	Grade Level: 8 **Team Members: Beth Dollas, Alessia Manzi** **Number of Days of Unit: 20 days**	
	UNIT NAME: Real Numbers	
Essential Questions	How are zero and negative exponents defined? How can the properties of integer exponents be proven? How do you use scientific notation? How do you evaluate a numerical expression with integer exponents? What are the laws of exponents?	
Content Standards	8.EE.A.1 - Know and apply the properties of integer exponents to generate equivalent numerical expressions. 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 measurement of very large or very small quantities.	
Concepts and subskills	• Use the properties of integer exponents to generate equivalent expressions. • Use scientific notation to estimate very large or very small quantities. • Perform operations with numbers expressed in scientific notation and other forms. • Interpret scientific notation that has been generated by technology	*Mathematical Practices* 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.

		8. Look for and express regularity in repeated reasoning.
Content Objectives "I Can Statements"	I can: ● Make sense of rational and irrational numbers and compare and order them. ● Approximate a square root by using perfect squares and decimal approximations. ● Solve word problems using perfect squares and perfect cubes. ● Use properties of integer exponents to simplify and evaluate exponential expressions. ● Represent very small or very large quantities using scientific notation. ● Change repeating decimals to fractions using equations. ● Classify numbers as irrational or rational. ● Recognize numbers as perfect squares or perfect cubes. ● Recognize patterns in exponential expressions, such as same bases or different bases, and use properties of exponents to simplify these expressions. ● Analyze very large and very small quantities, and estimate these quantities using powers of 10. ● Represent very large and very small numbers using scientific notation.	
Content Vocabulary	● Scientific Notation, ● Power ● Exponents ● Base ● Exponential notation ● Expanded form ● Square and cube (of a number)	
Text, Materials, and Resources	**Resources** – enVision mathematics textbook and online account, Today's Challenge, 3 Act Math, and MathXL online enrichment	
Assessments, Products, Projects	● Curriculum embedded performance tasks ○ Topic stem projects ○ Lesson quizzes ○ Student self-assessments ○ unit readiness test, mid-topic assessment, unit test and/or performance task	Evaluative Criteria:

	Grade Level: 8 **Team Members: Beth Dollas, Alessia Manzi** **Number of Days of Unit: 20 days**	
	UNIT NAME: Analyze and Solve Linear Equations	
Essential Questions	How do you determine if a linear equation has no solution, one solution or infinitely many solutions? What is the process for solving an equation in two variables? How can the slope of a line be determined using a graph, table or equation?	
Content Standards	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 successfully 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.	
Concepts and subskills	• Use similar triangles to explain why the slope is the same between any two points on a line. • Graph proportional relationships, interpreting the unit rate as the slope. • Compare proportional relationships represented in different ways. • Derive y = mx and y = mx + b. • Show that a linear equation in one variable has one solution, infinitely many solutions, or no solution by transforming the equation into simpler forms.	*Mathematical Practices* 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically.

	• Solve multi-step equations.	6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
Content Objectives "I Can Statements"	I can: ● Represent equations with bar diagrams to identify variables and to visually simplify and solve problems. ● Use both graphs and formulas to manipulate quantities. ● Organize data in tables and graphs to provide visual representations of equations. ● Consider the slope and y-intercept of a given line and describe how it would look before graphing. ● Justify that a relationship is proportional when represented as a table, graph, or equation. ● Use the structure of a line graph to identify and interpret its slope. ● Flexibly use tables, graphs, and equations to describe proportional relationships. ● Make sense of the y-intercept of a line in context and use it when graphing a given equation.	
Content Vocabulary	● Slope ● Y-intercept ● Rise /run ● Proportional ● x-intercept	
Text, Materials, and Resources	**Resources** – enVision mathematics textbook and online account, Today's Challenge, 3 Act Math, and MathXL online enrichment	
Assessments, Products, Projects	● Curriculum embedded performance tasks ○ Topic stem projects ○ Lesson quizzes ○ Student self-assessments ○ unit readiness test, mid-topic assessment, unit test and/or performance task	Evaluative Criteria:

	Grade Level: 8 **Team Members: Beth Dollas & Alessia Manzi**

	Number of Days of Unit: 10 days	
	UNIT NAME: Use of Functions to Model Relationships	
Essential Questions	• How do you use functions to model relationships between quantities? • How do you define, evaluate, and compare functions?	
Content Standards	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 (function notation is not required in Grade 8). 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; given 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 (xx,yy) 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.	
Concepts and subskills	• Understand the definition of a function. • Compare and write functions represented in different ways (words, tables, graphs). • Understand that y = mx + b is a linear function and recognize nonlinear functions. • Interpret the rate of change and initial value of a function.	*Mathematical Practices* 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision.

		7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
Content Objectives "I Can Statements"	● Apply the mathematics I know to solve problems ● Identify key quantities in a problem situation and map their relationships using a range of tools. ● Make assumptions and approximations about the quantities and relationships in a problem situation. ● Analyze relationships mathematically to draw conclusions and construct models. ● Interpret their mathematical results in the context of the situation, and propose improvements to the model as needed. ● Make sense of quantities and their relationships in problem situations. ● "Decontextualize" quantities, that is, represent quantities symbolically. ● "Contextualize" quantities, that is, explain what variables and symbols refer to in a real-world context.	
Content Vocabulary	● Linear Equation ● Non-linear Equation ● Rate of Change	
Text, Materials, and Resources	**Resources** – enVision mathematics textbook and online account, Today's Challenge, 3 Act Math, and MathXL online enrichment	
Assessments, Products, Projects	● Curriculum embedded performance tasks ○ Topic stem projects ○ Lesson quizzes ○ Student self-assessments ○ unit readiness test, mid-topic assessment, unit test and/or performance task	Evaluative Criteria:

	Grade Level: 8 **Team Members: Beth Dollas & Alessia Manzi** **Number of Days of Unit: 10 days**
	UNIT NAME: Investigate Bivariate Data
Essential Questions	● How can you use graphs, tables and equations of functions to compare the rate of change? ● How can you represent the relationship between paired data and use the representation to make predictions?
Content Standards	● 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. 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. ● 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.
Concepts and subskills	● Explore the idea that two sets of data may show a relationship to each other. ● Categorize associations between the paired data as positive, negative, linear, nonlinear, or no association at all. ● Extend the examination of bivariate data that show a linear association. ● Use two-way frequency and two-way relative frequency tables to make evidence-based conjectures about the data.
	Mathematical Practices 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically.

		6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
Content Objectives "I Can Statements"	● Construct scatter plots and use them to interpret the relationship between two sets of measurement data. ● Draw trend lines and determine the type of association that exists between the paired data in question. ● Make predictions using the equation of a trend line. ● Organize data in a two-way frequency table and make comparisons of and conjectures about the data. ● Create two-way relative frequency tables from a two-way frequency table and make comparisons of and conjectures about the data. ● Recognize the constant slope of a linear association and determine whether it is positive or negative. ● Interpret the meaning of the y-intercept and slope of a trend line in the context of the data. ● Use the structure of the equation of a line in the form y=mx+b to identify an appropriate trend line for a set of bivariate data. ● Make sense of the structure of a frequency table through the Associative and Commutative Properties of Addition. ● Justify their logic in drawing conclusions by calling on evidence in their data displays.	
Content Vocabulary	● Scatter plots ● Linear associations ● Cluster ● Gap ● Outlier ● Frequency tables ● Relative frequency tables ● Categorical data	
Text, Materials, and Resources	**Resources** – enVision mathematics textbook and online account, Today's Challenge, 3 Act Math, and MathXL online enrichment	
Assessments, Products, Projects	● Curriculum embedded performance tasks ○ Topic stem projects ○ Lesson quizzes ○ Student self-assessments ○ unit readiness test, mid-topic assessment, unit test	Evaluative Criteria:

	and/or performance task

	Grade Level: 8 **Team Members: Beth Dollas & Alessia Manzi** **Number of Days of Unit: 10 days**	
	UNIT NAME: Analyze and Solve Systems of Linear Equations	
Essential Questions	● What does it mean to solve a system of linear equations? ● How do you determine if a linear equation has no solution, one solution or infinitely many solutions? ● How do you solve a system of linear equations simultaneously?	
Content Standards	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 (using substitution and elimination strategies), and estimate solutions by graphing the equations. Solve simple cases by inspection.	
Concepts and subskills	• Understand that the solution of a system of two linear equations in two variables corresponds to the point of intersection of their graphs. • Solve systems of two linear equations in two variables graphically and algebraically. • Solve real-world mathematical problems leading to systems of two linear equations in two variables.	*Mathematical Practices* 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Content Objectives "I Can Statements"	● Analyze the graphs of the linear equations to determine the number of solutions of the system of equations. ● Understand the intersection of the graphs of two linear equations as the solution to that system of linear equations. ● Understand the intersection of the graphs of two linear equations as the solution to that system of linear equations. ● Attend to the meaning of the solution of a system of linear equations as the value or values that are true for both equations in the system. ● Create a logical representation of problems in graphical form. ● Apply inverse operations to solve linear equations algebraically. ● Look for the overall structure of slopes and y-intercepts of equations in a linear system to predict the number of solutions to the system. ● See linear systems with one solution as having a specific value for each variable that makes the system true at only one point. ● Analyze systems of linear equations to develop efficient solution strategies.
Content Vocabulary	● System of linear equations ● Solution of a system of linear equations ● Slope ● Y-intercept ● Rise /run ● Proportional ● x-intercept
Text, Materials, and Resources	**Resources** – enVision mathematics textbook and online account, Today's Challenge, 3 Act Math, and MathXL online enrichment
Assessments, Products, Projects	Evaluative Criteria: ● Curriculum embedded performance tasks ○ Topic stem projects ○ Lesson quizzes ○ Student self-assessments ○ unit readiness test, mid-topic assessment, unit test and/or performance task

	Grade Level: 8 **Team Members: Beth Dollas & Alessia Manzi** **Number of Days of Unit: 20 days**

	UNIT NAME: Congruence and Similarity	
Essential Questions	• How can you show that two figures are congruent using transformations? • Why is the interior angle sum of a triangle 180 degrees? • What are the properties of angles when parallel lines are cut by a transversal? • How can you show a figure is similar after using a dilation? • Can you describe a sequence of transformations that yields similar figures?	
Content Standards	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.5 - Use information arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by transversals, and the angle-angle criterion of similarity of triangles. 8.G.A.3 - Describe the effects 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 transformations (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 information arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by transversals, and the angle-angle criterion of similarity of triangles.	
Concepts and subskills	• Verify the properties of translations, reflections, and rotations.	*Mathematical Practices*

	• Describe translations, reflections, rotations, and dilations using coordinates. • Understand that figures are congruent when they can be related by a sequence of translations, reflections, and rotations (and dilations). • Describe a sequence that exhibits congruence or similarity between two figures. • Students will know when to say figures are similar. • Know that dilations shrink and enlarge figures. • Know that dilations are angle preserving. • Can find the location of dilated points on the plane.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
Content Objectives "I Can Statements"	• Recognize and understand the concept of rotations and how to perform them. • Represent and interpret congruence with or without a coordinate grid. • Construct and label representations that preserve angle measures and resize all lengths. • Use their knowledge of dilation and transformation to recognize whether figures are similar. • Make sense of the relationship between angles created by parallel lines and a transversal. • Justify their conclusions about reflections with mathematical ideas. • Consider their reasoning about why they rotate figures a certain way or apply certain rules to the rotation of a figure. • Make sense of accuracy in transformations and understand angles and congruency relationships. • Use their understanding of the definition of the dilation to verify images that are the product of dilation. • Construct arguments by analyzing problems and using established mathematical definitions.	
Content Vocabulary	• Dilation • Scale drawing • Scale factor • Enlargement • Reduction • Similar • Transformations	

	• Translations • Reflection/ Line of Reflection • Rotation/ Angle of Rotation/ Center of Rotation • Congruent • Angle preserving • Basic rigid motion • Distance preserving • Exterior angle • Vector • Image • Transversal • Corresponding Angles • Alternate Interior Angles • Same-Side Angles • Interior Angles • Remote Interior Angles • Exterior Angle of a Triangle	
Text, Materials, and Resources	**Resources** – enVision mathematics textbook and online account, Today's Challenge, 3 Act Math, and MathXL online enrichment	

Assessments, Products, Projects	• Curriculum embedded performance tasks
	  ○ Topic stem projects
	  ○ Lesson quizzes
	  ○ Student self-assessments
	  ○ unit readiness test, mid-topic assessment, unit test and/or performance task
		Evaluative Criteria:

	Grade Level: 8 **Team Members: Beth Dollas & Alessia Manzi** **Number of Days of Unit: 10 days**
	UNIT NAME: Understand and Apply the Pythagorean Theorem

<table>
<tr><td>Essential Questions</td><td colspan="2">How can you use the Pythagorean Theorem to solve problems?</td></tr>
<tr><td>Content Standards</td><td colspan="2">8.G.B Understand and apply the Pythagorean Theorem.
6. a. Understand the relationship among the sides of a right triangle.
b. Analyze and justify the Pythagorean Theorem and its converse using pictures, diagrams, narratives, or models.
7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</td></tr>
<tr><td>Concepts and subskills</td><td>● Recognize that the hypotenuse of a right triangle is the longest side and is opposite the right angle.
● The legs are adjacent to the right angle and can have equal or different measures.
● Absolute value can be used to find vertical and horizontal distances on the coordinate plane.
● The Pythagorean Theorem can be used to find any distance on the coordinate plane, including diagonal distances.</td><td>Mathematical Practices
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.</td></tr>
<tr><td>Content Objectives "I Can Statements"</td><td colspan="2">● Justify when and how to use the Pythagorean Theorem and the converse of the Pythagorean Theorem.
● Identify and explain the steps of substituting a value into the equation $a^2 + b^2 = c^2$ and solving for the unknown.
● Develop logical arguments that include definitions, properties, and given facts to support their application of the equation $a^2 + b^2 = c^2$.
● Recognize faulty claims about the application of the Pythagorean Theorem and articulate the conceptual or procedural error involved.
● Have a conceptual and practical understanding of the structure of the equation $a^2 + b^2 = c^2$.
● Use the structure of the equation $a^2 + b^2 = c^2$ to find an unknown side length of a right triangle and to identify right triangles.
● Use the structure of a right triangle and the equation $a^2 + b^2 = c^2$ to find the diagonal of a right rectangular prism</td></tr>
</table>

	and distances on the coordinate plane.
Content Vocabulary	● Hypotenuse ● Leg ● Pythagorean Theorem ● Proof ● Converse of the Pythagorean Theorem
Text, Materials, and Resources	**Resources** – enVision mathematics textbook and online account, Today's Challenge, 3 Act Math, and MathXL online enrichment
Assessments, Products, Projects	● Curriculum embedded performance tasks ○ Topic stem projects ○ Lesson quizzes ○ Student self-assessments ○ unit readiness test, mid-topic assessment, unit test and/or performance task Evaluative Criteria:

	Grade Level: 8 **Team Members: Beth Dollas & Alessia Manzi** **Number of Days of Unit: 10 days**	
	UNIT NAME: Solve Problems Involving Surface Area and Volume	
Essential Questions	● How can prior knowledge of volume help you use formulas to find the volume of various 3-dimensional shapes such as spheres, cones, and cylinders? ● ● How are the formulas for volume of a cylinder, cone and sphere related to one another?	
Content Standards	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.	
Concepts and subskills	● Students further their conceptual understanding of surface area by applying what they know to find the surface area of cylinders and cones.	*Mathematical Practices* 1. Make sense of problems and persevere in solving them.

	• Identify the two-dimensional surfaces that make up three-dimensional figures and draw nets as a strategy for finding surface area of cylinders and cones. • Students understand that volume is a measure of capacity. • They relate volumes of cones, cylinders, and spheres to the volumes of three-dimensional figures they know. • They use relationships to generalize volume formulas for cones, cylinders, and spheres.	2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
Content Objectives "I Can Statements"	• Make sense of the formulas for surface area and volume and recognize how these formulas are related in three-dimensional figures. • Understand how quantities are related when using volume and surface area formulas in mathematical and real-world situations. • Analyze three-dimensional figures and their corresponding nets to find their surface areas. • Consider units as they solve problems that involve volume and surface area. • Recognize how to find an unknown dimension in order to solve volume and surface area problems. • Apply the correct formula when finding the volume or surface area of three-dimensional figures. • Recognize the patterns and connections between the formulas for the volumes of rectangular prisms and cylinders, cylinders and cones, and cones and spheres. • Use the overall structure of the volume or surface area formula to determine the unknown dimension of a figure. • Understand the structure of the Pythagorean Theorem and when it is used to find needed measures in order to solve a volume problem. • Recognize how to apply the different volume formulas when finding the volume of a composite figure.	
Content Vocabulary	• Cone • Cylinder • Sphere • Composite figure	
Text, Materials, and Resources	**Resources** – enVision mathematics textbook and online account, Today's Challenge, 3 Act Math, and MathXL online enrichment	

Assessments, Products, Projects	Evaluative Criteria: ● Curriculum embedded performance tasks ○ Topic stem projects ○ Lesson quizzes ○ Student self-assessments ○ unit readiness test, mid-topic assessment, unit test and/or performance task