Curriculum Map/Pacing Guide

School: Hazard Middle School Grade Level: 8 Subject: 8th Grade Mathematic Standards

Ky Standard	Content/Topic	Skill/Time Period	Assessment
KY.8.NS.1 Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational. **MP.2.** Reason abstractly and quantitatively. **MP.6.** Attend to precision. **MP.7.** Look for and make use of structure.	<u>The Number System</u> This unit addresses the Common Core State Standard domain The Number System and builds upon work from Grades 6 and 7 related to representations of and operations with rational numbers. When extending prior knowledge of number systems, students will examine rational numbers and how they compare and relate to the introduction to irrational numbers. Students will see that rational and irrational numbers are distinct sets. A rational number is always represented by a repeating or terminating decimal, while an irrational number cannot be; it is represented by a nonrepeating, nonterminating decimal. The rational numbers together with irrational	<u>I can express rational numbers with decimal expansions</u> **3 Class Periods:** • 1 period - Long Division Review • 2 periods - Decimal Expansion by dividing the numerator by the denominator <u>I can identify irrational numbers.</u> **5 Class Periods** • 1 period - Real Numbers Set Review • 1 period - Irrational Number Set introduction • 1 period - Difference Between Rational and Irrational Numbers	<u>Formative</u> • Daily Bellringers • Daily discussion and observation • Exit Slips at the end of each topic component • Pearson Digits Notes and Homework (printed and online) • Number Systems Quiz 1 (Long Division, Expanding Decimals to place values up to thousandth place) • Number Set Sort Activity • Number Set Mini Quiz • Perfect Squares pop quizzes (w/o calculators) • Perfect Squares Scavenger Hunt (timed stations) • Perfect Squares and Square Roots IXL (w/o calculators)

KY.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. **MP.2.** Reason abstractly and quantitatively. **MP.7.** Look for and make use of structure. **MP.8.** Look for and express regularity in repeated reasoning.	numbers make up the set of numbers called the real numbers. Students will solve problems involving square roots of numbers that are not perfect squares. These square roots are irrational numbers. Since an irrational number cannot be expressed with a repeating or terminating decimal, the square root sign is used to represent an exact square root of a number that is not a perfect square. However, in a real-world context, an approximation of the irrational number as a terminating decimal sometimes better serves to solve the problem.	• 2 periods - Identifying and Sorting Rational and Irrational Numbers <u>I can approximate irrational numbers.</u> **7 Class Periods** • 1 period – Perfect Square Review • 2 class periods – Approximating Non Perfect Squares using manual multiplication • 4 periods – Approximating Non Perfect Squares using formula <u>I can compare and order rational and irrational numbers.</u> **2 Class Periods** • Converting rational and irrational numbers to same form to compare and order	• Approximating Non Perfect Square Roots task cards (with manual multiplication) • Duplicate Non Perfect Square Roots Approximation task cards (with formula) • Approximating Non Perfect Square Roots Quiz • Converting Repeating Decimals to Fractions Quiz • Comparing Rational and Irrational Numbers map activity • Comparing Rational and Irrational Numbers mini-quiz • Ordering Rational and Irrational Numbers mini-quiz <u>Summative</u> • Unit A Exam

		in a sequence and on the number line. <u>I can solve real-world problems involving irrational numbers.</u> **1 Class Period** • Using conversion method to find solutions to real-world problems involving irrational numbers. **2 Class Periods Review** **1 Class Period Summative Assessment**	
KY.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	<u>Expressions and Equations A.</u> This unit will focus on solving all types of linear equations in one variable. Students solve a variety of multistep equations and encounter problems that may have no solution or infinitely many solutions. Until now, students have only encountered problems with one solution, so this is an	<u>I can solve two-step equations.</u> **3 Class Periods** • 2 periods – Solve standard and non-standard two step equations. • 1 periods – Write two step equations from word problems and solve.	<u>Formative</u> • Daily Bellringers • Daily discussion and observation • Exit Slips at the end of each topic component • Building Equations Packets • One and Simple Two Step Quiz

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 combining like terms. **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments and critique the reasoning of others. **MP.7** Look for and make use of structure. **KY.8.EE.1** Know and apply the properties of integer	important advancement in their understanding of math problems in the real world. In the next unit, which covers the remaining parts of the Expressions and Equations domain, students will relate linear equations to lines with slopes and will solve systems of linear equations. In addition to linear equations, the unit also focuses on exponents. Students were briefly introduced to	<u>I can solve equations with variables on both sides.</u> **2 Class Periods** • 1 period – Combining like terms • 1 periods – Isolating variable <u>I can solve equations using the distributive property.</u> **2 Class Periods** • Combining like terms and isolating variables <u>I can determine how many solutions an equation has.</u> **2 Class Periods** • 2 periods – Solving special equations with infinite solutions or none **2 Class Periods Review** **1 Class Period Summative assessment**	• Complex Two Step Pennants • E.E. Quiz 1 (with IXL remediation and requiz) • E.E. Quiz 2 (with individual consult and ESS referral) • Solving Equations Quizziz • Solving Equations Scavenger Hunt • Solving Equations Battleship <u>Summative</u> • Unit B Part 1 Exam

exponents to generate equivalent numerical expressions. **MP.3** Construct viable arguments and critique the reasoning of others. **MP.7** Look for and make use of structure. **MP.8** Look for and express regularity in repeated reasoning. **KY.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 perfect squares and perfect cubes are rational. **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision.	exponents at the beginning of Grade 6, but they have only practiced those skills using formulas in geometry topics. Now, they delve into operations with exponents, including using them in scientific notation. The properties of exponents provide a structure that ensures efficient and uniform computations	<u>I can evaluate perfect squares and square roots and equations in the form $x^2 = p$.</u> **1 Class Period** • Use the TI-Inspire to find rational numbers squared, the square root of rational numbers, and the value of x using the inverse operations. <u>I can evaluate perfect cubes and cube roots and equations in the form $x^3 = p$.</u> **1 Class Period** • Use the TI-Inspire to find rational numbers cubed, the cube root of rational numbers, and the value of x using the inverse operations. <u>I can multiply exponential expressions.</u> **1 Class Period** • Use the product rule to multiply exponential terms with the same base.	<u>Formative</u> • Daily Bellringers • Daily discussion and observation • Exit Slips at the end of each topic component • Exponent Rules Guided Notes • Exponent Rules foldable • TI-Inspire Activities • Math is Exponentially Fun Activity • Product of a Power mini-quiz (Student self-check with IXL practice option) • Product of a Power Quiz • Quotient of a Power mini-quiz (Student self-check with IXL practice option) • Quotient of a Power Quiz • Mash-up Math Negative Exponents Video • Operations on Exponents Quiz (with remediation and IXL practice)

KY.8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 (Scientific Notation) to estimate very large or very small quantities and express how many times larger or smaller one is than the other. **MP.3** Construct viable arguments and critique the reasoning of others. **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **KY.8.EE.4** Perform operations with numbers expressed in		<u>I can divide exponential expressions.</u> **1 Class Period** • Use the quotient rule to divide exponential terms with the same base. <u>I can evaluate expressions with zero and negative exponents.</u> **1 Class Period** • Use the exponent rules associated with zero and negative exponents to evaluate exponential expressions. <u>I can use scientific notation to describe large quantities.</u> **2 Class Periods** • Convert very large numbers into scientific notation using base 10 exponent rules. <u>I can use scientific notation to describe very small quantities.</u> **2 Class Periods** • Convert very small numbers into scientific	<u>Summative</u> • Properties of Exponents Exam • Scientific Notation Exam • Unit B Part 2 Exam

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. Interpret scientific notation that has been generated by technology. **MP.2** Reason abstractly and quantitatively. **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision.		notation using base 10 exponent rules. <u>I can add and subtract numbers written in scientific notation.</u> **2 Class Periods** • Operations on numbers in the scientific notation format. <u>I can multiply and divide numbers written in scientific notation.</u> **2 Class Periods** • Operations on numbers in the scientific notation format. Both with and without technology.	

KY.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. **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments and critique the reasoning of others. **MP.4** Model with mathematics. **KY.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; know 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. **MP.3** Construct viable arguments and critique the reasoning of others.	<u>Expressions and Equations B.</u> Much emphasis was placed in Grades 6 and 7 on ratios and proportional relationships. Students used tables of values to graph linear equations in the context of proportional relationships, gaining a solid understanding of the constant of proportionality. Now, a formal connection is made to the concept of linear equations. Students explore linear equations of the form y = mx, which represent proportional relationships and are a good stepping stone to linear equations in y = mx + b form. The relationship between proportional relationships and linear equations is similar to that of rectangles and squares, where all squares are rectangles but not vice versa. Explaining this to students might help them understand that all proportional relationships are linear equations, but not all linear	<u>I can graph proportional relationships.</u> **1 Class period** • Using the coordinate grid to show relationships between two variables. <u>I can write linear equations in the form y = mx.</u> **1 Class period** • Using data and graphs to write linear equations with a y intercept at the origin. <u>I can find the slope of a line.</u> **1 Class period** • Using rise over run to the find the slope of a line on the coordinate grid by using congruent triangles to show the change in y over the change in x. <u>I can use data to find the unit rate/slope of a line.</u> **1 Class period**	<u>Formative</u> • Bellringers • Exit Slips • TI Inspire Activities (Graphing Lines, Using Slopes, Comparing Relationships, Solving Systems by Graphing. • Scavenger Hunt • Quizzes (Google Forms, hardcopy, TI Inspire) • Graphing Project using data • Student created assessments • Student created powerpoint lessons • Pearson Realize Topics 5 and 6 • Slope Foldable • Daily assignments • Observation • Whole class discussion • One on one discussion/instruction <u>Summative</u> Mid Unit Exam

MP.4 Model with mathematics. **MP.7** Look for and make use of structure. **KY.8.EE.8** Analyze and solve a system of two 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; understand that a system of two linear equations may have one solution, no solution, or infinitely many solutions. b. Solve systems of two linear equations in two variables algebraically by using substitution where at least one equation contains at least one variable whose coefficient is 1	equations are proportional relationships. Gaining competence with linear equations helps students model with mathematics, the fourth Standard for Mathematical Practice of the Common Core State Standards. This is especially beneficial given the real-world contexts that arise in this topic.	• Using data as points to find the change in y over the change in x. <u>I can find the y intercept of a line on the coordinate grid and analyze its meaning.</u> **1 Class period** • Use the y intercept to explain the "starting point" of the data relationship. <u>I can determine when a system of equations has one solution, no solutions, or infinite many solutions based on the slope of the lines.</u> **1 Class period** • Using the properties of parallel, perpendicular and unrelated lines and their slopes. <u>I can solve a simple system of equations using substitution.</u> **1 Class period**	End of Unit Exam

and by inspection for simple cases c. Solve real-world and mathematical problems leading to two linear equations in two variables. **MP.1** Make sense of problems and persevere in solving them. **MP.4** Make sense of problems and persevere in solving them. **MP.7** Look for and make use of structure.		• Solving for a variable first and using the value to solve for the other. <u>I can solve a simple system of equations using elimination.</u> **1 Class period** • Adding/subtracting terms to eliminate one of the variables. <u>I can solve a simple system of equations by graphing on the coordinate grid.</u> **1 Class period** • Graphing linear equations to find the intersection as a solution to the system. **1 Class period mid unit assessment** **2 Class periods review** **1 Class period summative assessment**	
KY.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	<u>Functions.</u> In the previous unit, students studied linear equations of y = mx + b form, including y = mx equations (proportional relationships where b = 0). In	<u>I can recognize a function.</u> **1 Class period** • Using the function rules.	<u>Formative</u> • Bellringers • Exit Slips • Pearson Realize

pairs consisting of an input and the corresponding output. **MP.7** Look for and make use of structure **MP.8** Look for and express regularity in repeated reasoning. **KY.8.F.2** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.4** Model with mathematics. **KY.8.F.3** Understand properties of linear functions. a. Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line.	Functions, students connect linear equations to linear functions, identify linear functions and their characteristics, compare different linear functions, and compare linear functions to non-linear functions. The Functions domain of the CCSS begins in Grade 8 but continues to appear in high school, where the investigation of nonlinear functions expands. Functions content addresses the second and fourth Standards for Mathematical Practice, reason abstractly and quantitatively and model with mathematics, as students use function rules, equations, graphs, and tables to model functions representing real-world situations.	<u>I can represent a function using various methods.</u> **1 Class period** • Using graphs, equations, tables, or verbal descriptions. <u>I can categorize functions as linear or non-linear.</u> **1 Class period** • Using the function rules. <u>I can find intervals of functions that are increasing, decreasing, and constant.</u> **1 Class period** • Using graphs of functions and their corresponding slopes. <u>I can sketch the graph of a function.</u> **1 Class period** • The equation and table of data will be used to show the relationship modeled in the function.	• Interactive notes (functions foldable, graphic organizer) • Quizziz Activity • Daily assignments • Teacher created powerpoint lessons • Observation • Whole group discussion • One on one instruction • Interactive activities • TI Inspire (Functions from Data Entry) • Quizzes (Google Forms, hardcopy, TI Inspire) • Intervention Activities (Slope, linear equations, graphs) <u>Summative</u> Functions Unit Exam

b. Identify and give examples of functions that are not linear. **MP.7** Look for and make use of structure. **KY.8.F.4** Construct a function to model a linear relationship between two quantities. a. 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. b. 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. **MP.4** Model with mathematics. **MP.5** Use appropriate tools strategically.		<u>I can define a linear function rule.</u> **2 Class periods** • Finding the equation of a function from a graph, a table of values, and a verbal description. <u>I can determine the rate of change and the initial value of a function.</u> **1 Class period** • Using a graph, a table of values, or a verbal description. <u>I can construct a function.</u> **1 Class period** • Using a graph or a table of values.	

MP.8 Look for and express regularity in repeated reasoning. **KY.8.F.5** Use graphs to represent functions. a. Describe qualitatively the functional relationship between two quantities by analyzing a graph. b. Sketch a graph that exhibits the qualitative features of a function that has been described verbally. **MP.3** Construct viable arguments and critique the reasoning of others.			
MP.7 Look for and make use of structure.			
KY.8.SP.1 Construct and interpret scatter plots for bivariate numerical data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers,	<u>Statistics.</u> While the Statistics unit in Grade 7 focused on sampling and measures of center and variation, the Grade 8 unit returns to data displays with topics on scatter plots and	<u>I can interpret a scatter plot.</u> **1 Class period** • Identify correlation (positive, negative, none), and identify clusters and outliers.	<u>Formative</u> • Bellringers • Exit Slips • Pearson Realize • Quizziz Activity • Daily assignments

positive or negative association, linear association and nonlinear association. **MP.2** Reason abstractly and quantitatively. **MP.7** Look for and make use of structure. **KY.8.SP.2** Know that lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a line and informally assess the model fit by judging the closeness of the data points to the line. **MP.2** Reason abstractly and quantitatively. **KY.8.SP.3** Use the equation of a linear model to solve problems in the context of bivariate numerical data, interpreting the slope and intercept.	two-way tables. Scatter plots are used for modeling real-world data, a goal of statistics classes in high school and beyond. Although trend lines are mostly explored informally, the understanding students gain in this unit will prepare them for linear regression in high school. Trend lines carry through the theme of making predictions using mathematics that has permeated the digits curriculum. Two-way tables also display two-variable, or bivariate, data, but they bring a new focus to data that involves data in the form of characteristics. Two-way tables prepare students for the study of logic.	<u>I can construct a scatter plot.</u> **1 Class period** • Using bivariate sets of data <u>I can draw a line of best fit on a scatter plot.</u> **1 Class period** • Using the y intercept and staying within the clusters, avoiding the outliers. <u>I can find the equation of the line of best fit.</u> **1 Class period** • Identify the slope and y intercept of the line and write in y = mx + b	• Teacher created powerpoint lessons • Collect data and graph project (FAL) • Observation • Whole group discussion • One on one instruction • Interactive activities • TI Inspire (Line of Best Fit) • Quizzes (Google Forms, hardcopy, TI Inspire) • Intervention Activities (Slope, linear equations) <u>Summative</u> Statistics Unit Exam

MP.2 Reason abstractly and quantitatively. **MP.4** Model with mathematics.			
KY.8.G.1 Verify experimentally the properties of rotations, reflections and translations: • Lines are congruent to lines. • Line segments are congruent to line segments of the same length. • Angles are congruent to angles of the same measure. • Parallel lines are congruent to parallel lines. **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **KY.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	Geometry Transformations, deductive reasoning and proof, and a culmination of the surface-area-and-volume thread are the goal of student learning in this unit. More broadly, the goal is to prepare students for high school geometry and trigonometry by giving them the basic understanding and skills to enter the world of more-formal geometric proof. Discerning correct logic and constructing arguments are the major pieces of the third Standard for Mathematical Practice of the CCSS.	I can translate points, lines and figures on the coordinate grid. **1 Class period** • Using the graph of the figure and the points. I can rotate lines and figures on the coordinate grid. **1 Class period** • Using the graph and the points of the line and figure. I can reflect points, lines and figures on the coordinate grid. **1 Class period** • Using the graph and points of the figure.	Formative • Daily Bellringers • Daily discussion and observation • Exit Slips at the end of each topic component • Pearson Digits Notes and Homework (printed and online) • Geometry Quiz 1 • Rotations Sort Activity • Rotations Mini Quiz • Rotations Scavenger Hunt (timed stations) • Transformations IXL • Reflections task cards (graphs and points) • Translations task cards • Transformations Quiz • Pythagorean Theorem task cards

rotations, reflections and translations. Given two congruent figures, describe a sequence that exhibits the congruence between them. **MP.2** Reason abstractly and quantitatively. **MP.7** Look for and make use of structure. **KY.8.G.3** Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates. **MP.3** Construct viable arguments and critique the reasoning of others. **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **KY.8.G.4** Understand that a two-dimensional figure is similar to another if the		<u>I can use the rules of parallel lines and transversals to find the measure of angles.</u> **3 Class periods** • Using angle relationships to find angle measures. <u>I can identify the sides of right triangles in relation to the right angle.</u> **1 Class period** • Use the right angle to find the legs and hypotenuse. <u>I can use the Pythagorean Theorem to find the length of the hypotenuse of a right triangle.</u> **1 Class period** • Using $a^2 + b^2 = c^2$ to find c. <u>I can use the Pythagorean Theorem to find the length of a leg of a right triangle.</u> **1 Class period** • Using $a^2 + b^2 = c^2$ to find a or b.	• Real World Right Triangles Project • Formulas Foldable • Pearson Activity • Formulas Quizzes • Daily assignments <u>Summative</u> Transformations Exam Pythagorean Theorem Exam Formulas Exam

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. **MP.2** Reason abstractly and quantitatively. **MP.5** Use appropriate tools strategically. **MP.7** Look for and make use of structure. **KY.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. **MP.3** Construct viable arguments and critique the reasoning of others.		<u>I can use the appropriate formula to find the perimeter, area, surface area, or volume of a 2 or 3 dimensional figure.</u> **3 Class periods** • Using substitution, combining like terms, and inverse operations to find various values.	

KY.8.G.6 Explain a proof of the Pythagorean Theorem and its converse. **MP.3** Construct viable arguments and critique the reasoning of others. **MP.7** Look for and make use of structure. **KY.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. **MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.4** Model with mathematics.			

KY.8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **KY.8.G.9** Apply the formulas for the volumes and surface areas of cones, cylinders and spheres and use them to solve real-world and mathematical problems. **MP.1** Make sense of problems and persevere in solving them. **MP.7** Look for and make use of structure. **MP.8** Look for and express regularity in repeated reasoning.			