8th Grade Math

Overview

Course Description: In this class students will learn the rest of the essentials necessary for them to move forward into Algebra at the High School level. The class will teach students how to solve one and two step equations and inequalities. Students will be introduced to quadratic, exponential, and step functions and have an understanding of how these functions are used outside of school. Students will learn about rational and irrational numbers and how to solve each kind of number using their order of operations. Students will take a better look at linear functions using graphs and solving word problems. Finally, students will learn about polynomials and probability.

Prerequisite Class/Skill: Successful completion of 7th grade math curriculum with the common core as a foundation is required to take this class.

Other: 3 Trimesters

Units of Study

Unit Title	Length of Study
The Number System	2 Weeks
Expression and Equations	12 Weeks
Functions	9 Weeks
Geometry	12 Weeks
Statistics and Probability	4 Weeks

Mathematics Core Units

Course Title: ___8th Grade Math___   **Unit Title:** _The Number System_   **Length of Unit** ___2 weeks___

Grade Level: ___8th grade___   **Unit __1__ of __7__**

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
8.NS.A.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.A.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., π2).	I Can… …identify rational and irrational numbers …write rational numbers as fractions …approximate the value of irrational numbers to the nearest thousandths …compare irrational and rational numbers.	Rational numbers Irrational numbers Square roots Perfect Square Radicand Radical sign	1. Daily assignments 2. Formative assessments 3. Quizzes 4. Testes 5. Daily warm-ups 6. Trimester post test 7. Routine spot checks	**Print Material and Technology** Common Core Clinics Grade 8 The Number System by Triumph Learning (free sample) Common Core Coach Grade 8 by Triumph Learning (free sample) Crosswalk Coach Grade 8 Mathematics by Triumph Learning (free sample) Teacher Created Worksheets Math in-service worksheets Curriculum Crafter Intel Math program assignments

Mathematics Core Units

Course Title: ___8th Grade Math___   **Unit Title:** ___Expressions and Equations___   **Length of Unit** ___12 weeks___

Grade Level: ___8th grade___   **Unit ___2___ of _7___**

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. **8.EE.A.2** Use square root and cube root symbols to represent solutions to equations of the form $x2 = p$ and $x3 = p$, 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. **8.EE.A.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. **8.EE.A.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.B.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. **8.EE.B.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. **8.EE.C.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	I Can… …use square roots and cube roots …apply the properties of exponents …solve one variable equations using one, two, and multiple steps …solve system of linear equations graphically and algebraically …use linear model to make predicts about future outcomes …find the unit rate, rate of change, and slope using graphs, coordinates, tables, and equations …find the initial value and y-intercept using graphs, coordinates, tables, and equations …write equations in y=mx+b form …graph and understand proportional relationships …identify similarities and differences between proportional relationships and linear relationships. …perform operations with numbers expressed in scientific notation …interpret scientific notation that has been generated by technology.	Constant of proportionality Rise Run Slope y-intercept Unit rate Rate of change Initial Value Coefficient Variable Substitution Method Elimination Method Graphing Method Linear equation Parallel Solution Slope-intercept form Proportional relationship System of linear equations Scientific Notation Exponents Standard Notation Cube Root Origin Ratio Intersection Infinitely many solutions	1. Daily assignments 2. Formative assessments 3. Quizzes 4. Testes 5. Daily warm-ups 6. Trimester post test 7. Routine spot checks 8. Check and sign activity	Print Material and Technology Common Core Clinics Grade 8 Expression and Equations by Triumph Learning (free sample) Common Core Coach Grade 8 by Triumph Learning (free sample) Crosswalk Coach Grade 8 Mathematics by Triumph Learning (free sample) Teacher Created Worksheets Math in-service worksheets Curriculum Crafter Intel Math program assignments Guidelines for solving equations (a.k.a. "Mr. V's Holy Grail")

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.

8.EE.C.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.

Mathematics Core Units

Course Title: __8th Grade__   **Unit Title:** __Functions__   **Length of Unit__9 weeks__

Grade Level: _____8th grade_____   **Unit __4__ of _7___**

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
8.F.A.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.A.2** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **8.F.A.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. **8.F.B.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.B.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… …identify functions from graphs, coordinates, tables, and equations …graph linear functions …graph nonlinear functions …use y=mx+b to graph functions …compare two functions …find the slope and y-intercept of a function …identify functions as increasing, decreasing, linear, or nonlinear …model functions …graph functions being modeled verbally.	Function Slope Vertical line test Rise Run y-intercept Linear functions Nonlinear functions Relation Input value Output value Coordinates Exponential function Inverse function Quadratic function Increasing function Decreasing function Piecewise function Domain Range	1. Daily assignments 2. Formative assessments 3. Quizzes 4. Testes 5. Daily warm-ups 6. Trimester post test 7. Routine spot checks	**Print Material and Technology** Common Core Clinics Grade 8 Functions, Statistics, and Probability by Triumph Learning (free sample) Common Core Coach Grade 8 by Triumph Learning (free sample) Crosswalk Coach Grade 8 Mathematics by Triumph Learning (free sample) Teacher Created Worksheets Math in-service worksheets Curriculum Crafter Intel Math program assignments

Mathematics Core Units

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?

8.G.A.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.A.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.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
 	
8.G.A.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.A.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.
 	
8.G.B.6 Explain a proof of the Pythagorean Theorem and its converse.
 	
8.G.B.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…
	
	…use transformations/rigid motions
	
	…identify transformations/rigid motions
	
	…perform a sequence of transformations/rigid motions
	
	…understand that a figure is still congruent after multiple transformations/rigid motions have been performed
	
	…identify angles from two parallel lines with a transversal
	
	…prove the Pythagorean Theorem
	
	…use the Pythagorean Theorem to solve realistic problems
	
	…find the interior and exterior angles of a triangle knowing two other angles of the triangle
	
	…use the Pythagorean Theorem on a coordinate system to find the distance between two points
	
	…find the volume of a sphere, cone, and cylinder
	
	…use the volume formulas for a sphere, cone, and cylinder to solve realistic problems.
	
	…use the transformations/rigid motions
		Transformations
		Rotation
		Reflection
		Translation
		Counter clockwise
		Clockwise
		Exterior angles
		Interior angles
		Alternate exterior angles
		Alternate interior angles
		Congruent
		Dilation
		Distance formula
		Corresponding angles
		Vertical angles
		Volume
		Transversal
		Supplementary
		Complementary
		Similar
		Scale Factor
		Radius
		Diameter
		Pythagorean theorem
		Legs
		Hypotenuse
		Sphere
		Cone
		Cylinder
		Image
		Rigid motion
		Parallel Lines
		Coordinate system
			1. Daily assignments
			
			2. Formative assessments
			
			3. Quizzes
			
			4. Testes
			
			5. Daily warm-ups
			
			6. Trimester post test
			
			7. Routine spot checks
			
			8. Right triangle floor activity
			
			9. Tessellation
				Print Material and Technology
				
				Common Core Clinics Grade 8 Geometry by Triumph Learning (free sample)
				
				Common Core Coach Grade 8 by Triumph Learning (free sample)
				
				Crosswalk Coach Grade 8 Mathematics by Triumph Learning (free sample)
				
				Teacher Created Worksheets
				
				Math in-service worksheets
				
				Curriculum Crafter
				
				Intel Math program assignments
				
				Trace paper worksheets

	to design a tessellation			
8.G.B.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	…dilate a figure using the scale factor and understand the effects it has on a coordinate system.			
8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.				

Mathematics Core Units

Course Title: ___8th Grade Math___   **Unit Title:** ___Statistics and Probability___   **Length of Unit** ___4 weeks___

Grade Level: ___8th grade___   **Unit** ___7___ **of** ___7___

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
8.SP.A.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. **8.SP.A.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.A.3** Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. **8.SP.A.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… …represent bivariate data graphically …identify patterns and trends on scatter plots …draw a trend line (line of best fit) to represent a positive/negative association …identify clusters and find outliers within a scatter plot …make predictions about future events using the trend line …write an equation in y=mx+b form using the trend line …collect data using a two-way frequency table …convert data from a frequency table to a relative frequency table …make educated observations from a two-way frequency table. …construct a two-way frequency table.	Cluster Frequency Linear association Nonlinear association Negative association Positive association Outlier Relative frequency Scatter plot Trend line Two-way table Bivariate data Line of best fit Slope Initial value y-intercept Rate of change Unit Rate	1. Daily assignments 2. Formative assessments 3. Quizzes 4. Testes 5. Daily warm-ups 6. Trimester post test 7. Routine spot checks	**Print Material and Technology** Common Core Clinics Grade 8 Functions, Statistics, and Probability by Triumph Learning (free sample) Common Core Coach Grade 8 by Triumph Learning (free sample) Crosswalk Coach Grade 8 Mathematics by Triumph Learning (free sample) Teacher Created Worksheets Math in-service worksheets Curriculum Crafter Intel Math program assignments