Bethel School District
Common Core State Standard Curriculum Map
8th Grade Mathematics

CCSS Key:
Ratios & Proportional Relationships (RP)
The Number System (NS)
Expressions & Equations (EE)
Geometry (G)
Statistics & Probability (SP)
** Focus Power Standard*

Common Core State Standards for Mathematics (Outcome Based)	***Learning Targets (Knowledge & Skills)***	***Engage NY Modules & Lessons***	Assessments
Power Standard: 8.EE.B Work with radicals and integer exponents.			
8.EE.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.	8.EE.1.1 Use laws of exponents when multiplying numbers with the same base 8.EE.1.2 Use laws of exponents when dividing numbers with the same base 8.EE.1.3 Use laws of exponents when raising an exponential expression to a power 8.EE.1.4 Convert bases with negative exponents to fractions	Module 1: Integer Exponents and Scientific Notation **Lessons 1-6** *Mid-Module Assessment*	

	8.EE.1.5 Simplify algebraic expressions involving zero exponents 8.EE.1.6 Simplify algebraic expressions involving negative exponents		
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* 3×10^8 *and the population of the world as* 7×10^9*, and determine that the world population is more than 20 times larger.*	8.EE.3.1 Write numbers in scientific notation 8.EE.3.2 Multiply numbers written in scientific notation 8.EE.3.3 Divide numbers written in scientific notation 8.EE.3.4 Estimate values written in scientific notation 8.EE.3.5 Distinguish between small and large values of numbers in scientific notation by looking at exponents 8.EE.3.6 Use scientific notation to compare the relative size of two numbers 8.EE.3.7 Convert numbers to and from scientific notation and standard form	Module 1: Integer Exponents and Scientific Notation **Lessons 7-9**	
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 small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	8.EE.4.1 Multiply numbers written in decimal and scientific notation 8.EE.4.2 Divide numbers written in decimal and scientific notation 8.EE.4.3 Choose appropriate units to represent very large or very small quantities	Module 1: Integer Exponents and the Scientific Notation **Lessons 10-13** *Module Assessment*	

	8.EE.4.4	Read and understand scientific notation when generated by technology (3.5 EE -5 means 3.5 x 10^-5)		
Power Standard: 8.G.G Understand congruence and similarity using physical models, transparencies, or geometry software.				
8.G.1. 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.	8.G.1.1 8.G.1.2 8.G.1.3 8.G.1.4	Construct a rotation using geometric tools Construction a reflection using geometric tools Construction a translation using geometric tools Use and identify symbols such as A, A', A'' and $\lvert AB \rvert$, etc.	Module 2: The Concept of Congruence **Lessons 1-5**	
8.G.3. Describe the effect of dilations*, translations, rotations, and reflections on two-dimensional figures using coordinates. *This will be addressed in the module on similarity (Module 3).	8.G.3.1 8.G.3.2 8.G.3.3	Identify the new coordinates of a translation as (x+/-a, y+/-b) Identify the new coordinates of a reflection over a given line Identify the new coordinates of a rotation of a given number of degrees around a given point	Module 2: The Concept of Congruence **Lesson 6 (supplement due to limited coverage in ENY)**	
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.2.1 8.G.2.2 8.G.2.3	Define congruence as a finite series of rigid motions Write congruent statements such as $\Delta ABC \cong \Delta A'B'C'$ because … Determine if two figures are congruent by identifying the transformation used to	Module 2: The Concept of Congruence **Lessons 7-10** *Mid-Module Assessment* **Lesson 11**	

	produce the figures 8.G.2.4 Describe the sequence of transformations from one congruent figure to another		
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.* *The highlighted area will be addressed later in the unit on similarity.	8.G.5.1 Find the measures of missing angles in a triangle 8.G.5.2 Identify vertical angles as congruent because they are created rotations or reflections 8.G.5.3 Informally describe the relationships created by parallel lines and a transversal 8.G.5.4 Formally describe the relationships created by parallel lines and a transversal using the technical vocabulary (alternate interior angles, etc.) 8.G.5.5 Find measures of the interior and exterior angles in triangles formed between parallel lines	Module 2: The Concept of Congruence **Lessons 12-14** *Module Assessment*	
8.G.H Understand and apply the Pythagorean Theorem.			
8.G.6. Explain a proof of the Pythagorean Theorem and its converse.	8.G.6.1 Use the Pythagorean Theorem to find the missing side of a right triangle. 8.G.6.2 Identify the parts of a right triangle (legs and hypotenuse)	Module 2: The Concept of Congruence **Lesson 15 (optional)**	

	8.G.6.3 Use the Pythagorean Theorem to determine if three length measurements form a right triangle 8.G.6.4 Determine if a triangle is a right triangle by using the Pythagorean Theorem 8.G.6.5 Verify the Pythagorean Theorem by examining the area of squares coming off of each side of the right triangle 8.G.6.6 Explain a proof of the Pythagorean Theorem		
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.7.1 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world problems in 2 dimension 8.G.7.2 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in mathematical and real-world problems in 3 dimensions	Module 2: The Concept of Congruence **Lesson 16 (optional)**	
8.G.G Understand congruence and similarity using physical models, transparencies, or geometry software.			
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.4.1 Explain the process of dilation using the vocabulary *scale factor* and *center of dilation* 8.G.4.2 Use a compass and ruler to dilate a two-dimensional object	Module 3: Similarity **Lessons 1-5** **Lesson 7**	

	8.G.4.3 Verify that the ratios of corresponding sides in dilated figures all have the same scale factor 8.G.4.4 Dilate a two-dimensional figure when given a scale factor 8.G.4.5 Given a dilated image, determine the scale factor between that and the original 8.G.4.6 Verify that corresponding angles in dilated figures are congruent 8.G.4.7 Using dilated figures, determine the length of missing sides 8.G.4.8 Know two figures are similar if the second can be obtained by the first from a series of dilation and rigid motions 8.G.4.9 Determine if two figures are similar when given a pre-image and an image 8.G.4.10 Given two similar figures, describe the sequence that proves their similarity	*Mid-Module Assessment* **Lesson 8-9**	
8.G.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	8.G.3.1 Identify the new coordinates of a dilation as (rx, ry) when 'r' is the scale factor 8.G.3.2 Identify the new coordinates of a similar figure after a dilation and series of rigid motions	Module 3: Similarity **Lesson 6**	
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	8.G.5.1 Use an informal argument to show that all triangles have an angle sum of 180 degrees	Module 3: Similarity	

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.*	8.G.5.2 Recognize that if two triangles have two corresponding angles that are congruent, then they automatically have three congruent angles and are therefore similar 8.G.5.3 Use angle relationships to recognize congruent angles when given triangles formed between two parallel lines 8.G.5.4 Determine if two triangles created between parallel lines are similar or not	**Lesson 10-12** *Module Assessment*	
8.G.H Understand and apply the Pythagorean Theorem.			
8.G.6. Explain a proof of the Pythagorean Theorem and its converse.	8.G.6.1 Explain a proof of the Pythagorean Theorem using similar triangles.	Module 3: Similarity **Lesson 13-14**	
8.EE.D Analyze and solve linear equations and pairs of simultaneous 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	8.EE.7.1 Classify the solution of a linear equation in one variable as no solution, one solution, or infinitely many solutions 8.EE.7.2 Solve multi-step one-variable equations, with rational number coefficients including using the distributive property	Module 4: Linear Equations **Lesson 1-9**	

the distributive property and collecting like terms.			
8.EE.C 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 object has greater speed.* **Highlighted portion is addressed near the end of Module 4.*	8.EE.5.1 Use real-world examples to understand the difference between constant rate and average rate 8.EE.5.2 Determine the unit rate for a given proportional relationship 8.EE.5.3 Determine if a data set represents a proportional relationship 8.EE.5.4 Write a linear equation in two variables using a proportional relationship 8.EE.5.5 Predict unknown values using a proportional data set 8.EE.5.6 Graph a proportional relationship from a table and recognize that the unit rate is the change in y-values when x is increased by one 8.EE.5.7 Understand informally that slope is a number that represents the slant of a line and can be positive, negative, zero or undefined 8.EE.5.8 Understand that the unit rate of a proportional relationship is the slope of the line	Module 4: Linear Equations **Lessons 10 – 14** *Mid-Module Assessment* **Lesson 15**	

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* + *b* for a line intercepting the vertical axis at *b.*	8.EE.6.1 Use a slope triangle to identify the slope of a line 8.EE.6.2 Use two separate slope triangles on the same line and explain why they create similar triangles 8.EE.6.3 Explain why you can use any two points on a line to determine the slope	Module 4: Linear Equations **Lesson 16**	
8.EE.D 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. 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.*	8.EE.8.a.1 Use two points to determine slope 8.EE.8.a.2 Find the slope and y-intercept of a linear equation written in slope-intercept form 8.EE.8.a.3 Graph a linear equation written in slope-intercept form 8.EE.8.a.4 Graph a linear equation written in standard form 8.EE.8.a.5 Write an equation given key information (slope, one point or two points) 8.EE.8.a.6 Solve a two-variable linear equation for y 8.EE.8.a.7 Rearrange linear equations from slope-intercept form to standard form and vice versa	Module 4: Linear Equations **Lesson 17-21** **Lesson 23**	

8.EE.C 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 object has greater speed.* **Highlighted portion is addressed near the end of Module 4.*	8.EE.5.9	Compare different representations of linear relationships to determine which has a greater rate	Module 4: Linear Equations **Lesson 22**	

8.EE.D 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. 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*	8.EE.8.a.8 8.EE.8.b.1 8.EE.8.b.2 8.EE.8.b.3 8.EE.8.b.4	Understand that the solution to a system of two linear equations is the point of intersection Graph two linear equations on the same graph and find the point of intersection Distinguish between systems one solution, no solution, and infinitely many solutions Solve a system of equations by substitution Solve a system of equations by elimination	Module 5: Examples of Functions from Geometry **Lesson 24 – 30** *Module Assessment*	

through the first pair of points intersects the line through the second pair.	8.EE.8.c.1	Solve real-world problems by writing two linear equations and solving the system 8.EE.8.c.4 Decide which method to use when solving systems of linear equations in real-world situations		
8.F.F Use functions to model relationships between quantities.				
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.1.1	Know that a function assigns to each input exactly one output 8.F.1.2 Understand that rate of change is not always constant and can offer examples of constant and non-constant situations 8.F.1.3 Know that a vertical line does not represent a linear function because there are an infinite number of outputs for a given input x	Module 5: Examples of Functions from Geometry **Lesson 1-2**	
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*.	8.F.4.4	Determine if a table represents a function 8.F.4.6 Compare two representations of functions (table, graph, equation)	Module 5: Examples of Functions from Geometry **Lesson 3 - 4**	
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. *For example, the function* $A = s^2$ *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)*	8.F.3.1	Understand that the equation *y = mx + b* is a straight line 8.F.3.2 Give examples of linear and non-linear functions	Module 5: Examples of Functions from Geometry **Lessons 5-6**	

and (3,9), 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 (*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.	8.F.4.1 Construct a function to show relationships between two quantities 8.F.4.2 Use a table or graph to determine rate of change and show understanding of the situation 8.F.4.3 Use a table or graph to determine initial value and show understanding of the situation	Module 5: Examples of Functions from Geometry **Lesson 7**	
8.G.I Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.			
8.G.9 Know the formulas for the volumes of cor use them to solve real-world and mathematical problems	8.G.9.1 Identify the shapes of cones, cylinders, and spheres 8.G.9.2 Use appropriate formulas for volume of cones, cylinders, and spheres in mathematical and real-world situations	Module 5: Examples of Functions from Geometry **Lessons 9 – 11** *Module Assessment*	
8.SP.J Investigate patterns of association in bivariate data.			
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.	8.F.5.2 Explain how slope changes when given a graph. 8.F.5.7 Sketch a graph by analyzing a situation that has been described verbally	Module 6: Linear Functions **Lessons 1-5**	
8.SP.1. Construct and interpret scatter plots for bivariate measurement data to investigate	8.SP.1.1 Construct a scatter plot on a plane using two variables	Module 6: Linear Functions	

patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	8.SP.1.2 Interpret scatter plot as linear or nonlinear 8.SP.1.3 Interpret the graph as strong correlation (clustering) or weak (outliers) 8.SP.1.4 Investigate the relationship between two quantities on a scatter plot 8.SP.1.5 Analyze the trend of a scatter plot and determine whether there is a positive, negative(linear), or no relationship (non-linear) 8.SP.1.6 Predict future outcomes using a scatter plot	**Lessons 6-7** *Mid-Module Assessment*	
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.2.1 Informally fit a straight line to scatter plots that suggest a linear association. 8.SP.2.2 Informally assess the closeness of the fit of the line.	Module 6: Linear Functions **Lessons 8-9** *Mid-Module Assessment*	
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.3.4 Interpret the real-world meaning of the slope and y-intercept in the context of the data given	Module 6: Linear Functions **Lessons 10-11**	
8.SP.4. Understand that patterns of association can	8.SP.4.1 Create a frequency table with collected data	Module 6: Linear	

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?*	8.SP.4.2 Interpret a frequency table 8.SP.4.3 Determine if there is a correlation between the information 8.SP.4.4 Read a graph to determine a correlation 8.SP.4.5 Construct a graph based on information given 8.SP.4.6 Make predictions and analyze the data between the variables in the frequency table 8.SP.4.7 Justify and defend the accuracy of my predictions	Functions **Lessons 13-14** *Module Assessment*	
8.NS.A 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.1.1 Classify numbers as irrational or rational. 8.NS.1.2 Understand that the decimal expansion of rational numbers repeats eventually. 8.NS.1.3 Understand that the decimal expansion of irrational numbers does not repeat. 8.NS.1.4 Convert the decimal expansion of a rational number to its a/b form.	Module 7: Introduction to Irrational Numbers using Geometry	

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., pi squared). For example, by truncating the decimal expansion of the square root of 2, show that the square root of 2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations	8.NS.2.1 Estimate the size of irrational numbers by comparing them to rational numbers. 8.NS.2.2 Estimate the location of irrational numbers on a number line.	Module 7: Introduction to Irrational Numbers using Geometry	
8.G.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	8.G.8.1 Construct a right triangle on a coordinate plane to determine the distance between two points 8.G.8.2 Use the Pythagorean Theorem to find the distance between two points in a coordinate plane 8.G.8.3 Determine or estimate the length of the hypotenuse of a right triangle on a coordinate plane	Module 7: Introduction to Irrational Numbers using Geometry	
8.EE.B Work with radicals and integer exponents			
8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form x squared = p and x cubed = p, where p is a rational #. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that the square root of 2 is irrational.	8.EE.B.1 Use radical notation to evaluate small perfect sq and perfect cubes. 8.EE.B.2 Know that the square root of 2 is irrational.	Module 7: Introduction to Irrational Numbers using Geometry	