, given the part and the percent.
Vocabulary:	Chapter 3: compatible numbers Chapter 2: least common denominator, percent, percent proportion, proportion, rational number
Comments:	

Content: Unit 2: Ratios and Proportional Relationships / The Number System (Chapters 1 then 4)	**Duration:** 6 weeks
Essential Question:	How can you use mathematics to describe change and model real-world situations? How are rates used in real life? How does understanding situations that require multiplying and dividing of fractions help to solve real world problems that involve fractions?
Skill:	Chapter 1: • Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. 1 • Understand the concept of a unit rate associated with a ratio. 1 • Use ratio and rate reasoning to solve real-world and mathematical problems. 1 • Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on a coordinate plane.1 • Use tables to compare ratios.1 • Solve unit rate problems including those involving unit pricing and constant speed.1 • Find a percent of a quantity as a rate per 100, solve problems involving finding the whole, given a part and a percent.1 • Use ratio language and notation to describe a ratio relationship. • Find the unit rate a/b associated with a ratio. • Construct tables of equivalent ratios -Find the missing values in the tables. -Plot the pairs of values on the coordinate plane. • Compare ratios. • Solve unit rate problems involving unit pricing and constant speed. • Find a percent of a quantity as a rate per 100. • Solve problems involving finding the whole, given a part and the percentage. Chapter 4: • Interpret and compute quotients of fractions and mixed numbers. • Solve word problems involving division of fractions by fractions. • Interpret and compute quotients of fractions, and solve real-world problems involving division of fractions by fractions. • Estimate products of fractions. • Multiply fractions and whole numbers. • Multiply fractions and mixed numbers. • Change units of measure in the customary system • Solve problems by drawing a diagram. • Divide whole numbers by fractions. • Divide fractions by fractions. • Divide mixed numbers.

Instructional/Engagement Activities	Unit Project Preview: **Get Out the Map.** Plot locations on the coordinate plane. Play the project video to generate excitement.: Vocabulary Activities Graphic Novel to help students learn about using fractions in a real-world situation. 21st Century Career Activities Key Concept Check Building on Essential Question exercises. Reflection using a graphic organizer
Assessment:	Are You Ready? Review Worksheets Diagnostic Testing Chapter Pretest Mid-Chapter Checks Formative Assessments Common Assessments: Glencoe Chapters 1 and 4 Tests (Summative)
Resources:	Chapters 1 and 4 Glencoe Math Course 1 (6th Grade) Are You Ready? Review Worksheets Inquiry Lab Activities Problem Solving Investigations Practice Pages, Reteach Pages, Enrich Pages
Standards:	Chapter 1: 6.RP.1: Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. 6.RP.2: Understand the concept of a unit ratio, and use rate language in the context of a ratio relationship. 6.RP.3: 6.RP.3a: Make tables of equivalent ratios/compare ratios 6.RP.3b: Solve unit rate problems involving unit pricing and constant speed. 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.

	Chapter 4: 6.NS.1: Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions. 6.RP.3: 6.RP.3d: Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
Vocabulary:	Chapter 1: coordinate plane, equivalent ratio, graph, greatest common factor, least common factor, ordered pair, origin, prime factorization, rate, ratio, ratio table, scaling, unit price, unit rate, x-axis, y-axis, x-coordinate, y-coordinate Chapter 4: Commutative Property, reciprocals, dimensional analysis, unit ratio
Comments:	

Content: Unit 3: Geometry (Chapters 9 then 10)	**Duration:** 6 weeks
Essential Question:	What types of units are necessary for finding the area of two dimensional figures and surface area and volume of three-dimensional figures? Why are these units appropriate? What is the relationship between area and volume? How does measurement help you solve problems in everyday life? How is shape important when measuring a figure?
Skill:	Chapter 9: • Determine the area of triangles and special quadrilaterals. • Determine the area of irregular or compound polygons. • Determine the volume of right rectangular prisms. • Given coordinates for the vertices of a polygon in the plane, -Use the coordinates to find side lengths and area of the polygon. • Represent three-dimensional figures using nets made of rectangles and triangles. • Determine the surface area of triangular and rectangular prisms. Chapter 10: • Find the volume of rectangular prisms. • Find the volume of triangular prisms. • Find the surface area of rectangular prisms using models and nets and using the formula.

	• Use nets to find the surface area of triangular prisms. • Use nets to find the surface area of pyramids
Instructional/Engagement Activities	Unit Project Preview: **A new Zoo (Page 652 Glencoe Math)** Complete a project that involves designing a new zoo. Vocabulary Activities Graphic Novel to help students learn about using fractions in a real-world situation. 21st Century Career Activities Key Concept Check Building on Essential Question exercises. Reflection using a graphic organizer
Assessment:	Are You Ready? Review Worksheets Diagnostic Testing Chapter Pretest Mid-Chapter Checks Formative Assessments Common Assessments: Glencoe Chapters 1 and 4 Tests (Summative)
Resources:	Chapters 9 and 10 Glencoe Math Course 1 (6th Grade) Are You Ready? Review Worksheets Inquiry Lab Activities Problem Solving Investigations Practice Pages, Reteach Pages, Enrich Pages
Standards:	Chapter 9: 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 to real-world and mathematical problems. 6.G.3: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to fine the length of a side. 6.NS.8: Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of the coordinates and absolute value to fine distances between points. Chapter 10: 6.G.2: Find the volume of a right triangular prism with fractional edge lengths. Apply the formulas V = lwh and V = bh to find volumes of right rectangular prisms. 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.
Vocabulary:	Chapter 9: Base, composite figure, congruent, formula, height, parallelogram, polygon rhombus Chapter 10: Cubic units, lateral face, prism, pyramid, rectangular prism, slant height, surface area, three-dimensional figure, triangular prism, vertex, volume.

Comments:

Content: Unit 4: Statistics and Probability (Chapters 11 then 12) **Duration:** 7 weeks

Essential Question:	How do dependent and independent variables affect a graph? How can the understanding and use of measures of central tendency be useful for interpreting and drawing conclusions about data? How re the mean, median, and mode helpful when describing data? Why is it important to carefully evaluate graphs? Why is learning mathematics important?
Skill:	Chapter 11: • Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it's in the answers. • 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. • 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. • Display numerical data in plots on a number line, including dot plots, histograms, and box plots. • Summarize numerical data sets in relation to their context such as reporting the number of observations, describing the nature of the attribute under investigation, including how it was measured and its unit of measurement. • Giving quantitative measures of center (median, mean) and variability (interquartile range/mean absolute deviation) as well as describing any overall pattern and any striking deviations

	from the overall pattern. • Relating the choice of measures of center and variability to the shape of the data distribution. Chapter 12: • Display numerical data in plots on a number line, line plots, histograms and box-and-whisker plots. • Determine quantitative measures of center and variability. • Describe any overall pattern and any deviations from the overall pattern. • Relate the choice of measures of center and variability to the shape of the data distribution and the context that the data was gathered.
Instructional/Engagement Activities	Unit Project Preview: **Let's Exercise (Page 800 Glencoe Math)** Make a bar graph about sports that students participate in each week. Vocabulary Activities Graphic Novel to help students learn. 21st Century Career Activities Key Concept Check Building on Essential Question exercises. Reflection using a graphic organizer
Assessment:	Are You Ready? Review Worksheets Diagnostic Testing Chapter Pretest Mid-Chapter Checks Formative Assessments Common Assessments: Glencoe Chapters 11 and 12 Tests (Summative) • Given examples of real-world problems that change relationship to one another variables will be used to represent the two quantities. • Given various examples of numerical data sets relation to their context will be determined through a display, analyzing or summarizing.
Resources:	Chapters 11 and 12 Glencoe Math Course 1 (6th Grade) Are You Ready? Review Worksheets Inquiry Lab Activities Problem Solving Investigations Practice Pages, Reteach Pages, Enrich Pages

Standards:	Chapter 11: 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.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. 6.SP.5 6.SP.5b: Describe the nature of the attribute under investigation, including how it was measured and its unit of measurement. 6.SP.5c: Giving quantitative measures of center (median/mean) and variability (IQR/MAD), 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: 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. Chapter 12: 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.4: Display numerical data in plots on a number line, including dot plots, histograms, and box plots. 6.SP.5……See Above 6.SP.5a 6.SP.5b 6.SP.5c 6.SP.5d
Vocabulary:	Chapter 11: Average, first quartile, interquartile range, mean, mean absolute deviation, measure of center, measures of variation, median, mode, outlier, quartiles, range, statistical question, third quartile. Chapter 12: Box plot, cluster, distribution, dot plot, frequency distribution, gap, histogram, line graph, line plot, peak, symmetric.

Comments:

Content: Unit 5: Integers/Expression and Equations Chapters 5, 6, then 7	**Duration:** 6 weeks
Essential Question:	Why do we need integers? How is computation with rational numbers similar and different to whole numbers? How can mathematical symbols model verbal expressions? How is it helpful to write numbers in different ways? How do you determine if 2 numbers or expressions are equal? How can we utilize equations to solve problems?
Skill:	Chapter 5: • Represent quantities in real-world contexts using positive and negative numbers. • Determine the opposite of a number and recognize that the opposite of the opposite of number line is itself. Example: -(-3) = 3 • Locate and plot integers and other rational numbers on a horizontal and vertical number line. • Locate and plot pairs of integers and other rational numbers on a coordinate plane. • Understand ordering and absolute values of rational numbers. • Solve real world and mathematical problems by graphing points in all 4 quadrants of the coordinate plane. • Understand that positive and negative numbers are used together to describe quantities having opposite directions or values. • Understand a rational number as a point on a number line. Extend number line diagrams and coordinate axes familiar with previous grades to represent points on a line and in the plane with negative number coordinates. • Write, interpret, and explain statement of order for rational numbers in real-world contexts. • Interpret the absolute value of a rational number as the distance from 0 on a number line. • Solve real-world and math problems by plotting points in all four quadrants of the coordinate plane. -Include the use of coordinates and absolute value to find distances between points. Chapter 6: • Write and evaluate numerical expressions involving whole-number exponents. • Write algebraic expressions from verbal descriptions. • Identify parts of an expression using mathematical terms. • Evaluate expressions at specific values of their variables including real-world problems.

	• Apply the properties of operations to generate equivalent expressions. • Write algebraic expressions to represent real-world or mathematical problems. Chapter 7: • Solve real-world and mathematical problems by writing and solving equations. • Solve equations by using mental math and the "Guess, check and revise" strategy. • Solve addition equations using models. • Solve and write addition equations. • Solve subtraction equations using models. • Solve and write subtraction equations. • Solve multiplication equations using models. • Solve and write multiplication equations. • Solve division equations using models. • Solve and write division equations.
Instructional/Engagement Activities	Unit Project Preview: **It's out of this world (Page 424 Glencoe Math)** Compare two planets' orbits around the sun. Vocabulary Activities Graphic Novel to help students learn. 21st Century Career Activities Key Concept Check Building on Essential Question exercises. Reflection using a graphic organizer
Assessment:	Are You Ready? Review Worksheets Diagnostic Testing Chapter Pretest Mid-Chapter Checks Formative Assessments Common Assessments: Glencoe Chapters 5, 6, 7 Tests (Summative) Given examples of multiplication and division problems students will show understanding of the skill. Given a number line positive numbers and negative numbers will be placed on opposite directions. (-3) and 3 are opposites Evaluate given examples of algebraic expressions.

Resources:	Chapters 5, 6, 7 Glencoe Math Course 1 (6th Grade) Are You Ready? Review Worksheets Inquiry Lab Activities Problem Solving Investigations Practice Pages, Reteach Pages, Enrich Pages
Standards:	Chapter 5: 6.NS.5: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values. 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. 6.NS.6a: Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line, recognize the opposite of the opposite. 6.NS.6b: Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane. 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.7: Understand ordering and absolute value of rational numbers. 6.NS.7a: Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. 6.NS.7b: Write, interpret, and explain statements of order for rational numbers in real-world contexts. 6.NS.7c: Understand the absolute value of a rational number as its distance from 0 on a number line, interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. 6.NS.7d: Distinguish comparisons of absolute value from statements about order. 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 and the same second coordinate. Chapter 6: 6.EE.1: Write and evaluate numerical expressions involving whole number exponents. 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. 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 parenthesis to specify a

	particular order. 6.EE.3: Apply the properties of operations to generate equivalent expressions. 6.EE.4: Identify when two expressions are equivalent. 6.EE.6: Use variables to represent numbers and write expression when solving a real-world or mathematical problem. Understand that a variable can represent an unknown number. 6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. 6.NS.4: Find the GCF of two whole numbers less than or equal to 100 and the LCM of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers. Chapter 7: 6.EE.5: Understand solving an equation or inequality as a process of answering a question: which values from a specific set make an equation or inequality true. Use substitution to determine whether a given number in a specifies set makes an equation or inequality true. 6.EE.7: Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px=q 6.RP.3:Use ratio and rate reasoning to solve real-world and mathematical problems.
Vocabulary:	Chapter 5: absolute value, positive integer, bar notation, quadrants, integer, rational number, negative integer, repeating decimal, opposites, terminating decimals Chapter 6: algebra, algebraic expressions, associative property, base, coefficient, commutative properties, constant, defining the variable, distributive property, equivalent expressions, evaluate, exponents, factor the expression, identity property, like terms, numerical expressions, perfect square, powers, properties, term, variable. Chapter 7: Addition property of equality, division property of equality, multiplication property of equality, subtraction property of equality, equal sign, equation, expressions, inverse operations, solution, solve.
Comments:	

Content: Unit 6: Functions and Inequalities (Chapters 8)	**Duration**: 4 weeks
Essential Question:	How are symbols such as <, >, = useful? How can a function table help you find input and output? What is the difference between an arithmetic and geometric sequence? How are order pairs of a function used to create a graph of a function? Why do you represent functions in different ways? How can graphing an inequality help to solve it? How is solving an inequality similar to solving an equation?
Skill:	Chapter 8: • Complete function tables and solve function rules. • Extend and describe arithmetic sequences using algebraic expressions. • Construct and analyze different verbal, tabular, graphical, and algebraic representations of functions. • Solve problems by making a table. • Solve inequalities by using mental math and the guess, check, and revise strategy. • Write and graph an inequality. • Solve and addition and subtraction inequalities. • Solve one step linier inequalities.
Instructional/Engagement Activities	Unit Project Preview: **It's out of this world (Page 424 Glencoe Math)** Compare two planets' orbits around the sun. Vocabulary Activities Graphic Novel to help students learn. 21st Century Career Activities Key Concept Check Building on Essential Question exercises. Reflection using a graphic organizer
Assessment:	Are You Ready? Review Worksheets Diagnostic Testing Chapter Pretest Mid-Chapter Checks Formative Assessments Common Assessments: Glencoe Chapters 8 Tests (Summative)

Resources:	Chapter 8 Glencoe Math Course 1 (6th Grade) Are You Ready? Review Worksheets Inquiry Lab Activities Problem Solving Investigations Practice Pages, Reteach Pages, Enrich Pages
Standards:	Chapter 8: 6.EE.2: Write, read, and evaluate expressions in which letters stand for numbers. 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 parenthesis to specify a particular order. 6.EE.5: Understand solving an equation or inequality as a process of answering question: which values from a specified set make the equation or inequality true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true. 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 any number in a specified set. 6.EE.8: Write an inequality in the form x>c or x<c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities in these forms have infinitely many solutions; represent solutions of such inequalities on number line diagrams. 6.EE.9: Use variables to represent two quantities in a real-world problem that change in relation 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.
Vocabulary:	Chapter 8: arithmetic sequence, dependent variable, function, function rule, function table, geometric sequence, independent variable, inequality, linear function, sequence, term

Comments: