MARLBORO CENTRAL SCHOOL DISTRICT – CURRICULUM MAP

Subject: Mathematics **Grade: 8**

Unit 1: Line & Angle Relationships

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
September (3 Weeks)	Where do you see angle relationships in the real world? How can we model angle relationships using algebraic equations? How can we find unknown angle measurements using a variety of angle properties?	Daily Homework Problems of the Week Quizzes/Tests "Our Town" Project Benchmark Examination #1	<u>Vocabulary</u> Line Line Segment Ray Parallel Perpendicular Complementary Angles Supplementary Angles Vertical Angles Adjacent Angles Alternate Interior/Exterior Angles Angle Sum of a Triangle Exterior Angle of a Triangle Remote Interior Angles Algebraic Equation Distributive Property Combining Like Terms	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. 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. Identify a variety of different types of angles within a given geometric diagram, and the mathematical attributes of those angle relationships.	8.EE.7b 8.G.5	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials

Subject: Mathematics **Grade: 8**

Unit 2: Geometric Transformations & Congruence

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
October/ November (5 Weeks)	How can we use properties of geometric transformations to create images of geometric figures on and off the coordinate plane? Where do we see geometric transformations in the real world? What properties of shapes are preserved and not preserved under the four geometric transformations?	Daily Homework Problems of the Week Quizzes/Tests Transformation Emblem Project Benchmark Examination #1	<u>Vocabulary</u> *x*-axis/*y*-axis *x*-coordinate/*y*-coordinate Ordered pair Reflection/Flip Line of reflection Translation/Slide Rotation/Turn Center of rotation Angle of Rotation Clockwise Counter-clockwise Dilation Scale factor Enlargement Reduction Size Shape Orientation Image Property Preservation	Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines, and line segments to line segments of the same length; Angles are taken to angles of the same measure; Parallel lines are taken to parallel lines. 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. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	8.G.1 8.G.2 8.G.3	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials

Subject: Mathematics **Grade: 8**

Unit 3: Dilations & Similarity

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
November (3 Weeks)	Where do we see dilations in the real world? How can we tell if multiple geometric figures are similar? How can we prove the similarity of two geometric figures using a sequence of transformations that includes a dilation?	Daily Homework Problems of the Week Quizzes/Tests Benchmark Examination #2	<u>Vocabulary</u> Dilation Similarity Congruence Scale Drawing Preservation of Angle Measure	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. 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.3 8.G.4	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials

Subject: Mathematics **Grade: 8**

Unit 4: Integer Exponents & Scientific Notation

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
December/ January (4 Weeks)	How can we use properties of integer exponents to write equivalent expressions? How can we write very small and very large numbers in scientific notation? How can we compare numbers written in both standard form and scientific notation? How can we perform arithmetic operations on numbers written in both standard form and scientific notation?	Daily Homework Problems of the Week Quizzes/Tests Exponent Properties Flipbook Benchmark Examination #2	<u>Vocabulary</u> Standard Form Scientific Notation Order of Magnitude Exponential Notation Base Exponent Power Integer Whole Number Expanded Form Square of a Number Cube of a Number Equivalent Fractions	Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. 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. *For example, estimate the population of the United States as 3 times* 10^8 *and the population of the world as 7 times* 10^9*, and determine that the world population is more than 20 times larger.* 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.1 8.EE.3 8.EE.4	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials

Subject: Mathematics **Grade: 8**

Unit 5: Linear Functions & Systems of Equations

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
January/ February (4 Weeks)	What are the defining characteristics of a linear relationship? What are real-world applications for slopes of linear functions? How can we model real-world situations using systems of equations? How can we determine the number of solutions that a system of equations has by inspection?	Daily Homework Problems of the Week Quizzes/Tests Benchmark Examination #2	<u>Vocabulary</u> Slope System of Linear Equations Solution to a System of Equations Coefficient Equation Like Terms Linear Equation Term Unit Rate Variable	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. 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. 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. 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.5 8.EE.6 8.EE.7 8.EE.8	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials

Subject: Mathematics **Grade: 8**

Unit 6: Examples of Functions from Geometry

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
February/ March (3 Weeks)	How can we model real-world situations using functions? Why is it useful to be able to compute the volume of a three-dimensional solid?	Daily Homework Problems of the Week Quizzes/Tests Benchmark Examination #3	<u>Vocabulary</u> Function Input Output Area Linear Equation Non-Linear Equation Rate of Change Solids Volume Pi Cone Cylinder Sphere	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. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.* Interpret 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) and (3,9), which are not on a straight line.* Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	8.F.1 8.F.2 8.F.3 8.G.9	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials

Subject: Mathematics **Grade: 8**

Unit 7: Bivariate Data & Non-Linear Models

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
March/ April (2 Weeks)	What are similarities and differences between linear and non-linear functions? How can we use scatterplots to model bivariate real-world data? What information can we determine from analyzing the contents of a two-way table?	Daily Homework Problems of the Week Quizzes/Tests Benchmark Examination #4	<u>Vocabulary</u> Association Relative Frequency Two-Way Table Categorical Variable Initial Value Numerical Value Scatterplot Slope	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. 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. 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, or linear and nonlinear association. Know that straight lines are widely used to model relationships between two quantitative variables. For scatterplots 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. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. 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.	8.F.4 8.F.5 8.SP.1 8.SP.2 8.SP.3 8.SP.4	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials

Subject: Mathematics **Grade: 8**

Unit 8: Irrational Numbers Using Geometry

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
April/May (3 Weeks)	What are the similarities and differences in ways we can express rational and irrational numbers? How can you use your knowledge of square roots and factors to simplify radical expressions? How can you use the Pythagorean Theorem to find missing angle measurements given a three-dimensional figure?	Daily Homework Problems of the Week Quizzes/Tests Benchmark Examination #4	<u>Vocabulary</u> Perfect Square Square Root Cube Root Rational Number Irrational Number Rate of Change	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. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. Explain a proof of the Pythagorean Theorem and its converse. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	8.NS.1 8.NS.2 8.EE.2 8.G.6 8.G.7 8.G.8	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials

Subject: Mathematics **Grade: 8**

Unit 9: Volume of Composite Solids & Applications

Instructional Timeframe	Essential Questions	Assessment (Evidence)	Content (What Students Should Know)	Skills (What Students Should Be Able To Do)	N.Y.S. Performance Indicator	Resources
May/ June (1 Week)	How can you use your knowledge of volume of three-dimensional solids to find the volume of composite solids? Where do you see composite solids in your own lives?	Daily Homework Problems of the Week Quizzes/Tests Benchmark Examination #4	<u>Vocabulary</u> Volume Sphere Cone Cylinder Sphere Pi	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	8.G.9	Teacher-Created Materials EngageNY Curricular Materials Supplementary Materials