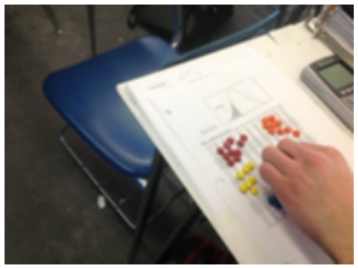
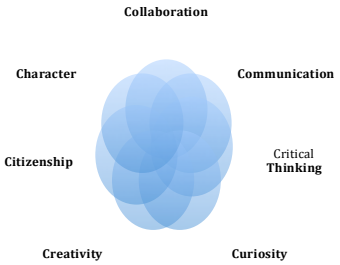
Content Area: Mathematics	Course: Math	Grade Level: 7/Pre Algebra
	**R14 The Seven Cs of Learning** 	

Unit Titles	Length of Unit
• Rational Numbers and Exponential Notation	9 weeks
• Proportionality	5 weeks
• Linear Relationships	9 weeks
• Creating, Comparing, and Analyzing Geometric Figures	9 weeks
• Statistical Inferences and Probability	6 weeks

Strands	Course Level Expectations
Ratios and Proportional Relationships	• Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, • Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope • Distinguish proportional relationships from other relationships.
The Number System	• Develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. • Apply properties of operations to add, subtract, multiply, and divide rational numbers • Solve real-world and mathematical problems involving the four operations with rational numbers. • 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
Expressions & Equations	• Formulate expressions and equations in one variable and use these equations to solve problems. • 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. • Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. • Graph proportional relationships, interpreting the unit rate as the slope of the graph. • Compare two different proportional relationships represented in different ways • Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. • Know and apply the properties of integer exponents to generate equivalent numerical expressions • Use scientific notation to represent very small and very large quantities and perform operations with numbers expressed in scientific notation.

Strands	Course Level Expectations
Geometry	• Analyze and interpret the relationship between two-dimensional and three-dimensional figures • Solve problems involving scale drawings of geometric figures • Solve real-life and mathematical problems involving angle measure, area, surface area, and volume • Construct geometric shapes with given conditions. • Use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems
Statistics & Probability	• Use random sampling to draw inferences about a population. • Draw informal comparative inferences about two populations. • Investigate chance processes and develop, use, and evaluate probability models. • Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

Unit Title	Rational Numbers and Exponential Notation	Length of Unit	9 weeks

Inquiry Questions (Engaging & Debatable)	● What strategies are most efficient for operating with rational numbers? ● How are positive and negative quantities represented in the real world? ● Can all numbers be represented as fractions and decimals? ● Are there more efficient ways to represent very large or very small quantities? ● Do the properties of operations hold when working with exponents? ●
Standards	**The Number System:** 7. NS.A.1, 7. NS.A.2, 7. NS.A.3, 8.NS.A.1, 8.NS.A.2, **Expressions and Equations:** 8.EE.A.1, 8.EE.A.2, , 8.EE.A.3, , 8.EE.A.4
Unit Strands & Concepts	● Properties of operations ● Rational numbers ● Equivalence ● System of real numbers ● Exponentiation
Key Vocabulary	Rational numbers, Integer, Additive inverse, Finite decimal, Infinite Decimal, Real Numbers, Irrational numbers, Rational numbers, radical, radicand, square roots, perfect squares, cube roots, terminating decimals, repeating decimals, truncate, laws of exponents, power, perfect cubes, scientific notation

Unit Title	Rational Numbers and Exponential Notation`	Length of Unit	9 weeks

Critical Content: My students will Know…	Key Skills: My students will be able to (Do)…
● Adding a negative number is equivalent to subtracting its positive opposite ● Multiplying by a given number is equivalent to dividing by its reciprocal ● The sum of any number and its opposite is zero ● Properties of operations extend to all rational numbers ● The rules for multiplying rational numbers allow for the distributive property to be extended to all rational numbers ● Integers can be divided, provided that the divisor is not zero ● Every quotient of integers (with non-zero divisor) is a rational number. (i.e -(p/q)=(-p)/1=p/(-q) ● The decimal form of a rational decimal either terminates in zeros or eventually repeats ● Every number has a decimal expansion ● Non-perfect squares and non-perfect cubes are irrational. ● The laws of exponents as well as why they work in mathematics	● Apply properties of operations as strategies to add, subtract, multiply, and divide rational numbers. ● Describe situations in which opposite quantities sum to zero ● 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. ● Interpret products and quotients of rational numbers by describing real-world contexts. ● Solve problems involving complex fractions ● Convert a decimal expansion which repeats eventually into a rational number ● Use rational approximations of irrational numbers to compare the size of irrational numbers ● Locate irrational numbers approximately on a number line diagram, and estimate the value of expressions that include irrational numbers ● Apply the properties of integer exponents to generate equivalent numerical expressions. ● Evaluate square roots of small perfect squares and cube roots of small perfect cubes ● Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate and make comparisons among very large or very small quantities ● Perform operations with numbers expressed in scientific notation

Assessments:	Performance task focused on strategies for adding subtracting, multiplying, and dividing rational numbers, properties of operations representing rational and irrational numbers, operating with exponents, interpreting and representing quantities represented in scientific notation, evaluating square and cube roots
Teacher Resources:	Engage NY, 3 Act Task Bank, CCSS aligned anchor tasks, Illustrative Mathematics, Georgia Department of Education CCSS aligned tasks, North Carolina Department of Instruction, CCSS aligned tasks.

Unit Title	Proportionality	Length of Unit	5 weeks

Inquiry Questions (Engaging & Debatable)	● How are proportional relationships represented? ● What strategies and methods are most efficient in solving for an unknown in a proportional relationship? ● How is percent represented in mathematical and real world contexts?
Standards	**Ratios and Proportional Relationships** 7.RP.A.1, &. RP.A2, 7.RP.A3
Unit Strands & Concepts	● Multiplicative reasoning ● Equivalence ● Proportional relationships ● Relationship between percent and fractions, decimals, and ratios
Key Vocabulary	Unit rates, ratios, proportional relationships, proportions, constant of proportionality, complex fractions, percent, simple interest, rate, principal, tax, discount, markup, markdown, gratuity, commissions, fees, percent of error

Unit Title	Proportionality	Length of Unit	5 weeks

Critical Content: My students will **Know**…	Key Skills: My students will be able to **(Do)**…
• Graphs that are not lines through the origin and tables in which there is not a constant ratio in the entries do not represent proportional relationships • cross multiplying can be used to solve a proportion represented by an equation through connecting the process with their prior work with unit rates and equivalent fractions • Percentages can also be used in making comparisons between two quantities	• Compute unit rates associated with ratios of fractions • Represent and analyze proportional relationships • Represent proportional relationships with equations • Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. • Use proportional relationships to solve multistep ratio and percent problems

Assessments:	Performance task focused on proportional reasoning, ways to representing and solving proportional relationships, equivalence, and strategies for solving mathematical and real world problems involving percent
Teacher Resources:	Engage NY, 3 Act Task Bank, CCSS aligned anchor tasks, Illustrative Mathematics, Georgia Department of Education CCSS aligned tasks, North Carolina Department of Instruction, CCSS aligned tasks.

Unit Title	Linear Relationships	Length of Unit	9 weeks

Inquiry Questions (Engaging & Debatable)	• How can algebraic expressions be represented? • How are the properties of operations helpful in working with equations and inequalities? • How are rational numbers used to represent real life problem situations? • How can linear relationships be represented?
Standards	**Expressions & Equations** 7.EE.A.1, 7.EE.A.2, 7.EE.B.3, 7.EE.B.4, 8.EE.B.5, 8.EE.B.6, 8.EE.B.7
Unit Strands & Concepts	• Properties of operations • Structure of equations, inequalities, and expressions • Equivalence • Representations of rational numbers
Key Vocabulary	coefficients, like terms, distributive property, factor,numeric expressions, algebraic expressions, maximum, minimum, Slope,similar triangles, y-intercept

Unit Title	Linear Relationships	Length of Unit	9 weeks

Critical Content: My students will Know…	Key Skills: My students will be able to (Do)…
● Different ways of writing expressions can serve different purposes and provide different ways of seeing a problem. ● Whole numbers, integers, and positive and negative fractions belong to a single system of rational numbers ● Recognize the ways in which the process of solving an inequality is similar to the process of solving linear equations: ● Multiplying or dividing both sides of an inequality by a negative number reverses the order of the comparison it represents ● The relationship between the graph of a proportional relationship and its equation y= mx as a special case of the relationship between a line and its equation y mx+ b, with b =0. ● Unit rate is synonymous with the the slope of the graph of an equation ● Slope is constant between any two points on a non-vertical line ● The slope of a vertical line is undefined and the slope of a horizontal line is 0. ● Equations have one solution when the variables do not cancel out. ● Equations having no solution have variables that will cancel out and constants that are not equal. ● An equation with infinitely many solutions occurs when both sides of the equation are the same.	● Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. ● Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), ● Apply properties of operations to calculate with numbers in any form; and convert between forms as appropriate ● Compare arithmetical and algebraic solutions to word problems ● Use variables to represent quantities in a real-world or mathematical problem ● Construct simple equations and inequalities to solve problems ● Graph the solution set of an inequality and interpret it in the context of the problem. ● Compare two different proportional relationships represented in different ways ● Graph proportional relationships ● 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. ● Solve one-variable equations including those with the variables being on both sides of the equals sign ● Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions ● Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property

Assessments:	Performance task focused on applying the properties of operations to work with equations and inequalities, equivalence, representing and operating with rational numbers, representing linear relationships in multiple ways, linear vs. nonlinear relationships.
Teacher Resources:	Engage NY, 3 Act Task Bank, CCSS aligned anchor tasks, Illustrative Mathematics.

Unit Title	Creating, Comparing, and Analyzing Geometric Figures	Length of Unit	9 weeks

Inquiry Questions (Engaging & Debatable)	• What conditions impact the possible constructions of a figure? • How are scale drawings useful in real world contexts? • What is the relationship between two and three-dimensional figures? • How do transformations affect the properties and characteristics of a given figure? • How can similarity and congruence be proved? • How are deducing facts about angle measure helpful in solving certain geometric problems?
Standards	**Geometry:** 7.G.A.1, 7.G.A.2, 7.G.A.3, 7.G.B.4, 7.G.B.5, 7.G.B.6, 8.G.A.1, 8.G.A.2, 8.G.A.3, 8.G.A.4, 8.G.A.5, 8.G.C.9
Unit Strands & Concepts	• Proportionality • Spatial reasoning • Geometric Attributes • Similarity and congruence • Geometric composition/decomposition • Rigid and nonrigid transformations • Deductive reasoning
Key Vocabulary	Scale drawing, dimensions, scale factor, plane sections, right rectangular prism, right rectangular pyramids, parallel, perpendicular, scalene triangle, obtuse triangle, equilateral triangle, right triangle, inscribed, circumference, radius, diameter, pi,, supplementary, vertical, adjacent, complementary, pyramids, face, base, cones, cylinders, spheres, translations, rotations, reflections, line of reflection, center of rotation, clockwise, counterclockwise, congruence, similarity, dilations, pre-image, image, rigid transformations, exterior angles, interior angles, alternate interior angles, angle-angle criterion, vertical angles, adjacent, supplementary, complementary, corresponding, transversal

Unit Title	Creating, Comparing, and Analyzing Geometric Figures	Length of Unit	9 weeks

Critical Content: My students will Know…	Key Skills: My students will be able to (Do)…
• Any cross-section of a prism cut by a plane parallel to the original planes is a copy of the base. • The relationship between the diameter and circumference of a circle • Relationship between radius and diameter of a circle • When conditions involving given side lengths or angle measures result in the construction of a unique triangle, more than one triangle, or no triangle • Rigid motions preserve the lengths of line segments and the measurements of angles. • 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 • Shape is preserved under dilations, but that size is not preserved unless r =1 . • The relationship between the volume of a cylinder and the volume of a cone • The volume of a sphere based on prior understanding of the volume of a cylinder	• Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions • 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. • Describe the two-dimensional figures that result from slicing three-dimensional figures • 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. • Apply understanding of supplementary, complementary, vertical, and adjacent angles to solve multi-step problems as well as to write and solve simple equations for an unknown angle in a figure. • Verify experimentally the properties of rotations, reflections, and translations • Describe a sequence that exhibits the congruence between two congruent figures. • Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. • Describe a sequence that exhibits the similarity between two congruent two-dimensional figures. • Use informal arguments to establish facts about the angle sum and exterior angle of triangles, • Justify an informal argument explaining the angles created when parallel lines are cut by a transversal, • Justify an informal argument explaining the angle-angle criterion for similarity of triangles. • Know the formulas for area and circumference of a circle and the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problem

Assessments:	Performance task focused on the calculation and application of the area and circumference of circles, geometric composition/decomposition, calculation and application of surface area etc.
Teacher Resources:	Engage NY, 3 Act Task Bank, CCSS aligned anchor tasks, Illustrative Mathematics,

Unit Title	Statistical Inferences and Probability	Length of Unit	6 weeks

Inquiry Questions (Engaging & Debatable)	• How can the likelihood of a given event be determined? • How can data from a representative sample be used to make inferences about a given population? • How can differences in observed frequency and theoretical probability be explained?
Standards	**Statistics and Probability** 7.SP.A.1, 7.SP.A.2, 7.SP.**B**.4, 7.SP.B.5, 7.SP.C.6, 7.SP.C7, 7.SP.C.8,
Unit Strands & Concepts	• Variability • Central Tendency • Statistical Inferencing • Sampling • Relative frequency • Theoretical probability
Key Vocabulary	Random sampling, population, representative sample, inferences, variation/variability, distribution, measures of center, measures of variability, sample spaces, probability, simple event, compound event, relative frequency

Unit Title	Statistical Inferences and Probability	Length of Unit	6 weeks

Critical Content: My students will Know…	Key Skills: My students will be able to (Do)…
● Probability as the relative frequency of a chance event ● 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. ● The connection between observed relative frequency and theoretical probability ● As the number of trials increase, the experimental probability approaches the theoretical probability. ● Multiplication can be useful in finite situations when counting outcomes for chance events ● A statistic computed from a random sample, such as the mean of the sample, can be used as an estimate of that same characteristic of the population from which the sample was selected. ● Statistics can be used to gain information about a population by examining a sample of the population ● Random sampling tends to produce a representative sample and support valid inferences ● There will be some degree of variability between a sample statistic and the target population	● Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency ● Predict the approximate relative frequency given the probability ● 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. ● Find probabilities of compound events using strategies such as organized lists, tables, tree diagrams, and simulation. ● 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. ● Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities ● Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

Assessments:	Performance task focused on developing, testing, and interpreting models of probability in comparison to observed frequencies, Applying strategies to compute compound probabilities, using measures of center and variability from random samples to draw inferences about two populations
Teacher Resources:	Engage NY, 3 Act Task Bank, CCSS aligned anchor tasks, Illustrative Mathematics