8th Grade Math Curriculum Map
Thinking with Math Models
Time Line: Marking Period 1

CCSS	Essential Questions/ Learning Goals	Skills /Vocabulary	Formative/ Summative Assessment	Resources
8.F.2 Compare properties of two functions each represented in a different way. Math Practices: 7	**How are functions useful?** 1. I can determine the properties of a function written in algebraic form. 2. I can determine the properties of a function when given the inputs and outputs in a table. 3. I can determine the properties of a function represented as a graph. 4. I can determine the properties of a function when given the situation verbally. 5. I can compare the properties of two functions that are represented differently.	Function, linear function, rate of change	Unit Test/NWEA	CMP: Thinking with Math models. Inv 1-3 CC Investigation 5: Bivariate Data
8.F.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. Math Practices: 3	1. I can explain that y=mx+b represents a linear function. 2. I can interpret the slope and y-intercept in relation to a function. 3. I can give examples of relationships	Linear function, slope, y-intercept, non-linear, rate of change,		

	that are non-linear functions. 4. I can analyze the rate of change between input and output values to determine if a function is linear or non-linear. 5. I can create a table of values that can be defined as a non-linear function.			
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 (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 table of values. Math Practices: 1	1. I can write a linear function that models a given situation given verbally as a tab le of x- and y- values or as a graph. 2. I can define the initial value, y-intercept ,and rate of change of a function in relation to the situation. 3. I can explain any constraints on the domain in relation to the situation.			
8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph. Sketch a graph that exhibits the qualitative features of a function that has been described verbally. Math Practices: 4	1. I can match the graph of a function to a give situation. 2. I can write a story that describes the functional relationship between two variables. *(Type 1 or 2) 3. I can create a graph of a function that describes the relationship between two variables.	Increasing, decreasing, linear, nonlinear		

8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between to quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. Math Practices: 4	1. I can plot ordered pairs on a coordinate grid representing the relationship between two data sets. 2. I can describe patterns in the plotter points such as clustering, outliers, positive or negative association, and linear or nonlinear association and describe the pattern in the context of the data sample. 3. I can interpret the patterns of association in the context of the data sample.	Scatter plot, bivariate, clustering, outliers, positive association, negative association, linear association, nonlinear association		Use ACE Problem 3 on page 33 to bring out the idea of positive and negative correlation.
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. Math Practices: 3	1. I can recognize whether or not data plotted on a scatter plot have a linear association. 2. I can draw a line of best fit? 3. I can determine whether or not my line of best fit is reliable.	Scatter plot, linear association, trend line, line of best fit, bivariate, linear model		
8.3P.3 Use the equation of a linear model to solve problems in the context of	1. I can write the equation of a line of best fit, and interpret the slope and y-intercept in terms of the situation.			

bivariate measurement data, interpreting the slope and intercept. Math Practices:2 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 ion two categorical variables collected from the same objects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables Math Practices: 3	2. I can use my line of best fit to make predictions regarding additional data points. 1. Can create a two-way table to record the frequencies of bivariate categorical values. 2. I can determine the relative frequencies for rows and or columns of a two way table. 3. I can use the relative frequencies and context of the problem to describe possible associations between the sets of data.	Bivariate, categorical data, two-way table, frequency, relative frequency		CC INV 5

CCSS	Essential Questions/ Learning Goals	Skills /Vocabulary	Formative/ Summative Assessment	Resources
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. Math Practices: 6	**In what ways can rational numbers be useful?** I can use reasoning to determine between which two consecutive whole numbers a square root will fall. I can plot the estimated value of an irrational number on a number line. I can estimate the value of an irrational number by rounding to a specific place value.	Rational and Irrational numbers.	NWEA/Unit Test	INV: 2.1 and 2.2 Square Root Ruler Activity Cube Root Block Activity.
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 the square root of 2 is irrational. Math Practices: 2	**How can algebraic expressions and equations be used to model analyze, and solve mathematical situations?** 1. I can recognize taking a square root as the inverse of squaring a number. 2. I can recognize taking a cube root as the inverse of cubing a number. 3. I can evaluate perfect square and cube roots. 4. I can justify that the square root	Cube, square, cube root, square root, radical, perfect square, perfect cube.		

	of a non-perfect square will be irrational.			
8.G.6 Explain a proof of the Pythagorean Theorem and its converse. Math Practices: 4, 7	**How does geometry better describe objects?** 1. I can use visual models to demonstrate the relationship of the three side lengths of any triangle. 2. I can use algebraic reasoning to related the visual model to the Pythagorean Theorem. 3. I can use the Pythagorean Theorem to determine if a given triangle is a right triangle.	Pythagorean Theorem, leg, hypotenuse, converse		Inv 3.1, 3.3, and 3.4
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. Math Practices: 4	**How does geometry better describe objects?** 1. I can apply the Pythagorean theorem to find an unknown side length of a right triangle. 2. I can draw a diagram and use the Pythagorean theorem to solve real-world problems involving right triangles. 3. I can draw a diagram to find the right triangles in a three-dimensional figure and use the Pythagorean Theorem to calculate various dimensions.			Inv. 3.1, 3.3, 3.4, 4.2.

8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. Math Practices: 2	**How does geometry better describe objects?** 1. I can connect any two points on a coordinate grid to a 3rd point so that the three points form a right triangle. 2. I can use the right triangle and the Pythagorean theorem to find the distance between the original two points.			Inv.3.3
8.NS.1 Know that numbers are not rational are called irrational. Understand informally that every number has a decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. Math Practices: 2	**In what ways can rational numbers be useful?** 1. I can classify a number as rational or irrational based on its decimal expansion. 2. I can convert a repeating decimal into a rational number.	Rational number, irrational number		Inv. 4.1

CCSS	Essential Questions/ Learning Goals	Skills /Vocabulary	Formative/Summative Assessment	Resources
8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. Math Practices: 7	**How can algebraic expressions and equations be used to model, analyze, and solve mathematical situations?** 1. I can determine the properties of integer exponents by exploring patterns and applying my understanding of properties of whole number exponents. 2. I can use the properties of integer exponents to simplify expressions	Integer, exponent	NWEA/ Unit Test	Growing, Growing Growing Skip ALL INV: 3, 4.3, 5.1, and 5.3. CC TRANSITION KIT INV 1: Exponents Supplement with Scientific Notation Unit
8.EE.3 Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. Math Practices: 7	1. I can write an estimation of a large quantity by expressing it as a product of a single-digit number and a negative power of ten. 2. I can write an estimation of a very small quantity by expressing it as the product of a single-digit number and a negative power of ten. 3. I can compare quantities written as the product of a single-digit number and a power of ten by stating their multiplicative relationships.	Power of Ten		
8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both	1. I can add and subtract two numbers written in scientific notation.	Scientific Notation		

decimal and scientific notation are used. Use scientific notation and chose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology. Math Practices: 6	2. I can multiply and divide two numbers written in scientific notation. 3. I select the appropriate units for measuring derived measurements when comparing quantities written in scientific notation. 4. I can identify and interpret the various ways scientific notation is displayed on calculators and through computer software.			

8th Grade Math Curriculum Map
FUNCTIONS
CC Transition Kit
Complete INV 2: Functions
Time Line: Marking Period 3

CCSS	Essential Questions/ Learning Goals	Skills /Vocabulary	Formative/ Summative Assessment	Resources
8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in two different ways. Math Practices: 8	**How can algebraic expressions and equations be used to model, analyze, and solve mathematical situations?** 1. I can graph a proportional relationship in the coordinate plane. 2. I can interpret the unit rate of a proportional relationship as the	Proportional relationships, Unit rate, slope	NWEA/ Unit Test	CC Transition Kit: INV 2

	slope of the graph. 3. I can justify that the graph of a proportional relationship will always intersect the origin (0,0) of the graph. 4. I can use a graph, a table, or an equation to determine the unit rate of a proportional relationship and use the unit rate to make comparison between various proportional relationships.			
8.EE.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. Math Practices: 1	**How can algebraic expressions and equations be used to model, analyze, and solve mathematical situations?** 1. I can create right triangles by drawing a horizontal line segment and a vertical line segment from any two points on a non-vertical line in the coordinate plane. 2. I can justify that these right triangles are similar by comparing the ratios of the lengths of the corresponding legs. 3. I can justify that since the triangles are similar, the ratios of all corresponding hypotenuses, representing the slope of the line,	Right triangle, let, hypotenuse, similar triangles, Slope, y-intercept.		

	will be equivalent. 4. I can justify that an equation in the form y=mx will represent the graph of a proportional relationship with a slope of m and a y-intercept of 0. 5. I can justify that an equation in the form of y=mx+b represents the graph of a linear relationship with a slope of m and a y-intercept of b.			
8.EE.7 Solve linear equations in one variable. Math Practices: 7	1. I can use the properties of real numbers to determine the solution of a linear equation.	Linear equation equivalent equations, rational number, coefficient, like terms, solution.		
8.EE.7.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. Math Practices: 7 8.EE.7.b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting	1. I can give examples of linear equations with one solution, infinitely many solutions, or no solution. 1. I can simplify a linear equation by using the distributive property and/or combining like terms.	Solution		

like terms. Math Practices: 7				
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 order pairs consisting of an input and the corresponding output. Math Practices: 3	**How are functions useful?** 1. I can explain that a function represents a relationship between an input and output where the output depends on the on the input; therefore, there can be only one output for each input. 2. I can show the relationship between the inputs and outputs of a function by graphing them as ordered pairs on a coordinate grid.	Function, input, output		

8th Grade Math Curriculum Map
Shapes of Algebra
Time Line: Marking Period 3

CCSS	Essential Questions/ Learning Goals	Skills /Vocabulary	Formative/ Summative Assessment	Resources
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	**How can algebraic expressions and equations be used to solve mathematical situations?** 1. I can explain how a line represents the infinite number of solutions to a linear equation with	Linear equation System of Linear Equations Simultaneous Linear Equations	Unit Test/ NWEA	INV 2.1: Shapes of Algebra 2.1 W.S. (Special Cases will be scattered throughout these

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 graph the equations. Solve simple cases by inspection. c. Solve real-world mathematical problems leading to two linear equations in two variables. <u>Math Practices</u>: 1, 2, 3, 4,	two variables. 2. I can explain how the point of intersection of two graphs will represent the solution to the system of two linear equations because those points are solutions to both equations. 3. I can use algebra reasoning (simple substitution) and the properties of real numbers to solve a system of linear equations. 4. I can use the graphs of two linear equations to estimate the solution of the system 5. I can use mathematical reasoning to solve simple systems of linear equations. 6. I can solve real-world problems and mathematical problems dealing with systems of linear equations and equations and interpret the solution in context of the problem.	Intersection		two worksheets) INV: 3.1 Shapes of Algebra W.S. 4.1. 4.3 Kuta Software Solving algebraically. (With Special Cases Spread throughout)

8th Grade Math Curriculum Map
Geometry Unit
Time Line: Marking Period 4

CCSS	Learning Goals	Skills /Vocabulary	Formative/ Summative Assessment	Resources
8.G.1: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angels are taken angles of the same measure. c. Parallel lines are taken to parallel lines. Math Practices:3 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. Math Practices:4 8.G.3	**How does geometry better describe objects?** I can verify- by measuring and comparing lengths, angle measures, and parallelism of a figure and its image that a figure has been translated, reflected, or rotated. 1. I can explain how transformations can be used to prove that two figures are congruent. 2. I can perform a series of transformations (reflections, rotations, and/or translations) to prove or disprove that two given figures are congruent. 1. I can describe the changes	Transformation, translation, reflection, rotation, parallel line, dilation	Unit Test/ NWEA 2 Unit Tests 1 after CC Transition Kit INV 3. 1 after CC Transition Kit 4	Kaleidoscopes, Hubcaps, and Mirrors: INV: 1,2,3,5 CC Transition Kit Investigation 3 CC Transition Kit 4

Describe the effects of dilations, translations rotations, and reflections on two-dimensions figures using coordinates. Math Practices: 2	occurring to the x- and y-coordinates after a **translation, reflection, rotation, or dilation**			
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 congruent figures, describe a sequence that exhibits the similarity between them.	1. I can explain how transformations can be used to prove that two figures are similar. 2. I can describe a sequence of transformations to prove or disprove that the two given figures are similar	Similar		
8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angels created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. Math Practices: 3	1. I can informally prove that the sum of any triangle's interior angles will have the same measure as a straight angle. (i.e. tearing the corners of a triangle.) 2. I can make conjectures regarding the relationships and measurements of the angles crated when two parallel lines are cut by a transversal. 3. I can apply proven relationships to establish minimal properties to justify similarity. (angle-angle)	Exterior Angle, Parallel lines, transversal, similar		
8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world mathematical problems.	I can describe the similarity between finding the volume of a cylinder and the volume of a right prism. I can recall the formula to find the	Cylinder, cone, sphere, volume		

Math Practices: 4	volume of a cylinder, cone, and sphere. I can informally prove the relationship between the volume of a cylinder and the volume of a cone with the same base. I can informally prove the relationship between the volume of a sphere and the volume of a circumcised cylinder. I can use the formulas to find the volume of cylinders, cones and spheres.			