Eighth Grade Common Core Standards & Learning Targets

CCS Standards: The Number System	**Long-Term Target(s)**
Know that there are numbers that are not rational, and approximate them by rational numbers.	
8.NS1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	I can identify whether a number is rational or irrational by whether its decimal form is exact, repeating, or does not repeat. I can convert repeating decimal numbers into their fraction equivalents.
8.NS2. 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., √ 2). *For example, by truncating the decimal expansion of* √2, *show that* √2 *is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*	I can estimate rational and irrational numbers in order to compare their relative size and location on a number line.
CCS Standards: Expressions and Equations	**Long-Term Target(s)**
Work with radicals and integer exponents.	
8.EE1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, 32 × 3–5 = 3–3 = 1/33 = 1/27.*	I can describe and apply the properties of integer exponents to expressions.
8.EE2. Use square root and cube root symbols to represent solutions to equations of the form *x2 = p* and *x3 = 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.	I can solve one-step equations requiring square or cube roots and determine when the solution is rational or irrational. I can evaluate square roots of small perfect squares and cube roots of small perfect cubes. I can explain why √2 is irrational.
8.EE3. 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. *For example, estimate the population of the United States as 3 × 108 and the population of the world as 7 × 109, and determine that the world population is more than 20 times larger.*	I can estimate and compare very large and very small quantities using scientific notation. I can determine how many times bigger one number is than another using scientific notation.
8.EE4. 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).	I can describe when and where to use scientific notation and choose appropriate units for very large and very small numbers. I can compare, interpret and calculate values using scientific notation and decimal equivalents

Interpret scientific notation that has been generated by technology.	in the same problem.
Understand the connections between proportional relationships, lines, and linear equations.	
8.EE5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*	I can compare, contrast, and interpret multiple representations of proportional relationships (graphs, tables, equations, and verbal models). I can graph proportional relationships by using the unit rate as the slope of the graph. I can compare and contrast two different proportional relationships that are represented in different ways, i.e. an equation with a graph.
8.EE6. 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.	I can write and interpret an equation for a line in slope-intercept form and determine the relationship is linear using similar triangles to show the slope is the same between any two points.
Analyze and solve linear equations and pairs of simultaneous linear equations.	
8.EE7. Solve linear equations in one variable. 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). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	I can write, solve, and interpret the solution set of multi-step linear equations in one variable. This means: • I can determine when a solution gives one solution, infinitely many solutions, or no solutions. • I can apply the distributive property to algebraic expressions. • I can combine like terms to simplify expressions and equations.
8.EE8. Analyze and solve pairs of simultaneous linear equations. 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. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.*	I can write, solve, and interpret the solutions to systems of linear equations with two variables graphically and algebraically. This means, in part: • I can recognize and explain the solution to a system of linear equations graphically (as a point of intersection). • I can describe instances when a system of equations will yield one solution, no solutions, or infinitely many solutions.

c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*	
CCS Standards: Functions	**Long-Term Target(s)**
Define, evaluate, and compare functions.	
8.F1. 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.1	I can determine if a relation is a function using a table, graph, or set of ordered pairs.
8.F2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*	I can compare and contrast multiple representations of (tables, graphs, equations, and verbal models) of two functions. This means that from any type of representation: • I can determine whether the relationship is a function. • I can identify the rate of change and y-intercept for a linear function.
8.F3. 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. *For example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.*	I can determine if a function is linear or non-linear from a table, equation, graph, or verbal model.
Use functions to model relationships between quantities.	
8.F4. 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.	I can write, graph, and interpret linear functions. This means: • I can construct a function to model a linear relationship from a table of values, two points, or verbal description. • I can determine the rate of change (slope) and initial value (y-intercept) from a table and graph. • I can explain the meaning of the rate of change and initial value of a linear function in terms of the situation it models.
8.F5. 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.	I can describe the relationship between two quantities when given a graph. I can sketch a graph from a verbal description of a function.

CCS Standards: Geometry	Long-Term Target(s)
Understand congruence and similarity using physical models, transparencies, or geometry software.	
8.G1. Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.	I can describe and apply the properties of translations, rotations, and reflections on lines, line segments, angles, parallel lines and geometric figures.
8.G2. 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.	I can describe how two figures are congruent if the first figure can be rotated, reflected, and/or translated to create the second figure. Given two congruent figures, I can describe the transformations needed to create the second from the first.
8.G3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	I can describe and apply dilation, translation, rotation, and reflection to two-dimensional figures in a coordinate plane.
8.G4. 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.	I can describe how two figures are similar if the first figure can be rotated, reflected, dilated and/or translated to create the second figure. Given two similar figures, I can describe the transformations needed to create the second from the first.
8.G5. 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. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*	I can informally prove the following: • The angle-sum theorem; • The properties of angles when parallel lines are cut by a transversal; • The angle-angle criterion for similar triangles.
Understand and apply the Pythagorean Theorem.	
8.G6. Explain a proof of the Pythagorean Theorem and its converse.	I can describe a proof of the Pythagorean Theorem and its converse.
8.G7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	I can determine the unknown side lengths in a right triangle problem using the Pythagorean Theorem.
8.G8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	I can determine the distance between two points in a coordinate plane using the Pythagorean

	Theorem.
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	
8.G9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	I know and can apply the formulas for volumes of cones, cylinders, and spheres.
CCS Standards: Statistics and Probability	**Long-Term Target(s)**
Investigate patterns of association in bivariate data.	
8.SP1. 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.	I can construct and interpret scatter plots. This means: • I can describe the relationships shown in a scatter-plot by identifying patterns such as: clustering; • outliers; • positive or negative association; • linear association; • nonlinear association.
8.SP2. 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.	I can sketch a line of best fit on a scatter plot, justify the location of the line; and explain why or why not a given line is a good fit.
8.SP3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*	I can write the equation of a line of best fit and use it to make predictions. I can use the slope and y-intercept to describe he relationship represented in a data set.
8.SP4. 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. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*	I can construct two-way frequency and relative frequency tables to summarize categorical data. I can use relative frequencies to describe the possible association between two variables of categorical data.