Tunkhannock Area School District
Grade Eight Mathematics
Curriculum Map 2014

Quarter 1

Targeted Standard(s):

Domains

8.NS The Number System

8.EE Expressions and Equations

PA Core Standards

CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties.

CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.

CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.

PA Core Assessment Anchors

M08.A-N.1 Demonstrate an understanding of rational and irrational numbers.

M08.B-E.1 Demonstrate an understanding of expressions and equations with radicals and integer exponents.

PA Core Assessment Anchor Descriptors

M08.A-N.1.1 Apply concepts of rational and irrational numbers.

M08.B-E.1.1 Represent and use expressions and equations to solve problems involving radicals and integer exponents.

PA Core Eligible Content

M08.A-N.1.1.1 Determine whether a number is rational or irrational. For rational numbers, show that the decimal expansion terminates or repeats (limit repeating decimals to thousandths).

M08.A-N.1.1.2 Convert a terminating or repeating decimal into a rational number (limit repeating decimals to thousandths).

M08.A-N.1.1.3 Estimate the value of irrational numbers without a calculator (limit whole number radicand to less than 144).

Example: $\sqrt{5}$ is between 2 and 3 but closer to 2.

M08.A-N.1.1.4 Use rational approximations of irrational numbers to compare and order irrational numbers.

M08.A-N.1.1.5 Locate/identify rational and irrational numbers at their approximate locations on a number line.

M08.B-E.1.1.1 Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator (with final answers expressed in exponential form with positive exponents). **Properties will be provided.**

Example: $3^{12} \times 3^{-15} = 3^{-3} =$

M08.B-E.1.1.2 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 perfect squares (up to and including 12^2) and cube roots of perfect cubes (up to and including 5^3) without a calculator.

Example: If $x^2 = 25$ then $x = \pm\sqrt{25}$.

M08.B-E.1.1.3 Estimate very large or very small quantities by using numbers expressed in the form of a single digit times an integer power of 10, and express how many times larger or smaller one number is than another.

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 than the United States population.

M08.B-E.1.1.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Express answers in 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 (e.g., interpret 4.7EE9 displayed on a calculator as 4.7×10^9).

Enduring Understandings:

- Know that there are numbers that are not rational, and approximate them by rational numbers.
- Work with radicals and integer exponents.

Essential Questions:

1. How can we represent, approximate, compare and order rational and irrational numbers?

Core Content/Objectives		Eligible Content	
Concepts What students will know	**Competencies** What students will be able to do	**Activities**	**Assessment** How learning will be assessed
I. The Real Number System A. Real Numbers **8.A-N.1.1.1** B. Rational Numbers **8.A-N.1.1.1**	**I. The Real Number System** A. 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. B. 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,	**Fluency Activities** • Math Dash • Rocket Math • Math Minute 1. Square Roots Go Rational Activity 2. Approximating Square Roots using tables activity https://www.khanacademy.org/	Formative Assessments • Vocabulary • Daily Homework • Problem Solving Activity • Peer Teaching Summative Assessments • Chapter Tests • Section Quizzes • Quarter Projects • Classroom Diagnostic Tool

C. Irrational Numbers **8.A-N.1.1.1**	and convert a decimal expansion which repeats eventually into a rational number. C. 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.	math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-irrational-numbers/v/recognizing-irrational-numbers	
II. Simplifying and Ordering Real Numbers A. Simplifying Rational and Irrational Numbers to Decimal Form **8.A-N.1.1.2** **8.A-N.1.1.3**	**II. Simplifying and Ordering Real Numbers** A. 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). For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.	Finding Square Roots Without a Calculator	
B. Order and Compare Rational and Irrational Numbers **8.A-N.1.1.4** **8.A-N.1.1.5**	B. 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). For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.	Perfect Squares and Roots Quiz	
C. Laws of Exponents **8.B-E.1.1.1**	C. Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 3^2 × 3^(–5) = 3^(–3) = 1/(3^3) = 1/27.		
D. Working with Roots and	D. Use square root and cube root symbols to		

Radicals **8.B-E.1.1.2**	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.		
E. Apply and Interpret Using Scientific Notation **8.B-E.1.1.3** **8.B-E.1.1.4**	E. 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. 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.	Test Your Knowledge https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-scientific-notation/e/scientific_notation Multiplying and Dividing in Scientific Notation https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-scientific-notation-compu/v/multiplying-and-dividing-in-scientific-notation	

Materials/Resources/Technology
Textbook, Teacher-created power points, graphing calculators, manipulatives, Khan Academy

Quarter 2

Targeted Standard(s):

Domain

8.EE Expressions and Equations

PA Core Standards

CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.

CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.

PA Core Assessment Anchors

M08.B-E.2 Understand the connections between proportional relationships, lines, and linear equations.

M08.B-E.3 Analyze and solve linear equations and pairs of simultaneous linear equations.

PA Core Assessment Anchor Descriptors

M08.B-E.2.1 Analyze and describe linear relationships between two variables, using slope.

M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods.

PA Core Eligible Content

M08.B-E.2.1.1 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

Example: Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

M08.B-E.2.1.2 Use similar right triangles to show and explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.

M08.B-E.2.1.3 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.

M08.B-E.3.1.1 Write and identify 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).

M08.B-E.3.1.2 Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Enduring Understandings:

- Understand the connections between proportional relationships, lines, and linear equations.

- Analyze and solve linear equations and pairs of simultaneous linear equations.

Essential Questions:

1. How do we recognize, apply and represent proportional quantities as linear relationships?

Core Content/Objectives		Eligible Content	
Concepts What students will know	**Competencies** What students will be able to do	**Activities**	**Assessment** How learning will be assessed
I. Graphing, Comparing and Interpreting Proportional Relationships A. Solving Proportions **8.B-E.2.1.1** B. Representing a Unit Rate as the Slope of the Graph **8.B-E.2.1.1** C. Graphing Proportions **8.B-E.2.1.1** **8.B-E.2.1.2**	**I. Graphing, Comparing and Interpreting Proportional Relationships** A. 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. B. 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. C. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For	Fluency Activities • Math Dash • Rocket Math • Math Minute Rate of Change Tutorial and Quiz Equations of Attack http://illuminations.nctm.org/Lesson.aspx?id=2858 Slope-Intercept Game http://www.math-play.com/slope-intercept-game.html	Formative Assessments • Vocabulary • Daily Homework • Problem Solving Activity • Peer Teaching Summative Assessments • Chapter Tests • Section Quizzes • Quarter Projects • Classroom Diagnostic Tool

	example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	Rates and Proportional Relationships https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-relationships-functions/cc-8th-graphing-prop-rel/e/comparing-proportional-relationships	
D. Comparing and Interpreting Proportional Relationships in Different Forms **8.B-E.2.1.1** **8.B-E.2.1.2**	D. 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.		
E. Use Proportions to Solve Similar Triangles **8.B-E.2.1.1** **8.B-E.2.1.2**	E. 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.	How do I move? http://illuminations.nctm.org/Lesson.aspx?id=1189	
F. Compare the Slope of Corresponding Sides of Similar Triangles on a coordinate Plane **8.B-E.2.1.1** **8.B-E.2.1.2**	F. 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.		
G. Using the Slope, Derive the Equation y=mx and the Equation y=mx+b **8.B-E.2.1.3**	G. 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		

II. Linear Equations A. Solving Linear Equations **8.B-E.3.1.1** B. Graphing Linear Equations **8.B-E.3.1.1** C. Solving Multi-Step Linear Equations **8.B-E.3.1.2**	**II. Linear Equations** A. Solve linear equations in one variable. 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 in one variable. 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). C. Solve linear equations in one variable. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting	Modeling with Linear Functions Quiz	

	like terms.		

Materials/Resources/Technology
Textbook, Teacher-created power points, graphing calculators, manipulatives, Khan Academy

Quarter 3

Targeted Standard(s):

Domains

8.EE Expressions and Equations
8.F Functions

PA Core Standards

CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.
CC.2.2.8.C.1 Define, evaluate, and compare functions.
CC.2.2.8.C.2 Use concepts of functions to model relationships between quantities.

PA Core Assessment Anchors

M08.B-E.3 Analyze and solve linear equations and pairs of simultaneous linear equations.
M08.B-F.1 Analyze and interpret functions.
M08.B-F.2 Use functions to model relationships between quantities.

PA Core Assessment Anchor Descriptors

M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods.
M08.B-F.1.1 Define, evaluate, and compare functions displayed algebraically, graphically, or numerically in tables or by verbal descriptions.
M08.B-F.2.1 Represent or interpret functional relationships between quantities using tables, graphs, and descriptions.

PA Core Eligible Content

M08.B-E.3.1.3 Interpret solutions to a system of two linear equations in two variables as points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

M08.B-E.3.1.4 Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.

Example: 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.

M08.B-E.3.1.5 Solve real-world and mathematical problems leading to two linear equations in two variables.

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.

M08.B-F.1.1.1 Determine whether a relation is a function.

M08.B-F.1.1.2 Compare properties of two functions each represented in a different way (i.e., algebraically, graphically, numerically in tables, or by verbal descriptions).

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.

M08.B-F.1.1.3 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.

M08.B-F.2.1.1 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.

M08.B-F.2.1.2 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 or determine a graph that exhibits the qualitative features of a function that has been described verbally.

Enduring Understandings:

- Analyze and solve linear equations and pairs of simultaneous linear equations.
- Define, evaluate, and compare functions.
- Use Functions to Model Relationships between Quantities

Essential Questions:

1. How do we recognize when it is appropriate to use a linear model to represent a real-world situation and what are the benefits of using a linear model to answer questions about the situations?
2. What is the meaning of a function?
3. In what ways can a linear function be represented?

Core Content/Objectives		Eligible Content	
Concepts What students will know	**Competencies** What students will be able to do	**Activities**	**Assessment** How learning will be assessed
I. Solving Systems of Linear Equations A. Understand the Solution to a Systems of Equations **8.B-E.3.1.3** B. Solve a System of Two Linear Equations	**I. Solving Systems of Linear Equations** A. Analyze and solve pairs of simultaneous linear equations. 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. Analyze and solve pairs of simultaneous linear equations.	Fluency Activities • Math Dash • Rocket Math • Math Minute Supply and Demand http://illuminations.nctm.org/Lesson.aspx?id=2544	Formative Assessments • Vocabulary • Daily Homework • Problem Solving Activity • Peer Teaching Summative Assessments • Chapter Tests • Section Quizzes

Algebraically **8.B-E.3.1.3** C. Estimate Solutions by Graphing **8.B-E.3.1.4** D. Apply Systems of Equations to Real World Situations **8.B-E.3.1.5**	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. Analyze and solve pairs of simultaneous linear equations. 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. D. Analyze and solve pairs of simultaneous linear equations. 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.	Wartime Battle (attached) Substitution Memory Game (attached)	• Quarter Projects • Classroom Diagnostic Tool
II. Functions A. Define and Understand a Function **8.B-F.1.1.1** B. Represent Functions	**II. Functions** A. 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.		

Algebraically, Graphically and Numerically **8.B-F.1.1.1**	B. 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.		
C. Compare Properties of Two Functions **8.B-F.1.1.2**	C. 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.	Printing Books activity http://illuminations.nctm.org/Lesson.aspx?id=1060	
D. Compare Linear and Non-Linear Functions **8.B-F.1.1.3**	D. 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.		
E. Model Relationships Using Functions **8.B-F.2.1.1**	E. Construct a function to model a linear relationship between two quantities. Determine the rate of		

F. Rate of Change and Initial Value of a Function **8.B-F.2.1.1** G. Analyze the Relationship Between Quantities From a Graph **8.B-F.2.1.2**	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. F. 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. G. 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.		

Materials/Resources/Technology
Textbook, Teacher-created power points, graphing calculators, manipulatives, Khan Academy

Quarter 4

Targeted Standard(s):

Domains

8.G Geometry

8.SP Statistics and Probability

PA Core Standards

CC.2.3.8.A.1 Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.

CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.

CC.2.3.8.A.3 Understand and apply the Pythagorean Theorem to solve problems.

CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.

CC.2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.

PA Core Assessment Anchors

M08.C-G.1 Demonstrate an understanding of geometric transformations.

M08.C-G.2 Understand and apply the Pythagorean Theorem.

M08.C-G.3 Solve real-world and mathematical problems involving volume.

M08.D-S.1 Investigate patterns of association in bivariate data.

PA Core Assessment Anchor Descriptors

M08.C-G.1.1 Apply properties of geometric transformations to verify congruence or similarity.

M08.C-G.2.1 Solve problems involving right triangles by applying the Pythagorean theorem.

M08.C-G.3.1 Apply volume formulas of cones, cylinders, and spheres.

M08.D-S.1.1 Analyze and interpret bivariate data displayed in multiple representations.

M08.D-S.1.2 Understand that patterns of association can be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table.

PA Core Eligible Content

M08.C-G.1.1.1 Identify and apply properties of rotations, reflections, and translations.

Example: Angle measures are preserved in rotations, reflections, and translations.

M08.C-G.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them.

M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures, using coordinates.

M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them.

M08.C-G.2.1.1 Apply the converse of the Pythagorean theorem to show a triangle is a right triangle.

M08.C-G.2.1.2 Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three

dimensions. (Figures provided for problems in three dimensions will be consistent with Eligible Content in grade 8 and below.)

M08.C-G.2.1.3 Apply the Pythagorean theorem to find the distance between two points in a coordinate system.

M08.C-G.3.1.1 Apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. **Formulas will be provided.**

M08.D-S.1.1.1 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 correlation, linear association, and nonlinear association.

M08.D-S.1.1.2 For scatter plots that suggest a linear association, identify a line of best fit by judging the closeness of the data points to the line.

M08.D-S.1.1.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
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.

M08.D-S.1.2.1 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 associations between the two variables.
Example: Given data on whether students have a curfew on school nights and whether they have assigned chores at home, is there evidence that those who have a curfew also tend to have chores?

M08.B-E.3.1.1 Write and identify 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).

M08.B-E.3.1.2 Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms

Enduring Understandings:

- Understand congruence and similarity using physical models, transparencies, or geometry software.
- Understand and apply the Pythagorean Theorem.
- Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
- Investigate patterns of association in bivariate data.

Essential Questions:

1. How do we recognize when it is appropriate to use a linear model to represent a real-world situation and what are the benefits of using a linear model to answer questions about the situation?
2. How can we use various representations to analyze, interpret, draw conclusions, and make predictions?
3. When do we need to discuss correlation of data? What information can we glean from a scatter plot?

Core Content/Objectives		Eligible Content	
Concepts What students will know	**Competencies** What students will be able to do	**Activities**	**Assessment** How learning will be assessed
I. Geometry A. Define and Understand Rotations, Reflections, Translations and Dilations (transformations) **8.C-G.1.1.1** B. Prove Congruency Using Rotations, Reflections, and Translations **8.C-G.1.1.2** C. Determine the Effects of Transformations on a Two Dimensional Object. **8.C-G.1.1.3** **8.C-G.1.1.4**	**I. Geometry** A. 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. B. 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. C. 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	Fluency Activities • Math Dash • Rocket Math • Math Minute Properties of Rigid Transformations http://www.khanacademy.org/commoncore/grade-8 Transformations Quiz Effects of Transformations Quiz Congruence Quiz	Formative Assessments • Vocabulary • Daily Homework • Problem Solving Activity • Peer Teaching Summative Assessments • Chapter Tests • Section Quizzes • Quarter Projects • Classroom Diagnostic Tool

D. Explain and Prove the Pythagorean Theorem and its Converse **8.C-G.2.1.1**	dimensional figures, describe a sequence that exhibits the similarity between them. D. Explain a proof of the Pythagorean Theorem and its converse.	Rise-Run Triangles http://illuminations.nctm.org/Lesson.aspx?id=2570	
E. Applications of the Pythagorean Theorem **8.C-G.2.1.2** **8.C-G.2.1.3**	E. 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.	Squares, Diagonals and Square Roots http://illuminations.nctm.org/Lesson.aspx?id=2351 https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-geometry/cc-8th-pythagorean-theorem/e/distance_formula	
F. Find Volume of Cones, Cylinders, and Spheres and Apply **8.C-G.3.1.1**	F. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	Volume Quiz	
II. Statistics and Probability A. Scatterplots **8.D-S.1.1.1**	**II. Statistics and Probability** A. 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.	Exploring Linear Data http://illuminations.nctm.org/Lesson.aspx?id=1189	

B. Line of Best Fit **8.D-S.1.1.2** C. Use and Interpret the Slope and Intercept of the Line of Best Fit (linear regression line, trend line, linear model) **8.D-S.1.1.3** D. Frequency and Relative Frequency **8.D-S.1.2.1**	B. 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. C. 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. D. 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. For example, collect	Line of Best Fit-Practice Two-Way Table Practice	

	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?		
E. Construct and Use a Two-Way Table **8.D-S.1.2.1**	E. 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. 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?		
III. Linear Equations A. Solving Linear Equations **8.B-E.3.1.1**	**III. Linear Equations** A. Solve linear equations in one variable. Give examples of linear equations in one variable with one solution,	https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/basic-equation-practice/v/equations-3 https://www.khanacademy.org/math/algebra/solving-	

	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 in one variable. 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). C. Solve linear equations in one variable. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	linear-equations-and-inequalities/basic-equation-practice/e/linear_equations_3	

Materials/Resources/Technology
Textbook, Teacher-created power points, graphing calculators, manipulatives, Khan Academy