Course Information

Grade(s):	**6 & 7**
Discipline/Course:	**Mathematics**
Course Title:	**Pre-Algebra 7**
Prerequisite(s):	**Transition to Pre-Algebra or exceptional performance on 5th grade math placement tests**
Course Description: *Program of Studies*	In the Pre-Algebra 7 course, instructional time should focus on five critical areas: (1) developing understanding of and applying proportional relationships; (2) drawing inferences about populations based on samples, (3) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations; (4) grasping the concept of a function and using functions to describe quantitative relationships; (5) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem 1. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships. 2. Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences. 3. Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students recognize equations for proportions ($y/x = m$ or $y = mx$) as special linear equations ($y = mx + b$), understanding that the constant of proportionality (m) is the slope, and the graphs are lines through the origin. They understand that the slope (m) of a line is a constant rate of change, so that if the input or x-coordinate changes by an amount A, the output or y-coordinate changes by the amount $m \cdot A$. Students also use a linear equation to describe the association between two quantities in bivariate data (such as arm span vs. height

	for students in a classroom). At this grade, fitting the model, and assessing its fit to the data are done informally. Interpreting the model in the context of the data requires students to express a relationship between the two quantities in question and to interpret components of the relationship (such as slope and y-intercept) in terms of the situation. Students strategically choose and efficiently implement procedures to solve linear equations in one variable, understanding that when they use the properties of equality and the concept of logical equivalence, they maintain the solutions of the original equation. Students solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane; these intersect, are parallel, or are the same line. Students use linear equations, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve problems. 4. Students grasp the concept of a function as a rule that assigns to each input exactly one output. They understand that functions describe situations where one quantity determines another. They can translate among representations and partial representations of functions (noting that tabular and graphical representations may be partial representations), and they describe how aspects of the function are reflected in the different representations. 5. Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students understand the statement of the Pythagorean Theorem and its converse, and can explain why the Pythagorean Theorem holds, for example, by decomposing a square in two different ways. They apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons. Students complete their work on volume by solving problems involving cones, cylinders, and spheres.
Course Essential Questions:	● How do patterns and functions help us describe data and physical phenomena and solve a variety of problems? ● How are quantitative relationships represented by numbers?

	● How do geometric relationships and measurements help us to solve problems and make sense of our world? ● How can collecting, organizing and displaying data help us analyze information and make reasonable and informed decisions?
Course Enduring Understandings:	Insights learned from exploring generalizations through the essential questions. (Students will understand that…) ● Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools, and technologies. ● Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies. ● Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools, and technologies. ● Data can be analyzed to make informed decisions using a variety of strategies, tools, and technologies.
Duration:	One Year
Course Materials/Resources:	Ed Gems Course 2A

Grade Seven Standards for Mathematical Practice The K-12 Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. This page gives examples of what the practice standards look like at the specified grade level. Students are expected to:	
Standards	Explanations and Examples
1. Make sense of problems and persevere in solving them.	In grade 7, students solve problems involving ratios and rates and discuss how they solved them. Students solve real world problems through the application of algebraic and geometric concepts. Students seek the meaning of a problem and look for efficient ways to represent and solve it. They may check their thinking by asking themselves, "What is the most efficient way to solve the problem?", "Does this make sense?", and "Can I solve the problem in a different way?"
2. Reason abstractly and quantitatively.	In grade 7, students represent a wide variety of real world contexts through the use of real numbers and variables in mathematical expressions, equations, and inequalities. Students contextualize to understand the meaning of the number or variable as related to the problem and decontextualize to manipulate symbolic representations by applying properties of operations.
3. Construct viable arguments and critique the reasoning of others.	In grade 7, students construct arguments using verbal or written explanations accompanied by expressions, equations, inequalities, models, and graphs, tables, and other data displays (i.e. box plots, dot plots, histograms, etc.). They further refine their mathematical communication skills through mathematical discussions in which they critically evaluate their own thinking and the thinking of other students. They pose questions like "How did you get that?", "Why is that true?" "Does that always work?" They explain their thinking to others and respond to others' thinking.

4. Model with mathematics.	In grade 7, students model problem situations symbolically, graphically, tabularly, and contextually. Students form expressions, equations, or inequalities from real world contexts and connect symbolic and graphical representations. Students explore covariance and represent two quantities simultaneously. They use measures of center and variability and data displays (i.e. box plots and histograms) to draw inferences, make comparisons and formulate predictions. Students use experiments or simulations to generate data sets and create probability models. Students need many opportunities to connect and explain the connections between the different representations. They should be able to use all of these representations as appropriate to a problem context.
5. Use appropriate tools strategically.	Students consider available tools (including estimation and technology) when solving a mathematical problem and decide when certain tools might be helpful. For instance, students in grade 7 may decide to represent similar data sets using dot plots with the same scale to visually compare the center and variability of the data. Students might use physical objects or applets to generate probability data and use graphing calculators or spreadsheets to manage and represent data in different forms.
6. Attend to precision.	In grade 7, students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning. Students define variables, specify units of measure, and label axes accurately. Students use appropriate terminology when referring to rates, ratios, probability models, geometric figures, data displays, and components of expressions, equations or inequalities.
7. Look for and make use of structure.	Students routinely seek patterns or structures to model and solve problems. For instance, students recognize patterns that exist in ratio tables making connections between the constant of proportionality in a table with the slope of a graph. Students apply properties to generate equivalent expressions (i.e. $6 + 2x = 3 (2 + x)$ by distributive property) and solve equations (i.e. $2c + 3 = 15$, $2c = 12$ by subtraction property of equality), $c=6$ by division property of equality). Students compose and decompose two- and three-dimensional figures to solve real world problems involving scale drawings, surface area, and volume. Students examine tree diagrams or systematic lists to determine the sample space for compound events and verify that they have listed all possibilities.

8. Look for and express regularity in repeated reasoning.	In grade 7, students use repeated reasoning to understand algorithms and make generalizations about patterns. During multiple opportunities to solve and model problems, they may notice that a/b ÷ c/d = ad/bc and construct other examples and models that confirm their generalization. They extend their thinking to include complex fractions and rational numbers. Students formally begin to make connections between covariance, rates, and representations showing the relationships between quantities. They create, explain, evaluate, and modify probability models to describe simple and compound events.

Academic Expectations The Fairfield Public Schools describe a variety of cross curricular expectations that all students should exemplify during their time within the schooling experience. This page gives examples of what the practice standards look like at the specified grade level. Students are expected to:		
Standards	Explanations	Example
1. Exploring and Understanding	When students engage in problem solving situations, they should be able to understand the problem, determine relevant information, and ask relevant additional questions.	Students should be able to answer the following questions when approaching a problem: 1. Do you understand all the words used in stating the problem? 2. What are you asked to find or show? 3. Can you restate the problem in your own words? 4. Can you think of a picture or diagram that might help you understand the problem?
2. Synthesizing and Evaluating	Engaging in a problem solving situation, students should be able to analyze the most efficient approach, and reflect on the process used to solve the problem.	Students should be able to answer the following questions when analyzing how to approach a problem, and also reflect on the result: 1. Is there enough information to enable you to find a solution? If not, what additional information is needed? 2. Are there multiple ways to complete the task? Which approach do you think is most efficient, and why? 3. Do you know a related problem? Look at the unknown and try to think of a familiar problem having the same or similar unknown. Can you use it? 4. Was your strategy effective? What worked? What didn't? 5. Was there another approach that could have been more efficient? 6. Is your answer reasonable? How do you know? 7. Was your presentation approach effective? If not, what would you change? 8. How did the communication tools allow you to get the message across to the intended audience?

3. Creating and Constructing	Engaged in a problem solving situation, students should implement a plan.	Students should be able to answer the following question to implementing their plan to solve a problem: 1. What strategy will you use to complete the task?
4. Conveying Ideas	Students should be able to use correct mathematical language, logically display their work for the desired problem.	Students should be able to answer the following questions to convey their mathematical thinking to solve a problem: 1. How will you present your information to your intended audience? 2. Does your response illustrate the correct terms and work to the problem?
5. Using Communication Tools	Students should be able to choose the correct tools to illustrate their mathematical work to solve a specific problem.	Students should be able to answer the following question to use specific communication tools to solve a problem: 1. If applicable, what communication tools will you use to convey your ideas and solution?
6. Collaborating Strategically	Students should be able to work collaboratively to solve problems.	Students should be able to answer the following question to collaboratively solve problems: 1. In what ways did you work together to help solve the desired problem?

Unit Number and Title:	**Unit 1: Equations**
Resource(s):	EdGems Course 2A: Unit 1
Learning Goals	
Standard(s):	7.EE.2.3 (Major Standard) Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. 7.EE.2.4.a/b (Major Standard) Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. 8.NS.1.1 (Supporting Standard) 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.1.2 (Supporting Standard) 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., $\pi 2$). 8.EE.1.2 (Major Standard) 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.3.7 (Major Standard) 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).

	8.EE.3.7.b (Major Standard) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
Essential Question(s):	● How can we solve multi-step equations and inequalities ? ● How can we classify rational and irrational numbers ● How can we locate rational and irrational numbers on a number line? ● What are perfect squares and cubes? ● What does it mean when linear equations have one solution? No solutions? Infinitely many solutions?
Enduring Understanding(s):	● One variable equations are the foundation for Algebra and solving them is rooted in mathematical properties (distributive, addition property of equality, multiplication property of equality). ● The equal sign indicates that two expressions are equivalent. It can also be used in defining or naming a single expression or function rule. ● The Real Number System is organized into subcategories of numbers with similar traits. ● Finding a root of a number is the inverse operation to the corresponding exponent.
Learning Goal(s): *Students will be able to use their learning to:*	1. Solve one- and two-step equations 2. Apply their understanding of balancing an equation to solve multi-step linear equations with variables on both sides of the equals sign 3. Work with equations that have one solution, no solution or infinitely many solutions 4. Solve inequalities and graph their solutions on a number line 5. Find perfect squares and perfect cubes as well as square roots and cube roots 6. Work with equations with exponents on the variable (squares and cubes). 7. Simplify square roots to represent irrational numbers in simplest form

Unit Number and Title:	**Unit 2: Pythagorean Theorem**
Resource(s):	EdGems Course 2A: Unit 2
Learning Goals	
Standards	8.G.2.6 (Major Standard) Explain a proof of the Pythagorean Theorem and its converse. 8.G.2.7 (Major Standard) Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. S.8.G.2.8 (Major Standard) Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
Essential Question(s):	● How can we apply the properties of right triangles and the Pythagorean Theorem to solve real-world problems? ● What is the Pythagorean Theorem and when does it apply? ● How can the Pythagorean Theorem be used to find missing lengths in a triangle? ● How can I use the Converse of the Pythagorean Theorem to classify a triangle?
Enduring Understanding(s):	● The Pythagorean Theorem holds for any right triangle and the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.
Learning Goal(s): *Students will be able to use their learning to:*	1. Participate in explorations to derive the Pythagorean Theorem 2. Use the Pythagorean Theorem to find missing side lengths in right triangles 3. Determine if three side lengths form a right triangle 4. Apply their knowledge of the Pythagorean Theorem to real-world situations with missing measures, including situations in two and three dimensions 5. Apply their knowledge of the Pythagorean Theorem to find distance on the coordinate plane

Unit Number and Title:	**Unit 3: Proportional Relationships**
Resource(s):	EdGems Course 2A: Unit 3
Learning Goals	
Standard(s):	8.EE.2.5 (Major Standard) 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. 8.EE.2.6 (Major Standard) 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.F.1.1 (Major Standard) 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.
Essential Question(s):	● What is the relationship that describes a function? ● How can functions be used to find the output from a given input? ● How can equations, graphs, word descriptions, and tables describe a function? ● What is a rate and how is it related to proportional reasoning?
Enduring Understanding(s):	● Functions are single-valued mappings from one set - the domain of the function - to another - its range. ● A function's rate of change is one of the main characteristics that determine what kinds of real-world phenomena the function can model.

	● Linear functions are characterized by a constant rate of change. Reasoning about the similarity of "slope" triangles allows deducing that linear functions have a constant rate of change and a formula of the type $f(x) = mx + b$. ● Functions can be represented in various ways, including through algebraic means (e.g., equations), graphs, word descriptions, and tables.
Learning Goal(s): *Students will be able to use their learning to:*	1. Determine if a relationship is a function by examining a graph or table 2. Examine a specific type of function formed by a proportional relationship 3. Students interpret the constant of proportionality (unit rate) as the slope of the graph 4. Progress from understanding the slope as the unit rate to calculating slope from a graph, a table or two ordered pairs.

Unit Number and Title:	**Unit 4: Functions**
Resource(s):	EdGems Course 2A: Unit 4
Learning Goals	
Standard(s):	8.F.1.2 (Major Standard) Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions) 8.F.1.3 (Major Standard) 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.2.4 (Major Standard) 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.2.5 (Major Standard) 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 8.F.3.6 (Major Standard) 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.
Essential Question(s):	● What is the relationship that describes a function? ● How can functions be used to find the output from a given input?

	● How can equations, graphs, word descriptions, and tables describe a function? ● What is a rate and how is it related to proportional reasoning?
Enduring Understanding(s):	● Functions are single-valued mappings from one set - the domain of the function - to another - its range. ● A function's rate of change is one of the main characteristics that determine what kinds of real-world phenomena the function can model. ● Linear functions are characterized by a constant rate of change. Reasoning about the similarity of "slope" triangles allows deducing that linear functions have a constant rate of change and a formula of the type $f(x) = mx + b$. ● Functions can be represented in various ways, including through algebraic means (e.g., equations), graphs, word descriptions, and table
Learning Goal(s): *Students will be able to use their learning to:*	1. Complete an in-depth study of linear functions as well as look at a variety of non-linear functions 2. Describe qualitative features of a graph such as increasing, decreasing, linear and non-linear 3. Graph linear functions from an equation as well as write equations for linear functions based on graphs or key information 4. Work with linear equations written in different forms (slope-intercept, pointslope and standard form) with the main goal of proficiency with slope-intercept form 5. Convert other forms of linear equations into slope intercept form

Unit Number and Title:	**Unit 5: Systems of Equations**
Resource(s):	EdGems Course 2A: Unit 5
Learning Goals	
Standard(s):	8.EE.3.8.a (Major Standard) 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 8.EE.3.8.c (Major Standard) Solve real-world and mathematical problems leading to two linear equations in two variables 8.NS.1.1 (Major Standard) 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.
Essential Question(s):	● How can situations be modeled as a system of linear equations and how can you solve those systems? ● What does it mean when the graphs of two functions intersect? ● What method is most appropriate to solve a system of equations (graph, substitution, or elimination)?

Enduring Understanding(s):	● Solving a system of equations can be done with graphs or equations. ● The different methods to solve a system of equations can be more efficient than others, based on the situation and context.
Learning Goal(s): *Students will be able to use their learning to:*	1. Combine their knowledge of solving equations and graphing lines from Units 1 and 4 to solve systems of equations 2. Look at systems of two linear equations and determine whether the lines are parallel, intersecting or the same line 3. Use three methods for solving systems of equations (graphing, substitution and elimination) 4. Write and solve systems for real world situations 5. Apply systems of equations to determine the fraction that represents a repeating decimal

Unit Number and Title:	**Unit 6: Two-Dimensional Geometry**
Resource(s):	EdGems Course 2A: Unit 6
Learning Goals	
Standard(s):	7.G.1.1 (Additional Standard) Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 7.G.1.2 (Additional Standard) Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. 7.G.2.4 (Additional Standard) Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. 7.G.2.5 (Additional Standard) Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. 7.G.2.6 (Additional Standard) Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons
Essential Question(s):	● How can you use scale drawings to solve problems? ● How can you draw shapes that satisfy given conditions? ● How can you use angle pairs to solve problems? ● How do I classify and solve problems with triangles and quadrilaterals? ● How can you find the circumference and area of a circle? ● How do you find the perimeter and area of a composite figure?

Enduring Understanding(s):	● Representations of geometric ideas and relationships allow multiple approaches to geometric problems and connect geometric interpretations to other contexts. ● Special angle pairs can be used to solve problems. ● Triangles and quadrilaterals can be classified based on their attributes. ● The three interior angles of a triangle add up to 180 degrees, and the four interior angles of a quadrilateral add up to 360 degrees.
Learning Goal(s): *Students will be able to use their learning to:*	1. Work with angle pairs including supplementary, complementary, vertical and adjacent angles (including linear pairs) 2. Given conditions about a triangle, determine if those conditions lead to one or more triangles 3. Build upon previous understandings of area and perimeter 4. Apply circumference and area formulas of a circle and use these in composite figures 5. Apply their understanding of ratios and rates to scale drawings that reduce or enlarge the size of the actual object using a scale factor

Unit Number and Title:	**Unit 7 – Parallel Lines, Transversals, and Triangles**
Resource(s):	Ed Gems Advanced Course 2 Unit 7
Learning Goals	
Standard(s):	8.G.1.5 (Major Standard) 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.2.6 (Major Standard) 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.
Essential Question(s):	● What types of angle relationships are formed by transversals and sets of parallel lines? ● What is the sum of interior angles in a triangle? ● What is the relationship between the interior and exterior angles of a polygon? ● How can we use proportional reasoning to determine similarity ?
Enduring Understanding(s):	● Representations of geometric ideas and relationships allow multiple approaches to geometric problems and connect geometric interpretations to other contexts. ● Special angle pairs can be used to solve problems. ● Triangles and quadrilaterals can be classified based on their attributes. ● The three interior angles of a triangle add up to 180 degrees, and the four interior angles of a quadrilateral add up to 360 degrees.
Learning Goal(s): *Students will be able to use their learning*	1. Examine angles formed by a transversal crossing a set of parallel lines 2. Apply angle relationships such as alternate interior and exterior angles and apply their skills of equation solving to find the measures of angles

to:	3. Discover the sum of the three interior angles in a triangle as well as the relationship between interior and exterior angles of a triangle 4. Determine if two triangles are similar using slope triangles (see right) and find missing side lengths using proportional reasoning 5. Examine angle relationships in a variety of diagrams

Unit Number and Title:	**Unit 8: Transformations**
Resource(s):	Ed Gems Accelerated Course 2 Unit 8
Learning Goals	
Standard(s):	8.G.1.1 (Major Standard) 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.1.2 (Major Standard) 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.1.3 (Major Standard) Describe the effect of dilations, translations, rotations, and reflections on twodimensional figures using coordinates. 8.G.1.4 (Major Standard) 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
Essential Question(s):	● What types of symmetry can be found around you? ● How can transformations be described algebraically? ● How can you use a line to generate the reflection image of a figure over that line? ● What are the coordinate rules for reflections over the x-axis and y-axis, dilations centered at the origin, and translations, and why do these rules make sense geometrically? ● How do you determine the angles of rotation for a figure that has rotational symmetry? ● What does it mean for figures to be similar and/or congruent?
Enduring Understanding(s):	● Geometric thinking involves developing, attending to, and learning how to work with imagery. ● Decomposing and rearranging provide a geometric way of both seeing that a measurement formula is the right one and seeing why it is the right one.

	• Symmetry provides a powerful way of working geometrically.
Learning Goal(s): *Students will be able to use their learning to:*	1. Perform transformations on points and polygons. These transformations include reflections, translations, rotations and dilations 2. Understand that reflections, translations, rotations create congruent figures while dilations create similar figures 3. Create graphs of images when given the pre-image, but will also write and/or use transformation rules to describe transformations 4. Perform compositions of transformations 5. Describe a sequence of transformations that can be performed to map one figure onto another to "prove" that two figures are congruent or similar

Unit and Title:	**Unit 9: Exponent Properties**
Resource(s):	Ed Gems Accelerated Unit 9
Learning Goals	
Standard(s):	8.EE.1 (Major Standard) Know and apply the properties of integer exponents to generate equivalent numerical expressions 8.EE.3 (Major Standard) 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.4 (Major Standard) 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.
Essential Question(s):	● What are the properties of exponents? ● How can represent numbers in expanded form and in scientific notation? ● How can we perform operations with numbers expressed in scientific notation?
Enduring Understanding(s):	● There are specific rules for how to simplify expressions involving exponents. ● Scientific Notation allows you to work with really large or really small numbers in a very efficient way.
Learning Goal(s): *Students will be able to use their learning to:*	1. Apply their understanding of exponents to learn properties of exponents and create equivalent expressions 2. Apply their understanding of 0 and negative exponent values to create equivalent numerical expressions

	3. Use concepts of place value to understand scientific notation and write numbers in scientific notation from standard form or vice versa 4. Perform operations with numbers expressed in scientific notation

Unit Number and Title:	Unit 10: Three Dimensional Geometry
Resource(s):	Ed Gems Course 2 Accelerated Unit 10
Learning Goals	
Standard(s):	7.G.1.3 (Additional Standard) Describe the two-dimensional figures that result from slicing three dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. 7.G.2.6 (Additional Standard) Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. 8.G.3.9 (Additional Standard) Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Essential Question(s):	● How can we find the cross-sections or three-dimensional shapes? ● How can we find the surface areas and volumes of three-dimensional shapes? ● How can we find a missing dimension of a three-dimensional shapes when given the volume? ● How can measurements be used to solve problems? ● What measurements are needed to find the volume of a 3-dimensional figure? ● How are prisms and cylinders alike and how are they different? How are pyramids and cones alike and how are they different?
Enduring Understanding(s):	● Spatial sense and geometric relationships are a means to solve problems and make sense of a variety of phenomena.

Learning Goal(s): *Students will be able to use their learning to:*	1. Determine the shapes of cross-sections when figures are sliced in specific ways 2. Find surface areas and volumes of prisms and pyramids as well as the volumes of cylinders, cones and spheres 3. Find surface area by drawing a net, therefore creating a composite two-dimensional figure, and finding the area of the net 4. Find volumes of prisms and cylinders by building on previous work with rectangular prisms by multiplying the area of the base by the height 5. Apply the relationship that prisms and cylinders with pyramids and cones respectively 6. Find volumes of solids but also must work backwards to find missing dimensions when given the volume. 7. Connect to square roots and cube roots when solving equations with exponents

Unit Number and Title:	Unit 11- Bivariate Data
Resource(s):	Ed Gems Accelerated Course 2 Unit 11
Learning Goals	
Standard(s):	8.SP.1.1 (Supporting Standard) 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.1.2 (Supporting Standard) 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.1.3 (Supporting Standard) Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. 8.SP.1.4 (Supporting Standard) 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
Essential Question(s):	● How can the collections, organization, interpretation, and display of data be used to answer questions? ● How can the organization of data help interpret the meaning of the data collected?
Enduring Understanding(s):	● Reading, understanding, interpreting, and communicating data are critical in modeling a variety of real-world situations, drawing appropriate inferences, making informed decisions, and justifying those decisions. ● The message conveyed by the data depends on how the data is collected, represented, and summarized.

	● The results of a statistical investigation can be used to support or refute an argument.
Learning Goal(s): *Students will be able to use their learning to:*	1. Create scatter plots to show bivariate (two variable) data 2. Look for positive or negative associations in the data as well as whether the data shows a linear or nonlinear association 3. For linear associations, informally fit a line to data and find the equations for their lines of best fit 4. Use equations of linear models to solve problems in real-world contexts 5. Look at data in two-way tables and find relative and conditional frequencies in order to see if there are associations in the data

Unit Number and Title:	Unit 12- Probability and Statistics
Resource(s):	Ed Gems Accelerated Course 2 Unit 12
Learning Goals	
Standard(s):	7.SP.1.1 (Supporting Standard) Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. 7.SP.1.2 (Supporting Standard) Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. 7.SP.2.3 (Supporting Standard) Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability 7.SP.2.4 (Supporting Standard) Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. 7.SP.3.5 (Supporting Standard) Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1 2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event 7.SP.3.6 (Supporting Standard) Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability 7.SP.3.7 (Supporting Standard) Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. .7.SP.3.8 (Supporting Standard) Find probabilities of compound events using organized lists, tables, tree

	diagrams, and simulation.
Essential Question(s):	How can you determine the probability of an event? How can we use models to determine the probability of an event? Compound event?
Enduring Understanding(s):	The probability of an event's occurrence can be predicted with varying degrees of confidence.
Learning Goal(s): *Students will be able to use their learning to:*	1. Describe the probability of an event using words (likely, impossible, etc.) and using numerical values (fractions, decimals and percents). 2. Compute both theoretical and experimental probability and use those probabilities to predict 3. Use models such as tree diagrams, lists and tables to find compound probabilities 4. Compare two data sets using measures of center and variability