Unit/Time	CONTENT	SKILLS	ASSESSMENTS	CCMS
Unit 1 **(20 days)**	**Real Numbers, Equations and Inequalities**	*Students will be able to…* • Simplify linear expressions utilizing the distributive property and collecting like terms. (8.EE.7) • Create a multi-step linear equation to represent a real-life situation. (8.EE.7) • Solve equations with linear expressions on either or both sides including equations with one solution, infinitely many solutions, and no solutions. (8.EE.7) • Create, solve, and graph one variable inequalities • Solve and graph solution set to compound inequalities • Create equations and solve including letter coefficients (A.CED.1, A.REI.3) • Rearrange formulas to highlight quantity of interest (A.CED.4) • Give examples of and identify equations as having one solution, infinitely many solutions, or no solutions. (8.EE.7) • Create and solve equation representations of more complex real-life situations. • Create and solve inequality representations of real-life situations. *(i.e. The school band sells shirts for $\$10$ each. It costs them $\$3$ per shirt to buy each shirt and $\$2$ per shirt to have the logo printed. There was also a $\$1000$ printer set-up fee. If they want to have a profit of at least $\$4$ per shirt sold, how many shirts do they need to sell?)* (A.CED.1, A.REI.3) • Solve simple quadratic equations of the form $ax^2 - c = p$.	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**Analyze and solve linear equations.** ▪ 8.EE.7 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. **Know that there are numbers that are not rational, and approximate them by rational numbers.** ▪ 8.NS.1 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. ▪ 8.NS.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). *For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*

		• Solve simple radical equations of the form $a\sqrt{x+b}=p$. • Distinguish between rational and irrational numbers. (8.NS.1) • Convert a decimal expansion which repeats eventually into a rational number. (8.NS.1) • Find rational approximations of irrational numbers. (8.NS.2) • Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions.(8.NS.2) • Explain the sum and product of rational/ irrational numbers (N.RN.3) • Evaluate square roots of small perfect squares and cube roots of small perfect cubes. (8.EE.2) • Use square root and cube root symbols to solve and represent solutions of equations. (8.EE.2) • Reduce irrational numbers to simplest radical form. $(\sqrt{24}=2\sqrt{6})$. *Some students may be ready to…* • Identify real and complex numbers through the introduction of $i=\sqrt{-1}$. • Rationalizing fractions with a square root in the denominator.		**Work with radical exponents.** 8.EE.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 $\sqrt{2}$ is irrational. **Standards for Inequalities?** **A.CED.1** **A.REI.3** **A.CED.4** **N.RN.3**
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	
Unit 2 **(10 days)**	**Functions (general)**	*Students will be able to …* • Verify that a relationship is a function or not. (8.F.1, F.IF.1) • Reason from a context, graph, or table after knowing which quantity is the input and which is the output. (8.F.1) • Represent and compare functions numerically, graphically, verbally and algebraically. (8.F.2) • Understand a graph is a set of solutions and a function representation (A.REI.10, F.IF.1, 8.F.1) • Describe the qualities of a function using a graph (e.g., where the function is increasing or decreasing, max/min, intercepts). (F.IF.4, 8.F.5)	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**Define, evaluate, and compare functions.** ▪ 8.F.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. ▪ 8.F.2 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.

		• Sketch a graph when given a verbal description of a situation. (8.F.5, F.IF.4) • Use function notation. (F.IF.2) • Discuss max/min and local max/min of a function (F.IF.4, 8.F.5) • Represent the domain and range of a function (F.IF.5) • Calculate and estimate average rate of change over an interval (F.IF.6)		▪ 8.F.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. **F.IF.4** **F.IF.2** **F.IF.5** **F.IF.6** **F.IF.1** **A.REI.10**
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	
Unit 3 **(25 days)**	**Linear Functions**	*Students will be able to …* • Interpret equations in form y=mx+b as a linear function with constant rate of change. (8.F.3, F.LE.1) • Determine whether a function is linear or non-linear. (8.F.3) • Identify and contextualize the rate of change and the initial value from tables, graphs, equations, or verbal descriptions. (8.F.4) • Construct a model for a linear function. (8.F.4) • Compare graphs, tables, and equations of proportional relationships. (8.EE.5) • Graph proportional relationships and interpret the unit rate as the slope. (8.EE.5) • Graph linear functions and show intercepts (F.IF.7, A.CED.2) • Compare graphs, tables, and equations of proportional relationships. (8.EE.5) • Use similar triangles to explain why the slope is the same between any two distinct points on a non-vertical line in the coordinate plane. (8.EE.6) • Derive the equation for a line through the origin and for a line intercepting the vertical axis at (0, b) . (8.EE.6) • Transform linear function $kf(x)$, $f(kx)$, $f(x)+k$, $f(x+k)$ (F.BF.3)	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**Understand the connections between proportional relationships, lines, and linear equations.** ▪ 8.EE.5 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. ▪ 8.EE.6 Use similar triangles to explain why the slope is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation for a line through the origin and the equation for a line intercepting the vertical axis at . **Define, evaluate, and compare functions.** ▪ 8.F.2 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.

		• Interpret parts of an expression in context including function notation (A.SSE.1, F.IF.2, F.LE.5, 8.F.4) • Compare properties of functions (linear) represented in different ways (F.IF.9, 8.F.2) • Find inverse function (F.BF.4) • Create inequalities in two variables and graph (A.CED.2, A.REI.12) • Represent constraints in linear equations and inequalities and interpret solutions as viable based on constraints (A.CED.3)		▪ 8.F.3 Interpret the equation as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function giving the area of a square as a function of its side length is not linear because its graph contains the points , and , which are not on a straight line. ▪ 8.F.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 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. **F.LE.1** **F.IF.7** **A.CED.2** **F.BF.3** **A.SSE.1** **F.IF.2** **F.LE.5** **F.IF.9** **F.BF.4** **A.CED.2** **A.REI.12** **A.CED.3**
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 4 **(12 days)**	**Systems of Linear Equations and Inequalities**	*Students will be able to …* • Solve systems by graphing, substitution, and elimination (combination). (8.EE.8, A.REI.6, A.REI.11) • Explain why intersection is solution to system (A.REI.11) • Determine if a system has one solution, no solutions, or many solutions. (8.EE.8)	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**Analyze and solve linear equations and pairs of simultaneous linear equations.** ▪ 8.EE.8 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.

		• Interpret the solution to a system of equations in context. (8.EE.8) • Graph the solution set of a system of inequalities (A.REI.12). • Determine if one solution, infinite solutions, or no solution by inspection (A.REI.6) • Prove replacing one EQ with the sum of it and a multiple of the other produces the same solution (A.REI.5)		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. 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.* **A.REI.12** **A.REI.6** **A.REI.11** **A.REI.5**
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 5 **(7 days)** ***Taught in 7th grade advanced math. We just need to review before PARCC.**	**Congruence and Similarity, Pythagorean Theorem, and Volume**	*Students will be able to…* • Describe a series of transformations that exhibits congruence between two congruent figures. (8.G.2) • Describe transformations (dilations, translations, rotations, and reflections) with words and with coordinates. (8.G.3) • Describe a series of transformations that exhibits similarity between two similar figures. (8.G.4) • Find the measures of angles using transversals, the sum of angles in a triangle, the exterior angles of triangles. (8.G.5) • Determine if triangles are similar using the angle-angle criterion. (8.G.5) • Justify congruence or similarity of figures using a series of transformations. (8.G.2 and 8.G.4).	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**Understand congruence and similarity using physical models, transparencies, or geometry software.** ▪ 8.G.1 Verify experimentally the properties of rotations, reflections, and translations: ▪ Lines are taken to lines, and line segments to line segments of the same length. ▪ Angles are taken to angles of the same measure. ▪ Parallel lines are taken to parallel lines. ▪ 8.G.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. ▪ 8. G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

		• Explain a proof of the Pythagorean Theorem and its converse. (8.G.6) • Use the Pythagorean Theorem to solve for a missing side of a right triangle given the other 2 sides in both 2-D and 3-D problems. (8.G.7) • Apply the Pythagorean Theorem to solve problems in real-world contexts. (8.G.7) • Apply the Pythagorean Theorem to find the distance between two points in the coordinate system. (8.G.8) • Find the volume of rounded objects in real-world contexts. (8.G.9) • Give volume in terms of π and using $\pi \approx 3.14$ or $\frac{22}{7}$. (8.G.9) • Find a missing dimension given the volume of rounded object. (8.G.9) • Derive (and use) the distance formula from the Pythagorean Theorem using the hypotenuse of a triangle. • Determine the volume of composite figures such as determining how much rubber is needed to make a tennis ball by taking the outer sphere volume minus the inner sphere volume or determining how much grain will fit in a cylindrical silo with a conical top.		▪ 8.G.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. ▪ 8.G.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. *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.* **Understand and apply the Pythagorean Theorem** ▪ 8.G.6 Explain a proof of the Pythagorean Theorem and its converse. ▪ 8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. ▪ 8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. **Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.** ▪ 8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 6 **(16 days)**	**Statistics**	*Students will be able to…* • Construct and interpret scatter plots and two-way tables for patterns such as positive or negative association, linearity or curvature, and outliers. (8.SP.1) • Generate an approximate line of best fit. (8.SP.2)	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets	**Investigate patterns of associations in bivariate data.** ▪ 8.SP.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.

		• Use the equation of a linear model to solve problems in the context of bivariate measurement data. (8.SP.3) • Interpret the slope and y-intercept of the line of best fit in context. (8.SP.3) • Show that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. (8.SP.4) • Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. (8.SP.4) • Use relative frequencies calculated for rows or columns to describe possible association between the two variables. (8.SP.4) • Explain why some points on a scatter plot would not be chosen to write an equation that represents the data. • Collect their own data, graph, interpret, and then make predictions using linear extrapolation and interpolation. • Find the standard deviation of a data set. • Use linear regression to generate the line of best fit. • Represent data with dot plots, histograms, and boxplots (S.ID.1) • Compare center (mean, median) and spread (interquartile range, standard deviation) of different data sets (S.ID.2) • Interpret differences in shape, center, and spread in context (S.ID.3) • Use mean and standard deviation to fit data set to a normal distribution (S.ID.4) • Construct scatter plots for bivariate measurement data (choose and interpret scale and origin) (8.SP.1, N.Q.1, S.ID.6) • Interpret scatter plots by investigating patterns including clustering, outliers, positive or negative association, and linear or nonlinear association (choose and interpret scale and origin) (8.SP.1, N.Q.1, S.ID.6)	Projects Quizzes Tests	▪ 8.SP.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. ▪ 8.SP.3 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.* ▪ 8.SP.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. *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?* **S.ID.1** **S.ID.2** **S.ID.3** **S.ID.4** **N.Q.1** **S.ID.6** **S.ID.6a** **S.ID.6c** **S.ID.6b** **S.ID.7** **S.ID.8** **S.ID.9** **S.ID.5**

		• For scatter plots, informally draw a function of best fit (S.ID.6a, S.ID.6c, 8.SP.2) • Informally assess the function of best fit by plotting and analyzing residuals (S.ID.6b, 8.SP.2) • Use the equation of the line of best fit to solve problems in context (S.ID.6a, 8.SP.3) • Interpret slope and the y-intercept of the equation in context (S.ID.7, 8.SP.3) • Compute and interpret correlation coefficient (S.ID.8) • Distinguish between correlation and causation (S.ID.9) • Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. (S.ID.5, 8.SP.4) • Use relative frequencies calculated for rows or columns to describe possible association between the two variables. (S.ID.5, 8.SP.4)		
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 7 **(7 days)**	**Polynomials, Exponents, and Scientific Notation**	*Students will be able to…* • Understand polynomials are a closed system (A.APR.1) • Find the degree of a polynomial (A.APR.1) • Add, subtract, multiply and divide polynomials (A.APR.1) • Apply the properties of integer exponents to generate equivalent numerical expressions. (8.EE.1) • Estimate very large or very small quantities using a single digit times a power of ten. (8.EE.3) • Express how much larger one number expressed as a single digit times a power of ten is than another in the context of the situation. (8.EE.3) • Express numbers in scientific notation. (8.EE.4) • Perform operations with numbers expressed in scientific notation and a mix of scientific notation and decimal notation. (8.EE.4)	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**Work with integer exponents.** • 8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* 32×3-5=3-3=133=127. • 8.EE.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. *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.* • 8.EE.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

		• Choose appropriate units of measurements for a given number in scientific notation. (8.EE.4) • Interpret scientific notation that has been generated by technology. (8.EE.4)		small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. **A.APR.1**
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 8 **(18 days)**	**Exponential Functions & Sequences**	• Prove exponential functions grow by equal factors and distinguish between exponential and linear (F.LE.1) • Create exponential equations (including for geometric sequence) given graph, description, or table in two variables (A.CED.2, F.IF.7, F.BF.1, F.BF.2) • Construct a function to model linear relationship including arithmetic sequences (recursively and with formula) given a graph, description, or table (F.BF.1, F.LE.2, F.BF.2) • Use function notation and evaluate exponential functions (F.IF.2) • Interpret exponential expressions in context (A.SSE.1, F.IF.4, F.LE.5, F.IF.8) • Choose and produce equivalent forms (A.SEE.3c, F.IF.8) • Graph exponential functions and sketch from description (A.CED.2, F.IF.4) • Discuss domain and range of exponential functions (F.IF.5) • Calculate and estimate average rate of change over an interval (F.IF.6) • Transform exponential function $kf(x)$, $f(kx)$, $f(x)+k$, $f(x+k)$ (F.BF.3)	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**F.LE.1** **A.CED.2** **F.IF.7** **F.BF.1** **F.BF.2** **F.IF.2** **A.SSE.1** **F.IF.4** **F.LE.5** **F.IF.8** **A.SEE.3c** **F.IF.8** **F.IF.5** **F.IF.6** **F.BF.3** **F.IF.9** **A.CED.1** **A.REI.11** **F.LE.2**

		• Compare properties of exponential functions and exponential and linear functions represented in different ways (F.IF.9) • Create exponential equations and inequalities in one variable and solve (A.CED.1) • Estimate graphically a solution to a system of exponentials or one exponential and one linear (A.REI.11)		
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 9 **(16 days)**	**Factoring Quadratic Expressions**	• Factor quadratics to find zeros (F.IF.8, A.SEE.3, A.CED.4)	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**F.IF.8** **A.SEE.3** **A.CED.4**
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 10 **(9 days)**	**Solving Quadratic Equations**	• Write quadratic function (F.BF.1) • Evaluate quadratic functions (F.IF.2) • Factor quadratics to find zeros (F.IF.8, A.SEE.3, A.CED.4) • Complete the square to find zeros, vertex, max/min, axis of symmetry (F.IF.8, A.SEE.3, A.CED.4) • Derive the quadratic formula (A.REI.4) • Create quadratic equations in two variables and graph (A.CED.2)	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**F.BF.1** **F.IF.2** **F.IF.8** **A.SEE.3** **A.CED.4** **A.REI.4** **A.CED.1** **A.CED.2**
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 11 **(12 days)**	**Transforming Quadratic Functions**	• Complete the square to find zeros, vertex, max/min, axis of symmetry (F.IF.8, A.SEE.3, A.CED.4)	Observation Participation Manipulatives	**F.IF.4** **F.IF.7** **F.BF.3**

		• Graph quadratic functions, sketch graph from description, and show max, min, intercepts (F.IF.4, F.IF.7) • Transform quadratic functions kf(x), f(kx), f(x)+k, f(x+k) (F.BF.3) • Calculate and estimate average rate of change over an interval (F.IF.6) • Compare properties of quadratic functions and quadratic and other functions represented in different ways (note that exponential grows faster than quadratic and quadratic faster than linear) (F.IF.9, F.LE.3)	Guided Practice Independent Practice Worksheets Projects Quizzes Tests	**F.IF.6** **F.IF.8** **A.SEE.3** **A.CED.4** **F.IF.9** **F.LE.3**
Unit/Time	**CONTENT**	**SKILLS**	**ASSESSMENTS**	**CCMS**
Unit 12 **(? days)**	**Absolute Value, Trig Functions, Special Right Triangles, and Radicals**	• *Unit to be developed depending on time. It varies from year to year.*	Observation Participation Manipulatives Guided Practice Independent Practice Worksheets Projects Quizzes Tests	