Grade 5	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
5.OA Operations and Algebraic Thinking			
Write and interpret numerical expressions.			
1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	Algebraic Problem Solving	Evaluating Expressions - Two Steps
2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.	Algebraic Problem Solving	Evaluating Expressions - One Step
Analyze patterns and relationships.			
3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.	Patterns	Patterns
5.NBT Number and Operations in Base Ten			
Understand the place value system.			
1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	Whole Numbers	Place Value
2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	Whole Numbers Decimals	Place Value Whole Number Multiplication and Division Operations with Whole Numbers Decimal Concepts
3	Read, write, and compare decimals to thousandths.	Decimals	Decimal Concepts
	a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).	Decimals	Decimal Concepts
	b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	Decimals	Decimal Concepts
4	Use place value understanding to round decimals to any place.	Decimals	Decimal Concepts

Grade 5	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Perform operations with multi-digit whole numbers and with decimals to hundredths.			
5	Fluently multiply multi-digit whole numbers using the standard algorithm.	Whole Numbers	Whole Number Multiplication and Division Operations with Whole Numbers
6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Whole Numbers	Whole Number Multiplication and Division Operations with Whole Numbers
7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	Decimals	Decimal Concepts Adding and Subtracting Decimals Multiplying and Dividing Decimals Operations with Decimals
5.NF Number and Operations - Fractions			
Use equivalent fractions as a strategy to add and subtract fractions.			
1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.	Fraction Operations	Adding Fractions Subtracting Fractions
2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.	Fraction Operations	Adding Fractions Subtracting Fractions

Grade 5	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.			
3	Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	Fractions	Fraction Concepts
4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.	Fraction Operations	Multiplying Fractions
	a. Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b.	Fraction Operations	Multiplying Fractions
	b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	Standard not addressed	Standard not addressed
5	Interpret multiplication as scaling (resizing), by:	Whole Numbers	Whole Number Multiplication and Division Operations with Whole Numbers
	a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.	Whole Numbers	Whole Number Multiplication and Division Operations with Whole Numbers
	b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n×a)/(n×b) to the effect of multiplying a/b by 1.	Fraction Operations	Multiplying Fractions
6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	Fraction Operations	Multiplying Fractions
7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.	Fraction Operations	Dividing Fractions
	a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.	Fraction Operations	Dividing Fractions
	b. Interpret division of a whole number by a unit fraction, and compute such quotients.	Fraction Operations	Dividing Fractions
	c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.	Fraction Operations	Dividing Fractions

Grade 5	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
5.MD Measurement and Data			
Convert like measurement units within a given measurement system.			
1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	Ratio and Proportion	Unit Conversions
Represent and interpret data.			
2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.	Standard not addressed	Standard not addressed
Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.			
3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.	Volume	Rectangular Prisms
	a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.	Volume	Rectangular Prisms
	b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.	Volume	Rectangular Prisms
4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	Volume	Rectangular Prisms
5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	Volume	Rectangular Prisms
	a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.	Volume	Rectangular Prisms
	b. Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.	Volume	Rectangular Prisms
	c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	Volume	Composite Shapes

Grade 5	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
5.G Geometry			
Graph points on the coordinate plane to solve real-world and mathematical problems.			
1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	Geometry in the Coordinate Plane	Introduction to the Coordinate Plane
2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	Geometry in the Coordinate Plane	Plotting Points
Classify two-dimensional figures into categories based on their properties.			
3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.	Geometric Figures and Their Properties	Classifying Triangles Quadrilaterals
4	Classify two-dimensional figures in a hierarchy based on properties.	Geometric Figures and Their Properties	Classifying Triangles Quadrilaterals

Grade 6	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
6.RP Ratios and Proportional Relationships			
Understand ratio concepts and use ratio reasoning to solve problems.			
1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.	Ratio and Proportion	Ratios
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.	Ratio and Proportion	Ratios Find Unit Rates
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.	Ratio and Proportion	Ratios
	a. 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.	Standard not addressed	Standard not addressed
	b. Solve unit rate problems including those involving unit pricing and constant speed.	Ratio and Proportion	Find Unit Rates
	c. 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.	Percentages	Percent Concepts Fraction, Decimal, and Percent Equivalents Percent and Percent Change Calculations with Percent
	d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	Ratio and Proportion	Unit Conversions
6.NS The Number System			
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.			
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.	Fraction Operations	Dividing Fractions Operations with Fractions
Compute fluently with multi-digit numbers and find common factors and multiples.			
2	Fluently divide multi-digit numbers using the standard algorithm.	Whole Numbers	Whole Number Multiplication and Division Operations with Whole Numbers
3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	Decimals	Adding and Subtracting Decimals Multiplying and Dividing Decimals Operations with Decimals
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.	Number Sense	Factors and Multiples Greatest Common Factor Least Common Multiple

Grade 6	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Apply and extend previous understandings of numbers to systems of rational numbers.			
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.	Integers	Integer Concepts
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.	Fractions Decimals Integers Geometry in the Coordinate Plane	Fraction Concepts Fraction and Decimal Equivalents Integer Concepts Integer Addition and Subtraction Introduction to the Coordinate Plane Plotting Points
	a. 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.	Integers	Integer Concepts
	b. 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.	Geometry in the Coordinate Plane	Introduction to the Coordinate Plane Plotting Points
	c. 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.	Fractions Decimals Integers Geometry in the Coordinate Plane	Fraction Concepts Fraction and Decimal Equivalents Integer Concepts Integer Addition and Subtraction Introduction to the Coordinate Plane Plotting Points

Grade 6	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
(continued) Apply and extend previous understandings of numbers to systems of rational numbers.			
7	Understand ordering and absolute value of rational numbers.	Integers	Integer Concepts
	a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.	Fractions	Comparing and Ordering Fractions
	b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.	Fractions	Comparing and Ordering Fractions
	c. 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.	Integers	Integer Concepts
	d. Distinguish comparisons of absolute value from statements about order.	Integers	Integer Concepts
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.	Geometry in the Coordinate Plane	Plotting Points
6.EE Expressions and Equations			
Apply and extend previous understandings of arithmetic to algebraic expressions.			
1	Write and evaluate numerical expressions involving whole-number exponents.	Exponents and Roots	Exponents
2	Write, read, and evaluate expressions in which letters stand for numbers.	Algebraic Problem Solving	Evaluating Expressions - One Step Evaluating Expressions - Two Steps
	a. Write expressions that record operations with numbers and with letters standing for numbers.	Algebraic Problem Solving	Evaluating Expressions - One Step Evaluating Expressions - Two Steps
	b. 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.	Standard not addressed	Standard not addressed
	c. 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).	Algebraic Problem Solving	Evaluating Expressions - One Step Evaluating Expressions - Two Steps
3	Apply the properties of operations to generate equivalent expressions.	Embedded throughout the program	Embedded throughout the program
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).	Standard not addressed	Standard not addressed

Grade 6	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Reason about and solve one-variable equations and inequalities.			
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.	Algebraic Problem Solving	Solving One Step Equations Solving Two Step Equations
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.	Embedded throughout the program	Embedded throughout the program
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.	Whole Numbers Fraction Operations Decimals	Whole Number Addition and Subtraction Whole Number Multiplication and Division Operations with Whole Numbers Adding Fractions Multiplying Fractions Operations with Fractions Adding and Subtracting Decimals Multiplying and Dividing Decimals Operations with Decimals
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.	Standard not addressed	Standard not addressed
Represent and analyze quantitative relationships between dependent and independent variables.			
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.	Linear Functions	Slope

Grade 6	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
6.G Geometry			
Solve real-world and mathematical problems involving area, surface area, and volume.			
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.	Perimeter and Area	Parallelograms Triangles Trapezoids Composite Shapes
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.	Volume	Rectangular Prisms
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.	Standard not addressed	Standard not addressed
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.	Standard not addressed	Standard not addressed
6.SP Statistics and Probability			
Develop understanding of statistical variability.			
1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.	Standard not addressed	Standard not addressed
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.	Data Analysis - Center and Spread	Measures of Center - Mode Measures of Center - Median Measures of Center - Mean Measures of Spread - Range
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.	Data Analysis - Center and Spread	Measures of Center - Mode Measures of Center - Median Measures of Center - Mean Measures of Spread - Range

Grade 6	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Summarize and describe distributions.			
4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	Data Analysis - Displays	Circle Graphs Bar Graphs and Histograms Stem-and-Leaf Plots Box and Whisker Plots
5	Summarize numerical data sets in relation to their context, such as by:	Data Analysis - Center and Spread	Measures of Center - Mode Measures of Center - Median Measures of Center - Mean Measures of Spread - Range
	a. Reporting the number of observations.	Standard not addressed	Standard not addressed
	b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	Standard not addressed	Standard not addressed
	c. 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.	Data Analysis - Center and Spread	Measures of Center - Mode Measures of Center - Median Measures of Center - Mean Measures of Spread - Range
	d. 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.	Standard not addressed	Standard not addressed

Grade 7	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
7.RP Ratios and Proportional Relationships			
Analyze proportional relationships and use them to solve real-world and mathematical problems.			
1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	Ratio and Proportion	Ratios Find Unit Rates
2	Recognize and represent proportional relationships between quantities.	Ratio and Proportion	Proportions
	a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.	Standard not addressed	Standard not addressed
	b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	Ratio and Proportion	Find Unit Rates
	c. Represent proportional relationships by equations.	Ratio and Proportion	Proportions
	d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.	Standard not addressed	Standard not addressed
3	Use proportional relationships to solve multistep ratio and percent problems.	Ratio and Proportion Percentages	Ratios Find Unit Rates Unit Conversions Proportions Similar Figures Percent Concepts Percent and Percent Change Calculations with Percent

Grade 7	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
7.NS The Number System			
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.			
	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.	Whole Numbers Fraction Operations Decimals Integers	Operations with Whole Numbers Adding Fractions Subtracting Fractions Operations with Fractions Adding and Subtracting Decimals Operations with Decimals Integer Concepts Integer Addition and Subtraction Operations with Integers
	a. Describe situations in which opposite quantities combine to make 0.	Integers	Integer Addition and Subtraction
1	b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.	Whole Numbers Fraction Operations Decimals Integers	Operations with Whole Numbers Adding Fractions Subtracting Fractions Operations with Fractions Adding and Subtracting Decimals Operations with Decimals Integer Concepts Integer Addition and Subtraction Operations with Integers
	c. Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	Integers	Integer Concepts Integer Addition and Subtraction Operations with Integers

Grade 7	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
(continued) Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.			
1	d. Apply properties of operations as strategies to add and subtract rational numbers.	Whole Numbers Fraction Operations Decimals Integers	Operations with Whole Numbers Adding Fractions Subtracting Fractions Operations with Fractions Adding and Subtracting Decimals Operations with Decimals Integer Concepts Integer Addition and Subtraction Operations with Integers
2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Whole Numbers Fraction Operations Decimals Integers	Operations with Whole Numbers Multiplying Fractions Dividing Fractions Operations with Fractions Multiplying and Dividing Decimals Operations with Decimals Integer Concepts Integer Multiplication and Division Operations with Integers
	a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	Embedded throughout the program	Embedded throughout the program
	b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real world contexts.	Integers	Integer Concepts Integer Multiplication and Division Operations with Integers

Grade 7	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
(continued) Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.			
2	c. Apply properties of operations as strategies to multiply and divide rational numbers.	Whole Numbers Fraction Operations Decimals Integers	Operations with Whole Numbers Multiplying Fractions Dividing Fractions Operations with Fractions Multiplying and Dividing Decimals Operations with Decimals Integer Concepts Integer Multiplication and Division Operations with Integers
	d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	Decimals	Fraction and Decimal Equivalents
3	Solve real-world and mathematical problems involving the four operations with rational numbers.	Embedded throughout the program	Embedded throughout the program
7.EE Expressions and Equations			
Use properties of operations to generate equivalent expressions.			
1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	Embedded throughout the program	Embedded throughout the program
2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.	Algebraic Problem Solving	Evaluating Expressions - One Step Evaluating Expressions - Two Steps Evaluating Expressions with the Distributive Property
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.			
3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.	Whole Numbers Fraction Operations Decimals	Operations with Whole Numbers Adding Fractions Subtracting Fractions Multiplying Fractions Dividing Fractions Operations with Fractions Adding and Subtracting Decimals Multiplying and Dividing Decimals Operations with Decimals

Grade 7	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
(continued) Solve real-life and mathematical problems using numerical and algebraic expressions and equations.			
4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	Embedded throughout the program	Embedded throughout the program
	a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.	Embedded throughout the program	Embedded throughout the program
	b. Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.	Standard not addressed	Standard not addressed
7.G Geometry			
Draw, construct, and describe geometrical figures and describe the relationships between them.			
1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	Ratio and Proportion	Proportions
2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	Standard not addressed	Standard not addressed
3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	Standard not addressed	Standard not addressed

Grade 7	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.			
4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	Perimeter and Area	Perimeter and Circumference Circles Composite Shapes
5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	Geometric Figures and Their Properties	Angles Angle Pairs Parallel Lines and Transversals
6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	Perimeter and Area	Parallelograms Triangles Trapezoids Circles Composite Shapes
		Surface Area	Rectangular Prisms Cylinders
		Volume	Rectangular Prisms Cylinders
7.SP Statistics and Probability			
Use random sampling to draw inferences about a population.			
1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	Standard not addressed	Standard not addressed
2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.	Standard not addressed	Standard not addressed
Draw informal comparative inferences about two populations.			
3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.	Standard not addressed	Standard not addressed
4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	Standard not addressed	Standard not addressed

Grade 7	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Investigate chance processes and develop, use, and evaluate probability models.			
5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	Probability	Simple Probability
6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.	Standard not addressed	Standard not addressed
7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	Standard not addressed	Standard not addressed
	a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.	Standard not addressed	Standard not addressed
	b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.	Probability	Simple Probability
8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	Probability	Compound Probability
	a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	Probability	Compound Probability
	b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.	Probability	Compound Probability
	c. Design and use a simulation to generate frequencies for compound events.	Standard not addressed	Standard not addressed

Grade 8	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
8.NS The Number System			
Know that there are numbers that are not rational, and approximate them by rational numbers.			
1	Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.	Standard not addressed	Standard not addressed
2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).	Standard not addressed	Standard not addressed
8.EE Expressions and Equations			
Work with radicals and integer exponents.			
1	Know and apply the properties of integer exponents to generate equivalent numerical expressions.	Standard not addressed	Standard not addressed
2	Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.	Exponents and Roots	Square and Cube Roots
3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.	Standard not addressed	Standard not addressed
4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	Exponents and Roots	Scientific Notation
Understand the connections between proportional relationships, lines, and linear equations.			
5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.	Standard not addressed	Standard not addressed
6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.	Linear Functions	Slope Slope-Intercept Form

Grade 8	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Analyze and solve linear equations and pairs of simultaneous linear equations.			
7	Solve linear equations in one variable.	Linear Functions	Slope Slope-Intercept Form Point-Slope Form
	a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).	Standard not addressed	Standard not addressed
	b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	Linear Functions	Slope Slope-Intercept Form Point-Slope Form
8	Analyze and solve pairs of simultaneous linear equations.	Algebraic Problem Solving 2	Solving a System of Linear Equations by Graphing Solving a System of Linear Equations Algebraically
	a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	Algebraic Problem Solving 2	Solving a System of Linear Equations by Graphing
	b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.	Algebraic Problem Solving 2	Solving a System of Linear Equations Algebraically
	c. Solve real-world and mathematical problems leading to two linear equations in two variables.	Algebraic Problem Solving 2	Solving a System of Linear Equations by Graphing Solving a System of Linear Equations Algebraically
8.F Functions			
Define, evaluate, and compare functions.			
1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	Standard not addressed	Standard not addressed
2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	Standard not addressed	Standard not addressed
3	Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.	Linear Functions	Slope-Intercept Form

Grade 8	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Use functions to model relationships between quantities.			
4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	Linear Functions	Slope Slope-Intercept Form Point-Slope Form
5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	Standard not addressed	Standard not addressed
8.G Geometry			
Understand congruence and similarity using physical models, transparencies, or geometry software.			
1	Verify experimentally the properties of rotations, reflections, and translations:	Standard not addressed	Standard not addressed
	a. Lines are taken to lines, and line segments to line segments of the same length.	Standard not addressed	Standard not addressed
	b. Angles are taken to angles of the same measure.	Standard not addressed	Standard not addressed
	c. Parallel lines are taken to parallel lines.	Standard not addressed	Standard not addressed
2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	Transformations	Translations Reflections Rotations Composition of Transformations
3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	Transformations	Translations Reflections Rotations Composition of Transformations
4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	Transformations	Translations Reflections Rotations Composition of Transformations
5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.	Geometric Figures and Their Properties	Angles Angle Pairs Parallel Lines and Transversals Classifying Triangles Quadrilaterals Angles in a Polygon

Grade 8	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Understand and apply the Pythagorean Theorem.			
6	Explain a proof of the Pythagorean Theorem and its converse.	Standard not addressed	Standard not addressed
7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	Right Triangles	Pythagorean Theorem: Hypotenuse Pythagorean Theorem: Legs Pythagorean Theorem: Mixed Problems
8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	Right Triangles	Distance Formula
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.			
9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	Volume	Cylinders Pyramids and Cones Spheres
8.SP Statistics and Probability			
Investigate patterns of association in bivariate data.			
1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	Standard not addressed	Standard not addressed
2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.	Standard not addressed	Standard not addressed
3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.	Standard not addressed	Standard not addressed
4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Number and Quantity			
N-RN The Real Number System			
Extend the properties of exponents to rational exponents.			
1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	Standard not addressed	Standard not addressed
2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	Exponents and Roots	Exponents Square and Cube Roots
Use properties of rational and irrational numbers.			
3	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	Standard not addressed	Standard not addressed
N-Q Quantities			
Reason quantitatively and use units to solve problems.			
1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	Embedded throughout the program	Embedded throughout the program
2	Define appropriate quantities for the purpose of descriptive modeling.	Embedded throughout the program	Embedded throughout the program
3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Standard not addressed	Standard not addressed
N-CN The Complex Number System			
Perform arithmetic operations with complex numbers.			
1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real.	Standard not addressed	Standard not addressed
2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	Standard not addressed	Standard not addressed
3	(+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.	Standard not addressed	Standard not addressed
Represent complex numbers and their operations on the complex plane.			
4	(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.	Standard not addressed	Standard not addressed
5	(+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation.	Standard not addressed	Standard not addressed
6	(+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Use complex numbers in polynomial identities and equations.			
7	Solve quadratic equations with real coefficients that have complex solutions.	Standard not addressed	Standard not addressed
8	(+) Extend polynomial identities to the complex numbers.	Standard not addressed	Standard not addressed
9	(+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	Standard not addressed	Standard not addressed
N-VM Vector and Matrix Quantities			
Represent and model with vector quantities.			
1	(+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, |v|, ||v||, **v**).	Standard not addressed	Standard not addressed
2	(+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	Standard not addressed	Standard not addressed
3	(+) Solve problems involving velocity and other quantities that can be represented by vectors.	Standard not addressed	Standard not addressed
Perform operations on vectors.			
4	(+) Add and subtract vectors.	Standard not addressed	Standard not addressed
	a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.	Standard not addressed	Standard not addressed
	b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.	Standard not addressed	Standard not addressed
	c. Understand vector subtraction v – w as v + (–w), where –w is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.	Standard not addressed	Standard not addressed
5	(+) Multiply a vector by a scalar.	Standard not addressed	Standard not addressed
	a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise.	Standard not addressed	Standard not addressed
	b. Compute the magnitude of a scalar multiple cv using ||cv|| = |c|v. Compute the direction of cv knowing that when |c|v ≠ 0, the direction of cv is either along v (for c > 0) or against v (for c < 0).	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Perform operations on matrices and use matrices in applications.			
6	(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.	Standard not addressed	Standard not addressed
7	(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.	Standard not addressed	Standard not addressed
8	(+) Add, subtract, and multiply matrices of appropriate dimensions.	Standard not addressed	Standard not addressed
9	(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.	Standard not addressed	Standard not addressed
10	(+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.	Standard not addressed	Standard not addressed
11	(+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.	Standard not addressed	Standard not addressed
12	(+) Work with 2 × 2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area.	Standard not addressed	Standard not addressed
Algebra			
A-SSE Seeing Structure in Expressions			
Interpret the structure of expressions.			
1	Interpret expressions that represent a quantity in terms of its context.*	Standard not addressed	Standard not addressed
	a. Interpret parts of an expression, such as terms, factors, and coefficients.	Algebraic Problem Solving Equivalent Algebraic Expressions	Evaluating Expressions - One Step Evaluating Expressions - Two Steps Evaluating Expressions with the Distributive Property Distributing and Factoring Out a Common Factor Combining Like Terms Monomials Multiplying Polynomials
	b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	Standard not addressed	Standard not addressed
2	Use the structure of an expression to identify ways to rewrite it.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Write expressions in equivalent forms to solve problems.			
3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	Standard not addressed	Standard not addressed
	a. Factor a quadratic expression to reveal the zeros of the function it defines.	Standard not addressed	Standard not addressed
	b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	Standard not addressed	Standard not addressed
	c. Use the properties of exponents to transform expressions for exponential functions.	Standard not addressed	Standard not addressed
4	Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.	Standard not addressed	Standard not addressed
A-APR Arithmetic with Polynomials and Rational Expressions			
Perform arithmetic operations with polynomials.			
1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	Equivalent Algebraic Expressions	Multiplying Polynomials
Understand the relationship between zeros and factors of polynomials.			
2	Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).	Standard not addressed	Standard not addressed
3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	Standard not addressed	Standard not addressed
Use polynomial identities to solve problems.			
4	Prove polynomial identities and use them to describe numerical relationships.	Standard not addressed	Standard not addressed
5	(+) Know and apply the Binomial Theorem for the expansion of (x + y)n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Rewrite rational expressions.			
6	Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.	Standard not addressed	Standard not addressed
7	(+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.	Standard not addressed	Standard not addressed
A-CED Creating Equations*			
Create equations that describe numbers or relationships.			
1	Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	Embedded throughout the program	Embedded throughout the program
2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Standard not addressed	Standard not addressed
3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.	Standard not addressed	Standard not addressed
4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	Standard not addressed	Standard not addressed
A-REI Reasoning with Equations and Inequalities			
Understand solving equations as a process of reasoning and explain the reasoning.			
1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Embedded throughout the program	Embedded throughout the program
2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Solve equations and inequalities in one variable.			
3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Linear Functions	Slope Slope-Intercept Form Point-Slope Form Two-Point Form
4	Solve quadratic equations in one variable.	Algebraic Problem Solving 2	Using the Quadratic Formula
	a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)2 = q that has the same solutions. Derive the quadratic formula from this form.	Standard not addressed	Standard not addressed
	b. Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.	Algebraic Problem Solving 2	Using the Quadratic Formula
Solve systems of equations.			
5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	Standard not addressed	Standard not addressed
6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	Algebraic Problem Solving 2	Solving a System of Linear Equations by Graphing Solving a System of Linear Equations Algebraically
7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	Standard not addressed	Standard not addressed
8	(+) Represent a system of linear equations as a single matrix equation in a vector variable.	Standard not addressed	Standard not addressed
9	(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Represent and solve equations and inequalities graphically.			
10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	Standard not addressed	Standard not addressed
11	Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*	Standard not addressed	Standard not addressed
12	Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	Standard not addressed	Standard not addressed
Functions			
F-IF Interpreting Functions			
Understand the concept of a function and use function notation.			
1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).	Standard not addressed	Standard not addressed
2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Standard not addressed	Standard not addressed
3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	Standard not addressed	Standard not addressed
Interpret functions that arise in applications in terms of the context.			
4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*	Standard not addressed	Standard not addressed
5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*	Standard not addressed	Standard not addressed
6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Analyze functions using different representations.			
7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*	Standard not addressed	Standard not addressed
	a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	Linear Functions Algebraic Problem Solving 2	Slope Slope-Intercept Form Point-Slope Form Two-Point Form Parallel and Perpendicular Lines Using the Quadratic Formula
	b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	Standard not addressed	Standard not addressed
	c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	Standard not addressed	Standard not addressed
	d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.	Standard not addressed	Standard not addressed
	e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	Standard not addressed	Standard not addressed
8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	Standard not addressed	Standard not addressed
	a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	Standard not addressed	Standard not addressed
	b. Use the properties of exponents to interpret expressions for exponential functions.	Standard not addressed	Standard not addressed
9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
F-BF Building Functions			
Build a function that models a relationship between two quantities.			
1	Write a function that describes a relationship between two quantities.*	Embedded throughout the program	Embedded throughout the program
	a. Determine an explicit expression, a recursive process, or steps for calculation from a context.	Embedded throughout the program	Embedded throughout the program
	b. Combine standard function types using arithmetic operations.	Standard not addressed	Standard not addressed
	c. (+) Compose functions.	Standard not addressed	Standard not addressed
2	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*	Patterns	Arithmetic Sequences - Recursive Form Arithmetic Sequences - Closed Form Geometric Sequences - Recursive Form
Build new functions from existing functions.			
3	Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	Standard not addressed	Standard not addressed
4	Find inverse functions.	Standard not addressed	Standard not addressed
	a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x3 for x > 0 or f(x) = (x+1)/(x–1) for x ≠ 1.	Standard not addressed	Standard not addressed
	b. (+) Verify by composition that one function is the inverse of another.	Standard not addressed	Standard not addressed
	c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.	Standard not addressed	Standard not addressed
	d. (+) Produce an invertible function from a non-invertible function by restricting the domain.	Standard not addressed	Standard not addressed
5	(+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
F-LE Linear and Exponential Models*			
Construct and compare linear and exponential models and solve problems.			
1	Distinguish between situations that can be modeled with linear functions and with exponential functions.	Standard not addressed	Standard not addressed
	a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	Standard not addressed	Standard not addressed
	b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	Linear Functions	Slope Slope-Intercept Form Point-Slope Form Two-Point Form
	c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	Formulas	Interest Solving: Simple Interest
2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	Patterns Linear Functions	Arithmetic Sequences - Recursive Form Arithmetic Sequences - Closed Form Geometric Sequences - Recursive Form Geometric Sequences - Closed Form Slope Slope-Intercept Form Point-Slope Form Two-Point Form
3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	Standard not addressed	Standard not addressed
4	For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	Standard not addressed	Standard not addressed
Interpret expressions for functions in terms of the situation they model.			
5	Interpret the parameters in a linear or exponential function in terms of a context.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
F-TF Trigonometric Functions			
Extend the domain of trigonometric functions using the unit circle.			
1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	Standard not addressed	Standard not addressed
2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	Standard not addressed	Standard not addressed
3	(+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosines, and tangent for x, π+x, and 2π–x in terms of their values for x, where x is any real number.	Standard not addressed	Standard not addressed
4	(+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	Standard not addressed	Standard not addressed
Model periodic phenomena with trigonometric functions.			
5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*	Standard not addressed	Standard not addressed
6	(+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.	Standard not addressed	Standard not addressed
7	(+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.	Standard not addressed	Standard not addressed
Prove and apply trigonometric identities.			
8	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.	Standard not addressed	Standard not addressed
9	(+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Geometry			
G-CO Congruence			
Experiment with transformations in the plane.			
1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Standard not addressed	Standard not addressed
2	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	Transformations	Translations Reflections Rotations Composition of Transformations
3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Standard not addressed	Standard not addressed
4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Standard not addressed	Standard not addressed
5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	Transformations	Translations Reflections Rotations Composition of Transformations
Understand congruence in terms of rigid motions.			
6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	Transformations	Translations Reflections Rotations Composition of Transformations
7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Standard not addressed	Standard not addressed
8	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Prove geometric theorems.			
9	Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	Standard not addressed	Standard not addressed
10	Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.	Standard not addressed	Standard not addressed
11	Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.	Standard not addressed	Standard not addressed
Make geometric constructions.			
12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	Standard not addressed	Standard not addressed
13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Standard not addressed	Standard not addressed
G-SRT Similarity, Right Triangles, and Trigonometry			
Understand similarity in terms of similarity transformations.			
1	Verify experimentally the properties of dilations given by a center and a scale factor:	Standard not addressed	Standard not addressed
	a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.	Standard not addressed	Standard not addressed
	b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Standard not addressed	Standard not addressed
2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	Ratio and Proportion	Similar Figures
3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Prove theorems involving similarity.			
4	Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.	Standard not addressed	Standard not addressed
5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Ratio and Proportion	Similar Figures
Define trigonometric ratios and solve problems involving right triangles.			
6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Standard not addressed	Standard not addressed
7	Explain and use the relationship between the sine and cosine of complementary angles.	Standard not addressed	Standard not addressed
8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Right Triangles	Pythagorean Theorem: Hypotenuse Pythagorean Theorem: Legs Pythagorean Theorem: Mixed Problems Distance Formula Trigonometric Ratios: Side Measure Trigonometric Ratios: Angle Measure
Apply trigonometry to general triangles.			
9	(+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.	Standard not addressed	Standard not addressed
10	(+) Prove the Laws of Sines and Cosines and use them to solve problems.	Standard not addressed	Standard not addressed
11	(+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
G-C Circles			
Understand and apply theorems about circles.			
1	Prove that all circles are similar.	Standard not addressed	Standard not addressed
2	Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	Standard not addressed	Standard not addressed
3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	Standard not addressed	Standard not addressed
4	(+) Construct a tangent line from a point outside a given circle to the circle.	Standard not addressed	Standard not addressed
Find arc lengths and areas of sectors of circles.			
5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	Standard not addressed	Standard not addressed
G-GPE Expressing Geometric Properties with Equations			
Translate between the geometric description and the equation for a conic section.			
1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	Standard not addressed	Standard not addressed
2	Derive the equation of a parabola given a focus and directrix.	Standard not addressed	Standard not addressed
3	(+) Derive the equations of ellipses and hyperbolas given foci and directrices.	Standard not addressed	Standard not addressed
Use coordinates to prove simple geometric theorems algebraically.			
4	Use coordinates to prove simple geometric theorems algebraically.	Standard not addressed	Standard not addressed
5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	Linear Functions	Parallel and Perpendicular Lines
6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Standard not addressed	Standard not addressed
7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*	Geometry in the Coordinate Plane Right Triangles	Midpoint Distance Formula

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
G-GMD Geometric Measurement and Dimension			
Explain volume formulas and use them to solve problems.			
1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.	Standard not addressed	Standard not addressed
2	(+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.	Standard not addressed	Standard not addressed
3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*	Volume	Rectangular Prisms Cylinders Pyramids and Cones Spheres Composite Shapes
Visualize relationships between two-dimensional and three-dimensional objects.			
4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	Standard not addressed	Standard not addressed
G-MG Modeling with Geometry			
Apply geometric concepts in modeling situations.			
1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).*	Standard not addressed	Standard not addressed
2	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*	Standard not addressed	Standard not addressed
3	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Statistics and Probability			
S-ID Interpreting Categorical and Quantitative Data			
Summarize, represent, and interpret data on a single count or measurement variable.			
1	Represent data with plots on the real number line (dot plots, histograms, and box plots).	Data Analysis - Displays	Bar Graphs and Histograms Box and Whisker Plots
2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	Data Analysis - Center and Spread	Measures of Center - Mode Measures of Center - Median Measures of Center - Mean Measures of Spread - Range Quartiles
3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	Standard not addressed	Standard not addressed
4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	Standard not addressed	Standard not addressed
Summarize, represent, and interpret data on two categorical and quantitative variables.			
5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	Standard not addressed	Standard not addressed
6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	Standard not addressed	Standard not addressed
	a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.	Standard not addressed	Standard not addressed
	b. Informally assess the fit of a function by plotting and analyzing residuals.	Standard not addressed	Standard not addressed
	c. Fit a linear function for a scatter plot that suggests a linear association.	Standard not addressed	Standard not addressed
Interpret linear models.			
7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	Linear Functions	Slope Slope-Intercept Form
8	Compute (using technology) and interpret the correlation coefficient of a linear fit.	Standard not addressed	Standard not addressed
9	Distinguish between correlation and causation.	Standard not addressed	Standard not addressed

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
S-IC Making Inferences and Justifying Conclusions			
Understand and evaluate random processes underlying statistical experiments.			
1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	Standard not addressed	Standard not addressed
2	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.	Standard not addressed	Standard not addressed
Make inferences and justify conclusions from sample surveys, experiments, and observational studies.			
3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	Standard not addressed	Standard not addressed
4	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	Standard not addressed	Standard not addressed
5	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	Standard not addressed	Standard not addressed
6	Evaluate reports based on data.	Standard not addressed	Standard not addressed
S-CP Conditional Probability and the Rules of Probability			
Understand independence and conditional probability and use them to interpret data.			
1	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).	Standard not addressed	Standard not addressed
2	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	Probability	Compound Probability
3	Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.	Standard not addressed	Standard not addressed
4	Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	Standard not addressed	Standard not addressed
5	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	Probability	Compound Probability

High School	Common Core State Standards for Mathematics	Apangea Learning Math	
		Unit	Thread
Use the rules of probability to compute probabilities of compound events in a uniform probability model.			
6	Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.	Standard not addressed	Standard not addressed
7	Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.	Standard not addressed	Standard not addressed
8	(+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.	Standard not addressed	Standard not addressed
9	(+) Use permutations and combinations to compute probabilities of compound events and solve problems.	Probability	Compound Probability
S-MD Using Probability to Make Decisions			
Calculate expected values and use them to solve problems.			
1	(+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.	Standard not addressed	Standard not addressed
2	(+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.	Standard not addressed	Standard not addressed
3	(+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.	Standard not addressed	Standard not addressed
4	(+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.	Standard not addressed	Standard not addressed
Use probability to evaluate outcomes of decisions.			
5	(+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.	Standard not addressed	Standard not addressed
	a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast food restaurant.	Standard not addressed	Standard not addressed
	b. Evaluate and compare strategies on the basis of expected values.	Standard not addressed	Standard not addressed
6	(+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	Probability	Simple Probability Compound Probability
7	(+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	Standard not addressed	Standard not addressed

The High School Standards specify the mathematics that all students should study in order to be college and career ready. Additional mathematics that students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics is indicated by a (+) symbol. All standards without a (+) symbol should be in the common mathematics curriculum for all college and career ready students. Standards without a (+) symbol may also appear in courses intended for all students.

Making mathematical models is a Standard for mathematical practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (*). The star symbol sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to all standards in that group.