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Standards Based Map

8th Grade Math

Timeline	NxG Standard(s)	Student I Can Statement(s) / Learning Target(s)	Essential Questions	Academic Vocabulary	Strategies / Activities	Resources / Materials	Suggested Assessment Types	Notes / Self - Reflection
All Year							Smarter Balanced Practice / Sample Questions www.smarterbalanced.org	
1st Quarter	M.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.	I can demonstrate that every number has a decimal expansion. I can convert a repeating decimal to a rational number. I can show that the decimal expansion repeats for rational numbers.	How can rational and irrational numbers be used?	Rational numbers Irrational numbers Decimal expansion Repeating decimals	"Rational Number Line-Up" www.math-play.com Rational and Irrational Number game www.maccss.ncdpi.wikispaces.net "Real Number Race" "The Laundry Problem"	CCSS Unit 1	Extended / Written Response Short Answer	

		I can convert a decimal expansion which repeats eventually into a rational number.						
1st Quarter	M.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	I can use rational approximations of irrational numbers to compare the value of irrational numbers, and locate and plot their approximation on a number line. I can use estimated values to compare two or more irrational numbers.	How can rational and irrational numbers be represented graphed on a number line?	Approximation Truncating	www.ixl.com The Number System	www.mathworksheetsland.com The Number System: Irrational Numbers and Decimal Expansion	Extended / Written Response Short Answer Formative Assessment	
1st Quarter	M.8.EE.1 know and apply the properties of integer exponents to generate equivalent numerical expressions.	I can infer the properties of integer exponents. I can use laws of integer exponents to simplify numerical expressions.	How are the properties of integer exponents used to generate equivalent numerical expressions?	Integer Equivalent Expressions Exponent Square Cube Power Base	www.illustrativemathematics.org website “Bacterial Growth” Activity www.sharemylesson.com “Laws of Exponents Treasure Hunt”	www.mathisfun.com “Laws of Exponents” hrsbstaff.ednet.ns.ca PPT Exponents Power Point Presentation	Performance assessment	

1st Quarter	M.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 √2 is irrational.	I can use square root and cube root symbols to represent solutions to equations in the form $x^2=p$ where p is a positive number. I can recognize that squaring a number and taking the square root and cubing a number and taking the cube root are inverse operations. I can evaluate the square root of a perfect square and the cube root of a perfect cube. I can justify that the square root of a non-perfect square is irrational.	How are the properties of integer exponents used to generate equivalent numerical expressions?	Evaluate Perfect square Perfect cube Radical	www.youtube.com/user/citadelphysics Pendulum Activity	www.map.mathshell.org “Giantburgers” “Ponzi - Pyramid Schemes”	Extended / Written Response Short Answer Performance task	
1st Quarter	M.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.	I can express and compare very small and very large numbers using scientific notation.	How are very large and very small numbers expressed?	Scientific notation	www.doe.virginia.gov/testing/solsearch/sol/math/7/mess_7-1bc.pdf “Scientific Notation with the Solar System”	www.map.mathshell.org “Size It Up” Activity	Performance task	
1st Quarter	M.8.EE.4 perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are	I can perform operations with numbers expressed in scientific notation; chose units of appropriate	How can scientific and decimal notation be used to solve problems involving very small and very large numbers?	Units of measure	Use previously noted strategies and resources.	Cross-curricular with science	Performance task	

	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.	size for measurements; and interpret scientific notation that has been generated by technology.						
1st Quarter	M.8.G.6 explain a proof of the Pythagorean Theorem and its converse.	I can explain a proof of the Pythagorean Theorem and its converse.	How can the Pythagorean Theorem and its converse be modeled?	Pythagorean theorem Hypotenuse Leg Right angle Acute angle Obtuse angle Converse	WVDE Teach 21 Investigation The Theorem of Pythagoras and its Converse Pinterest – many activities www.nbclearn.com "The Science of NFL Football"	http://nvlm.usu.edu "Pythagorean Theorem Puzzles." www.glencoe.com/sec/math/t_resources/gamezone/pdfs/mac3_04/class_ch03.pdf Pythagorean Theorem Game	Extended / written response Performance assessment	
1st Quarter	M.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.	I can apply the Pythagorean Theorem to determine the unknown side lengths in right triangles in mathematical problems and in real-world situations in two and three dimensions.	How is the Pythagorean Theorem used to determine unknown side lengths in right triangles?	Two-dimensional Three –dimensional	Hopewell Geometry www.map.mathshell.org	"Patterns in Prague" www.insidemathematics.org	Performance assessment Informal assessment	

1st Quarter	M.8.G.8 apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	I can apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	How is the Pythagorean Theorem used to find the distance between two points in a coordinate system?	Coordinate plane Origin Axis Quadrant	www.math-aids.com "Coordinate worksheets"	http://Illuminations.nctm.org "As the Crow Flies"	Performance assessment	
2nd Quarter	M.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.	I can give examples of linear equations with one solution, infinitely many solutions and no solutions. I can use inverse operations and the properties of equality to solve linear equations in one variable. I can solve linear equations with rational number coefficients and variables on both sides of the equation; involving the distributive property; and involving collecting like terms.	How is a solution to linear equation derived?	Linear Coefficient Solution Like terms Infinite Distributive property Inverse operations Equation	The Algebra Toolbox: www.lzlomek.wordpress.com Hot Seat Solving Equations Risk Placemat Equations	www.learner.org "Cups and Chips"	Selected response Extended / Written response Short Answer Performance assessment	

2nd Quarter	M.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.	I can graph proportional relationships in the coordinate plane. I can interpret the unit rate as a slope of the graph. I can compare two different proportional relationship represented in different ways, such as tables, graphs and equations.	How can you compare two different proportional relationships?	Unit rate Slope Positive slope Negative slope Zero slope Undefined slope Rate of change Proportional relationships Horizontal vertical	http://Illuminations.nctm.org "Rise-Run Triangles" "Pedal Power" www.internet4classroom.com "Practice Converting Linear Equations into Slope-Intercept Form"	www.mvhs.ipsd.org "Rate of Change and Slope War"	Selected response Extended / Written response Short Answer Performance assessment	
2nd Quarter	M.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*.	I can use similar triangles to explain why the slope *m* is the same between any two distinct points on a non-vertical line in a coordinate plane. I can justify that an equation in the form y=*m*x+b will represent the graph of a proportional relationship with a slope of *m* and a y-intercept of b.	How can similar triangles be used to represent slope? How is the equation of a line derived?	Similar Non-vertical y-intercept	The Algebra Toolbox: www.lzlomek.wordpress.com "Matching Graphs to Slope-Intercept Form"	http://schools.nyc.gov "Slippery Slopes" http://maccss.ncdpi.wikispaces.net "Perplexing Puzzle"	Selected response Extended / written response Short Answer Performance assessment	

2nd Quarter	M.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. C. solve real-world and mathematical problems leading to two linear equations in two variables.	I can explain that a line represents an infinite number of solutions to a linear equation with two variables. I can define the solution to a system of linear equations as the intersection of their lines. I can recognize the solution of a system of two equations algebraically, and estimate solutions by graphing the equations.	How is a solution to a system of linear equations derived?	Parallel Perpendicular Intersection Algebraically	Pinterest: "Fly or Drive?" http://Illuminations.nctm.org "There has to be a system for this sweet problem." (The Candy Problem)	www.nsa.gov "Concentric Circles with Systems of Linear Equations" Activity www.ilovemath.org Wartime Battle Think-Tac-Toe Review Systems of Equations Game	Selected response Extended / written response Short Answer Performance assessment	
2nd Quarter	M.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.	I can explain in a function the output depends on the input and there can only be one output for each input. I can distinguish between functions and non-functions using equations, graphs, and tables.		Function Input Output Ordered pairs	http://Illuminations.nctm.org "Roller Coasting thru Functions"	www.mathplayground.com "Function Machines"	Selected response Extended / Written Response Short Answer Performance Assessment	

3rd Quarter	M.8.F.2 compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	I can determine the properties of a function written in algebraic form given the inputs and outputs of a table represented by a graph or given verbally. I can compare properties of two functions each represented in a different way.	How can functions be compared?		www2.edc.org “Function Machines”	www.insidemathematics.org “Sorting Functions” www.studyzone.org “Function Tables”	Selected response Extended / Written Response Short Answer Performance Assessment	
3rd Quarter	M.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.	I can interpret the equation y=mx+b as defining a linear function whose graph is a straight line and interpret the slope and y-intercept I can give examples of functions that are non-linear.	How do you know if a function is linear or non-linear?	Non-linear	www.doe.mass.edu “Connecting Proportions, Lines, and Linear Equations”	Algebra Toolbox www.lzlomek.wordpress.com “My Favorite Unit to Teach – Linear Functions”	Extended / Written Response Short Answer Essay Performance Assessment	
3rd Quarter	M.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.	I can write a function to model a linear relationship between two quantities. I can determine the rate of change and the initial value of a function from a description of a relationship or from two (x,y) values, including reading these from a table or a graph.	How can you model functions of linear relationships? Why are the initial value and rate of change important to linear functions?	Initial value Domain	http://Illuminations.nctm.org “The Crow and the Pitcher”	www.opusmath.com “Modeling with Functions”	Selected response Extended / Written Response Short Answer Performance Assessment	

		I can explain any constraints on the domain of the linear relationship.						
3rd Quarter	M.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.	I can sketch a graph to model a given verbal situation. I can describe a situation when given a graph.	How can a verbal description of a function be modeled as a graph?		www.opusmath.com "Modeling with Functions" www.internet4classroom.com Analyzing Graphs	www.graphingstories.com Graphing stories 15 seconds at a time www.learnzillion.com "Describe the Rate of Change…"	Selected response Extended / Written Response Short Answer Performance Assessment	
3rd Quarter	M.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.	I can rotate, reflect and translate geometric figures in the coordinate plane. I can verify experimentally that lines or line segments that are rotated, reflected and/or translated transform to lines and line segments of the same length. I can verify experimentally that angles that are rotated, reflected and/or translated transform to angles of the same measure.	How would you demonstrate the properties of rotations, translations and reflections?	Translations Rotations Reflections Lines Line segments Parallel lines Image Pre-image Transformation	WVDE Teach 21 Investigation Unit 2: Congruence and Similarity Lessons 1, 2, & 3 www.onlinemathlearning.com Transformations Section www.learnzillion.com Explore Transformations by Investigating Their Effect on Rotations, Reflections and Translations	Tech Steps: Vector Investigation www.troup612resources.troup.k12.ga.us Introduction to Translations, Rotations and Reflections www.internet4classroom.com various transformations activities	Short Answer Performance assessment Personal Communication / Oral Presentation	

4th Quarter	M.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.	I can infer that a rigid transformation preserves original size and shape. I can describe the sequence of transformations that exhibits the congruency between two figures.	How can congruency between two figures by described by a series of rotations, reflections, and/or translations?	Congruence / Congruency Sequence	WVDE Teach 21 Investigation Unit 2: Congruence and Similarity Lesson 4: Congruency www.learnzillion.com 2-Dimensional Figure Congruence	www.opusmath.com "Understand that a 2-Dimensional Figure is Congruent to Another" www.geogebra.org	Short Answer Performance assessment Personal Communication / Oral Presentation	
4th Quarter	M.8.G.3 describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.	I can describe the effect of dilations, rotations, translations and reflections on two dimensional figures using coordinates.	How can coordinates be used to describe the effects of dilations, translations, rotations and reflections?	Dilation Scale factor	WVDE Teach 21 Investigation Unit 2: Congruence and Similarity Lessons: 9, 10, and 11 www.cc.betterlesson.com Exploring Dilations 2	www.virtualnerd.com "How do you make a Figure Larger Using a Dilation?" www.illustrativemathematics.org "Reflecting Reflections" "Point Reflection"	Short Answer Extended Written Response Performance assessment Personal Communication / Oral Presentation	
4th Quarter	M.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.	I can determine that similar figures have angles that are the same measure and sides that are proportional. I can recognize the effects of a scale factor on a dilation. I can describe a sequence of transformations that exhibits the similarity between two figures.	How can similarity between two figures be described by a series of rotations, reflections, dilations, and/or translations?	Similarity Series	WVDE Teach 21 Investigation Unit 2: Congruence and Similarity Lesson 5: Similarity	www.teachers.greenville.k12.sc.us Cartoon Dilations	Short Answer Extended Written Response Performance assessment Personal Communication / Oral Presentation	

4th Quarter	M.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.	I can use reasoning to determine relationships that exist between interior and exterior sums of triangles. I can determine that relationships exist between angles created when parallel lines are cut by a transversal. I can use exploration and deductive reasoning to determine the relationship that exists between the angle-angle criterion for similarity of triangles.	How can explorations be used to determine the relationships that exist between interior and exterior sums of triangles? How can explorations be used to determine the relationships that exist between angles created when parallel lines are cut by a transversal? How can explorations be used to determine the relationships that exist between the angle-angle criterion for similarity of triangles?	angle sum exterior angle interior angle transversal alternate interior angles alternate exterior angles same-side angles supplementary angles complementary angles vertical angles corresponding angles adjacent angles	WVDE Teach 21 Investigation Unit 2: Congruence and Similarity Lessons 6, 7 and 8 www.ims.ode.state.oh.us “I Can Name That Angle In One Measure!”	www.learnzillion.com “Understand the Properties of Interior Angles” “Understand the Relationships Between Exterior Angles”	Short Answer Extended Written Response Performance assessment Personal Communication / Oral Presentation	
4th Quarter	M.8.G.9 know the formulas for the volumes of cones, cylinders and spheres and use them to solve real-world and mathematical problems.	I can derive and use the volume formula for a cone, cylinder and a sphere to solve real-world problems.	How can formulas for the volume of cones, cylinders and spheres be derived? How can formulas for volume be used to solve mathematical and real-world problems?	Volume Cone Cylinder Sphere	WVDE Teach 21 Investigation Unit 6: “Cylinders, and Cones and Spheres! Oh My! Lessons 1-6 Performance Task: “Popcorn Re-designed” www.learner.org Volume Formulas Experiment	www.maccss.ncdpi.wikispaces.net “The Gift Box Dilemma” “Meltdown” www.pbslearningmedia.org “Comparing Volumes of Cylinders, Cones and Spheres” www.flocabulary.com “Flocabulary” Volume raps	Short Answer Extended Written Response Performance assessment Personal Communication / Oral Presentation	

4th Quarter	M.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.	I can construct and interpret a scatter plot for bivariate measurement data. I can investigate and describe patterns associated between two quantities using a scatter plot.	How can scatter plots be constructed and used to interpret data?	Bivariate data Scatter plot Cluster Outlier Correlation Relationship Negative association Positive association	WVDE Teach 21 Lessons: “Does It Measure UP?” “Gathering Data” “Relative Frequencies and Associations” www.opusmath.com “Patterns in Bivariate Data”	www.map.mathshell.org “Sugar Prices” “Bird’s Eggs” www.scholastic.com “Cultivating Data” Khan Academy – various activities	Short Answer Extended Written Response Performance assessment Personal Communication / Oral Presentation	
4th Quarter	M.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.	I can recognize when a scatter plot represents a linear relationship. I can informally fit a straight line for scatter plots that suggest a linear association.	How is the line-of-best-fit used to assess data?	Line-of-best-fit Trendline Informal	Tech-Steps Lesson: Linear Data Deductions www.nmps.org/assetfactory “Scatter Plots and Trendlines” www.austincc.edu “How Can I Use Trendlines and Linear Regression to Analyze the Relationship Between 2 Experimental Variables?”	www.learnnc.org “Guidance Counselor: Working with Scatter Plots” www.illuminations.nctm.org “Line of Best Fit” www.opusmath.com “Patterns in Bivariate Data	Short Answer Extended Written Response Performance assessment Personal Communication / Oral Presentation	
4th Quarter	M.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.	I can use the equation of a linear model to solve problems in the context of a linear problem. I can interpret the slope and y-intercept of an equations of a linear model in the context of the problem.	How can the equations for the line-of-best-fit be used to solve mathematical and real-world problems?		www.internet4classroom.com various activities	www.learnzillion.com “Use the equation of a linear model to solve problems in the context of bivariate data.”	Short Answer Extended Written Response Performance assessment	

4th Quarter	M.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.	I can recognize that categorical data can also be described numerically through the use of a two-way table. I can construct and interpret a two-way table summarizing the data on two categorical variables collected from the same subjects. I can use relative frequencies calculated for rows or columns to describe possible association between two variables.	How can a two-way table be constructed and interpreted?	Two-way table Frequency Relative frequency Categorical variables	www.amstat.org "Can You Roll Your Tongue?" www.learnzillion.com Identify Bivariate Categorical Data by Reading a Two-Way Table Construct a Two-Way Table From a List Construct a Two-Way Table from Interpreting a Venn Diagram	www.coachjadams.wikispaces.com Making 2-Way Frequency Tables www.anderson5.net Two-Way Frequency and Relative Frequency Tables	Short Answer Extended Written Response Performance assessment	