Coventry Mathematics Common Core Curriculum

Year at a Glance (grade 8)

Trimester 1	Trimester 2	Trimester 3
Unit of Study 1: **Transformations, Congruence & Similarity** 🟩 *MAX 17 days*	Unit of Study 4: *(finish - grade T2)* **Slope** 🟩 *MAX 20 days total*	**Unit of Study 7:** **Systems** 🟩 *MAX 15 days*
Unit 1 Scoring Criteria	Unit 4 Scoring Criteria	Unit 7 Scoring Criteria
Unit of Study 2: **Rational & Irrational Numbers** 🟦 *MAX 10 days*	**Unit of Study 5:** **Linear Functions** 🟩 **Patterns in Bivariate Data** (embedded) 🟦 *MAX 21 days*	**Unit of Study 8:** **Rules of Exponents & Scientific Notation** 🟩 *MAX 15 days*
Not Summatively Assessed	Unit 5 Scoring Criteria	Unit 8 Scoring Criteria
Unit of Study 3: **Pythagorean Theorem** 🟩 *MAX 12 days*	**Unit of Study 6:** **Solving Equations with One Variable** 🟩 *MAX 20 days*	**Unit of Study 9:** **Angles** 🟩 *MAX 5 days*
Unit 3 Scoring Criteria	Unit 6 Scoring Criteria	Unit 9 Scoring Criteria
Unit of Study 4: *(start - hold grades until T2)* **Slope** 🟩 *MAX 20 days total*		**Unit of Study 10:** **Volume** 🟡 *MAX 10 days*
		Unit 10 Scoring Criteria

🟩 *major standards*   🟦 *supporting*   🟡 *additional standard*

Use these to code the aligned standards

Trimester 1

Unit 1: Transformations, Congruence & Similarity	Time: MAX 17 days (~50 minutes per day)

Essential Questions:
- How do transformations affect the coordinates of the vertices of two-dimensional figures?

Prior Learning:
In grade 6, students drew polygons in the coordinate plane and gave coordinates for the vertices. In grade 7, students drew geometric shapes with given conditions (by freehand, using a ruler and protractor, or with technology). They also constructed triangles from three measures, angles, or sides, noticing when the conditions determined a unique triangle, more than one triangle, or no triangle. Students also solved problems involving scale drawings of geometric figures.

Current Learning:
In grade 8, this is a critical area and a major cluster. Students understand that two figures are similar if the second can be obtained from the first by a sequence of movements. Given two similar two-dimensional figures, they explain the sequence of movements between the two.
Through investigation, students explore interior and exterior angles of triangles and angle measures created by two parallel lines cut by a transversal, and the angles of similar triangles.

Future Learning:
In high school, students will experiment with transformations in the plane. They will prove geometric theorems about lines, angles, triangles, and parallelograms. Students will make formal geometric constructions with a variety of tools and methods. They will work with similarity in terms of similarity transformations and prove theorems involving similarity. Students will also use this knowledge of geometric concepts in modeling situations.

Mathematical Practices
SMP 2 Reason abstractly and quantitatively.
SMP 5 Use appropriate tools strategically.
SMP 7 Look for and make use of structure.

Standard	Emphasis / Standard	Notes
Understand congruence and similarity using physical models, transparencies and geometric software.	■8.G.1 ■8.G.2 ■8.G.3 ■8.G.4	
Student Target(s) / Performance Indicators:	**Standards:**	**Notes:**
Transform 2-D figures (rotate, reflect translate, dilate) on the coordinate plane by… ● using technology ● drawing by hand	■8.G.1 ■8.G.3	

● using coordinates		
Demonstrate similarity of 2-D figures by… ● completing a sequence of transformations ● describing a sequence of transformations to obtain the second figure from the first	🟩8.G.4	
Demonstrate congruence of 2-D figures by… ● completing a sequence of transformations (not dilations) ● describing a sequence of transformations to obtain the second figure from the first	🟩8.G.2	

Scoring Criteria:

Geometry			
4 – Distinguished	**3 – Proficient**	**2 – Developing**	**1 – Emerging**
I. Demonstrate understanding of congruence and similarity through transformations.			
I can ● Describe **more than one** sequence of transformations that proves congruence or similarity between two figures.	I can ● **Accurately** (may have minor/careless error) create a two-dimensional figure (congruent and/or similar) from a sequence of transformations. ● Describe a sequence of transformations that **proves congruence or similarity** between two figures.	I can ● *Create a two-dimensional figure (congruent and/or similar) from a sequence of transformations. ● **Describe a sequence of appropriate transformations between two figures.	I can ● Create a two-dimensional figure (congruent and/or similar) from **a transformation**. ● Identify a transformation

🟩*major standards*   🟦 *supporting*   🟡 *additional standard*

Trimester 1

Unit 2: Rational & Irrational Numbers	Time: MAX 10 days (~50 minutes per day)

Essential Questions:
- What is the difference between a rational and irrational number?
- How can you convert between forms of rational numbers (whole numbers, fractions, decimals, repeating decimals)?
- How can you decide the location of irrational numbers on a number line?
- What does the square root of a number mean? What does the cube root of a number mean?
- How do perfect squares help you estimate the square root of non-perfect squares?
- What is the relationship between squaring and taking the square root of a number?

Prior Learning:
In seventh grade, students became fluent in rational number operations.

Current Learning:
This unit is a supporting cluster. Students learn about irrational numbers. They understand that a number that is not rational is irrational. Students learn how to find the approximate value of an irrational number and its location on a number line. They also estimate the value of expressions with irrational numbers. Students use square roots and cube roots to solve equations (x^2 = p and x^3 = p, where p is a positive rational number). They evaluate square roots of small perfect squares and cube roots of small perfect cubes. Later in eighth grade, students use their knowledge of square roots, cube roots, and rational numbers in their study of the Pythagorean Theorem, volume, and rules with exponents.

Future Learning:
In high school, students will extend the properties of integer exponents to rational exponents. They will use the properties of rational and irrational numbers to solve problems in a variety of contexts.

Mathematical Practices
SMP 6 Attend to precision.
SMP 7 Look for and make use of structure
SMP 8 Look for and express regularity in repeated reasoning

Standard	Emphasis / Standard	Notes
Work with radicals and integer exponents **Know that there are numbers that are not rational, and approximate them by rational numbers**	■8.EE.2 ■8.NS.1 ■8.NS.2	
Student Target(s) / Performance Indicators:	**Standards:**	**Notes:**
Use square root & cube root symbols to represent solutions by…	■8.EE.2	

- evaluating square roots of small perfect squares - evaluating cube roots of small perfect cubes		
Know that numbers that are not rational are irrational by ... finding the decimal expansion of rational numbers (which terminates or repeats eventually)	■8.NS.1	
Use rational approximations to compare size of irrational numbers by ... - approximating their location on a number line - estimating the value of expressions (ex: π, √2)	■8.NS.2	
Scoring Criteria: *Not assessed summatively.* *Embedded into Expressions & Equations.*		

■*major standards*　　■ *supporting*　○*additional standard*

Trimester 1

Unit 3: Pythagorean Theorem	Time: MAX 12 days (~50 minutes per day)

Essential Questions:
- How can you prove the Pythagorean Theorem?
- What does the converse of the Pythagorean Theorem prove?
- What is the difference between a leg and the hypotenuse of a right triangle?
- How do you find the length of the hypotenuse given the lengths of both legs of a right triangle?
- How do you find the length of a leg, given the length of the second leg and the hypotenuse of a right triangle?
- How could you use the Pythagorean Theorem to find the distance between two points on the coordinate plane?
- How would you apply the Pythagorean Theorem to a real-world situation?

Prior Learning:
In grade 6, students found vertical and horizontal distances on the coordinate plane. In grade 7, students focused on constructing triangles from three measures of angles or sides. They solved real-world and mathematical problems involving two- and three-dimensional objects composed of triangles.

Current Learning:
In grade 8, this unit is a major cluster and a critical area. Students further their knowledge of rational and irrational numbers. They also continue to estimate the value of expressions with irrational numbers. Students explain a proof of the Pythagorean Theorem and its converse. They apply the theorem to determine missing side lengths in a right triangle in real-world and mathematical problems (with two and three dimensions). Students also use the Pythagorean Theorem to find the distance between two points on the coordinate plane.

Future Learning:
In high school, students will prove theorems about lines, angles, triangles, and parallelograms. They will also construct shapes to meet certain requirements. Students will use coordinates to prove simple geometric theorems algebraically.

Mathematical Practices
SMP 1 Makes sense or problems and perseveres in solving them.
SMP 3 Construct viable arguments and critique the reasoning of others.
SMP 4 Model with mathematics.

Standard	Emphasis / Standard	Notes
Understand and apply the Pythagorean Theorem.	🟩8.G.7 🟩8.G.8	
Student Target(s) / Performance Indicators:	**Standards:**	**Notes:**

Determine unknown side lengths in right triangles by… ● applying the Pythagorean Theorem	🟩8.G.7	
Find the distance between two points on the coordinate plane by… ● applying the Pythagorean Theorem	🟩8.G.8	

Scoring Criteria:

Geometry			
4 – Distinguished	**3 – Proficient**	**2 – Developing**	**1 – Emerging**
III. Understand and apply the Pythagorean Theorem.			
I can ● Use context to analyze the reasonableness of a solution.	I can ● **Correctly** apply the Pythagorean Theorem in real-world and mathematical problems.	I can ● Apply the Pythagorean Theorem to find a hypotenuse **or** missing leg with minor equation errors.	I can ● Attempt to apply the Pythagorean Theorem to find a hypotenuse or missing legs.

🟩*major standards*   🟦 *supporting*   🟡*additional standard*

Trimester 1 & 2

Unit 4: Slope	Time: MAX 20 days (~50 minutes per day)

Essential Questions:
- What is the relationship between rate of change and slope?
- What does the equation
- $y = mx + b$ look like on a graph?
- What makes a function nonlinear?
- Using a graph and an equation in the form $y = mx + b$, how do you compare the slopes?

Prior Learning:
In sixth grade, students grow their ability to analyze proportional relationships.
In seventh grade, students were able to analyze proportional relationships and they solved problems involving unit rates. They have also worked with solving problems involving scale drawings and geometric figures. Students have reproduced images at a different scale.

Current Learning:
In eighth grade, all components of this unit are critical areas and major clusters. Students build on previous knowledge with unit rate, proportional relationships, and graphing to connect these ideas and understand that points (x, y) on a non-vertical line are the solutions of the equation y = mx + b, where m is the slope of the line as well as the unit rate. In eighth grade, students interpret unit rate as the slope of the graph. They interpret and compare different slopes. Students use similar triangles on a graph to explain why the slope of a line is the same between any two points (for example, 4/8 = 1/2). They then extend that graph to find the y-intercept. Students understand that y = mx + b defines a linear function and what a nonlinear function looks like.

Future Learning:
In high school algebra, students will use graphing to interpret multiple functions. They will construct linear functions.

Mathematical Practices
SMP 1 Make sense of problems and persevere in solving them.
SMP 5 Use appropriate tools strategically
SMP 6 Attend to precision
SMP 8 Look for and express regularity in repeated reasoning

Standard	Emphasis / Standard	Notes
Understand the connections between proportional relationships, lines and linear equations. **Define, evaluate and compare functions.**	🟩8.EE.5 🟩8.EE.6 🟩8.F.3	
Student Target(s) / Performance Indicators:	**Standards:**	**Notes:**

Skill	Standard	
Compare proportional relationships by … ● graphing ● finding rate of change/slope (unit rate)	🟩8.EE.5	
Explain why slope is the same between any two points on a non-vertical line by… ● using similar triangles	🟩8.EE.6	
Derive the equation of a line by ... ● finding rate of change/slope ● finding initial value/y-intercept	🟩8.EE.6	
Define a linear function by ... ● using the equation y = mx + b ● graphing a line ● giving examples of functions that are not linear	🟩8.F.3	

Scoring Criteria:

Expressions & Equations			
4 – Distinguished	**3 – Proficient**	**2 – Developing**	**1 – Emerging**
II. Explain the connections between proportional (and non-proportional) relationships, lines, and linear equations.			
I can ● Accurately explain relationships as proportional or nonproportional using **vocabulary* appropriate to the context.**	I can ● Accurately explain relationships as proportional or nonproportional using **supporting** evidence.	I can ● Accurately explain relationships as proportional or nonproportional using **minimal** evidence.	I can ● Identify a relationship with an incorrect or missing explanation..

Functions			
4 – Distinguished	**3 – Proficient**	**2 – Developing**	**1 – Emerging**
III. Describe the functional relationship between two quantities by analyzing a graph and sketch the functional relationship between two quantities.			
I can ● **Accurately** (may have a minor/careless error) analyze a function within the **context** of the relationship **OR create a context** to describe the given graph.	I can ● **Accurately** analyze a function (both linear/non-linear) over specified intervals (ex. increasing, decreasing and/or constant). ● **Appropriately** sketch the functional relationship between two quantities.	I can ● **Accurately** analyze **parts of** a function (both linear/non-linear) over specified intervals (ex. increasing, decreasing or constant). ● Sketch the functional relationship representing some key features.	I can ● **Identify** parts of a function (both linear/non-linear) as increasing, decreasing or constant. ● Sketch the functional relationship representing a key feature.

🟩 *major standards*   🟦 *supporting*   🟡 *additional standard*

Trimester 2

Unit 5: Linear Functions ▇ & Patterns in Bivariate Data (embedded) ▫	Time: MAX 21 days (~50 minutes per day)

Essential Questions:
- What is a function?
- What are the relationships between the different ways to represent them (algebraically, graphically, with input/output tables,or by verbal description)?
- How can you determine (and compare) the rates of change of functions given in different representations?
- How could you use a function to model a real world situation?

Prior Learning:
In sixth grade, students learned about independent and dependent variables and analyzed the relationship between them using graphs, tables, and equations. In seventh grade, students identified the unit rate in tables, graphs, equations, diagrams, and verbal
descriptions of proportional relationships. Students explained what a point (x, y) means in terms of a problem situation. Students represented proportional relationships with equations.

Current Learning:
These concepts are a critical area and major cluster of the grade 8 CCSS standards and should be taught at the developmental and reinforcement level. Students define a function (they do not need to use function notation). They make a function table to generate ordered pairs as a means of graphing a function. Students determine the rate of change of a function represented in multiple ways and are able to describe and compare two functions represented in multiple ways. Students construct a function to model a linear relationship between two quantities. They interpret what rate of change and initial value mean in the context of the function. Students will use their knowledge of functions later in the school year while studying slope. They need to be fluent with using and interpreting linear functions by the end of grade 8.

Future Learning:
In high school algebra, students will be deepening their knowledge of functions to expand their studies of nonlinear functions.

Mathematical Practices
SMP 1 Make sense of problems and persevere in solving them.
SMP 2 Reason abstractly and quantiatively
SMP 4 Model with mathematics.

Standard	Emphasis / Standard	Notes
Define, evaluate and compare functions.	▇8.F.1 ▇8.F.2	
Use functions to model relationships between quantities	▇8.F.4 ▇8.F.5	

Investigate patterns of association in bivariate data	☑ 8.SP.1 ☑ 8.SP.2 ☑ 8.SP.3 ☑ 8.SP.4	
Student Target(s) / Performance Indicators:	**Standards:**	**Notes:**
Determine if a relation is a function through … ● tables ● graphs ● mappings ● scenarios	☐ 8.F.1	
Compare properties of two functions represented in different ways … ● algebraically ● graphically ● numerically in tables ● verbal descriptions	☐ 8.F.2	
Construct and interpret a function to model a linear relationship between two quantities by … ● calculating rate of change ● finding the y-intercept	☐ 8.F.4	
Describe the relationship between two quantities by … ● analyzing a graph ● sketching a graph	☐ 8.F.5	
Investigate patterns of association between two quantities by … ● constructing and interpreting scatter plots ● analyzing clustering, outliers, positive or negative association, linear or nonlinear association ● finding a line of best fit ● interpreting slope and intercepts	☑ 8.SP.1 ☑ 8.SP.2 ☑ 8.SP.3	Line of best fit for linear relationships only
Summarize data by … ● constructing and interpreting two-way tables ● using frequencies and relative frequencies	☑ 8.SP.4	

Scoring Criteria:

Functions			
4 – Distinguished	**3 – Proficient**	**2 – Developing**	**1 – Emerging**
I. **Compare properties of two functions each represented in a different way (algebraically, graphically, in tables, or verbal descriptions).**			

I can	I can	I can	I can
• Explain the rates of change and initial values with respect to the **context of the problem**, or create a context to describe the given functions.	• **Accurately*** compare rate of change **and** initial value of two functions each represented in a different way (given equations, graphs, sets of ordered pairs, tables, or verbal descriptions)	• Accurately compare rate of change **or** initial value of two functions each represented in a different way (given equations, graphs, sets of ordered pairs, tables, or verbal descriptions)	• Give a general description of the functions.

<table>
<tr><td colspan="4">II. Construct a function to model a linear relationship between two quantities.</td></tr>
<tr>
<td>I can
• Accurately determine the slope AND the y-intercept from the given representations (graph, set of ordered pairs, table, and verbal description).
• Accurately construct a function (equation) to model the given linear relationship between two quantities.</td>
<td>I can
• Determine the slope AND the y-intercept from the given representations (graph, set of ordered pairs, table, and verbal description) with minor error.
• Accurately construct a function (equation) to model the given linear relationship between two quantities.</td>
<td>I can
• Determine the slope OR y-intercept from the given representations (graph, set of ordered pairs, table, and verbal descriptions).
• Construct a function* (equation) using the information found to model the given linear relationship between two quantities.</td>
<td>I can
• Determine a slope and a y-intercept from the given representations (graph, set of ordered pairs, table, and/or verbal descriptions).
• Construct a function** (equation) using the information found to model the given linear relationship.</td>
</tr>
<tr><td colspan="4">III. Describe the functional relationship between two quantities by analyzing a graph and sketch the functional relationship between two quantities.</td></tr>
<tr>
<td>I can
• Accurately (may have a minor/careless error) analyze a function within the context of the relationship OR create a context to describe the given graph.</td>
<td>I can
• Accurately analyze a function (both linear/non-linear) over specified intervals (ex. increasing, decreasing and/or constant).
• Appropriately sketch the functional relationship between two quantities.</td>
<td>I can
• Accurately analyze parts of a function (both linear/non-linear) over specified intervals (ex. increasing, decreasing or constant).
• Sketch the functional relationship representing some key features.</td>
<td>I can
• Identify parts of a function (both linear/non-linear) as increasing, decreasing or constant.
• Sketch the functional relationship representing a key feature.</td>
</tr>
</table>

🟩 *major standards*   🟦 *supporting*   🟡 *additional standard*

Trimester 2

Unit 6: Solving Equations with One Variable	Time: MAX 18 days (~50 minutes per day)

Essential Questions:
- *What steps would you use to solve any linear equation in one variable?*
- *What are the possible types of solutions to any linear equation in one variable?*
- *How would you write an equation that demonstrates each of the following: one solution, no solution, or infinitely many solutions?*

Prior Learning:
In sixth grade, students were exposed to applying the distributive property and simplifying algebraic expressions by combining like terms.
In seventh grade, students were fluent in working with rational numbers and multistep equations with one variable on one side of the equation. Students applied the distributive property and they have knowledge of combining like terms with rational number coefficients.

Current Learning:
Students solve linear equations with one variable resulting in one solution, infinitely many solutions, or no solution. They also solve linear equations with rational number coefficients, requiring the distributive property and combining like terms. This is a major cluster (PARCC) and a critical area of CCSS. Later this year, students will use their knowledge from this unit for the following units: Linear Functions, Slope, and Systems of Equations.

Future Learning:
In high school algebra, students will create, solve, and graph linear inequalities in one variable. Students will solve linear equations in one variable with variable coefficients. Students will solve quadratic equations in one variable.

Mathematical Practices
SMP 1 Make sense of problems and persevere in solving them.
SMP 2 Reason abstractly and quantitatively.
SMP 8 Look for an express regularity in repeated reasoning

Standard	Emphasis / Standard	Notes
Analyze and solve linear equations and pairs of simultaneous linear equations.	🟩8.EE.7	
Student Target(s) / Performance Indicators:	**Standards:**	**Notes:**

Solve linear equations in one variable by … • using the standard algorithm • using inverse operations and solving algebraically for the unknown variable • using the distributive property	■8.EE.7	This includes solving equations with variables on both sides
Identify possible outcomes for solutions by giving examples of equations with … • one solution • infinitely many solutions • no solutions	■8.EE.7	

Scoring Criteria:

Expressions & Equations			
4 – Distinguished	**3 – Proficient**	**2 – Developing**	**1 – Emerging**
III. Solve linear equations in one variable.			
I can • **Justify/ defend** my accurate solution.	I can • **Accurately** solve linear equations in one variable with an appropriate process.	I can • Solve linear equations in one variable with an appropriate process.	I can • Solve linear equations in one variable with a flawed process.

■*major standards*　■ *supporting*　● *additional standard*

Trimester 3

Unit 7: Systems	Time: MAX 15 days (~50 minutes per day)

Essential Questions:
- What is the significance of the point where two linear equations intersect on a graph?
- How can you determine if a system has one, no, or infinite solutions both graphically and algebraically?
- How can you solve a system by using substitution or elimination, and how would you determine which is the most efficient method?
- How can you use a system of equations to solve a real-world problem?

Prior Learning:
In seventh grade, students graphed and solved linear equations, and used input/output tables to graph equations. Through various representations, students identified unit rate. Given a graph, students interpreted unit rate and understood how data points were related to a given situation.

Current Learning:
Early in eighth grade, students work with linear equations; graphing and comparing their slopes. They understand that equations can have one, infinitely many or no solutions. The standards in this unit are a major cluster and a critical area. In this unit students discover that the solution to a system of linear equations is the intersection of their graphs. Students learn how to solve systems of linear equations graphically and algebraically; such as data tables, substitution and elimination using adding and subtracting only. By inspection, a student will be able to determine if a system of equations has one, infinitely many or no solutions. Students will also estimate solutions to systems that, when graphed, have non-integer coordinates. Students translate real-world and mathematical situations into systems of equations and determine solutions. They will make sure the solution makes sense to the given situation.

Future Learning:
In high school algebra, students will solve systems using formal methods of elimination by multiplying before adding and subtracting. Students will solve linear inequalities as well as systems of linear and nonlinear equations.

Mathematical Practices
SMP 2 Reason abstractly and quantitatively.
SMP 5 Use appropriate tools strategically
SMP 7 Look for and make use of structure

Standard	Emphasis / Standard	Notes
Analyze and solve linear equations and pairs of simultaneous linear equations.	■8.EE.8	

Student Target(s) / Performance Indicators:	Standards:	Notes:
Solve pairs of simultaneous linear equations by… ● solving by graphing ● solving algebraically by substitution ● solving algebraically by elimination using addition and subtraction ● identifying systems in which there are no solutions (parallel lines) and infinitely many solutions (coinciding lines)	■8.EE.8	

Scoring Criteria:

Expressions & Equations			
4 – Distinguished	3 – Proficient	2 – Developing	1 – Emerging
IV. **Analyze, write, and solve pairs of simultaneous linear equations in mathematical and real-world problems.**			
I can ● **Justify/ defend** my accurate solution.	I can ● **Accurately** create a pair of simultaneous linear equations. ● **Accurately** solve a pair of simultaneous linear equations using an appropriate process. ● State the solution in a way that is **appropriate** to the context of the problem.	I can ● Create a pair of simultaneous linear equations. ● Solve a pair of simultaneous linear equations using an appropriate process. ● State the solution within the context of the problem.	I can ● Create an equation from a situation. ● Solve a pair of simultaneous linear equations using a flawed process.

■ *major standards*   ■ *supporting*   ● *additional standard*

Trimester 3

Unit 8: Rules of Exponents & Scientific Notation	Time: MAX 15 days (~50 minutes per day)

Essential Questions:
- How can the rules of exponents make calculating values easier?
- How could you use patterns to explain rules of exponents?
- Why is scientific notation needed?
- How do you know when a number is properly written in scientific notation?
- How do you convert between standard form and scientific notation?
- How do you compare two numbers written in scientific notation?

Prior Learning:
Students have denoted whole number powers of 10 with exponential notation since grade 5, and they have seen the pattern in the number of zeros when powers of 10 are multiplied. In grade 6, students looked at whole number exponents. They also worked with operations of fractions. In grade 7, students worked with integers and fractions.

Current Learning:
In grade 8, this unit is a major cluster. Students know and apply properties of integer exponents and create equivalent expressions. (Know that $32 \times 3\text{-}5 = 3\text{-}3 = 1/33 = 1/27$) They express very large or very small quantities using powers of 10. Students understand what scientific notation looks like through technology. They choose units of appropriate size for measurements.

Future Learning:
In high school, students will extend the properties of exponents to irrational exponents. They will rewrite and evaluate expressions involving radicals and rational number exponents.

Mathematical Practices
SMP 2 Reason abstractly and quantitatively.
SMP 4 Model with mathematics.
SMP 8 Look for and express regularity in repeated reasoning.

Standard	Emphasis / Standard	Notes
Work with radicals and integer exponents.	■8.EE.1 ■8.EE.3 ■8.EE.4	
Student Target(s) / Performance Indicators:	**Standards:**	**Notes:**
Simplify expressions by… - using properties of exponents - performing operations with expressions in scientific notation	■8.EE.1 ■8.EE.4	

| Express very large and/or very small quantities by…
 ● using scientific notation | 🟩8.EE.3 | |

Scoring Criteria:

Expressions & Equations			
4 – Distinguished	**3 – Proficient**	**2 – Developing**	**1 – Emerging**
I. Apply the properties of integer exponents to generate equivalent numerical expressions.			
I can ● Accurately apply an appropriate property to generate a **simplified** equivalent numerical expression.	I can ● **Accurately apply** an **appropriate property** to generate an equivalent numerical expression.	I can ● Generate an equivalent numerical expression OR apply properties with errors to generate expressions.	I can ● Generate a numerical expression.

🟩*major standards*   🟦 *supporting*   🟡*additional standard*

Trimester 3

Unit 9: Angles	Time: MAX 5 days (~50 minutes per day)

Essential Questions:
- What is the result of a transversal cutting parallel lines?
- What is the sum of the interior angles of a triangle? How can you prove it?
- What is the relationship between an exterior angle and the two other angles in a triangle?
- How would angle relationships be applied to the real world?

Prior Learning:
In grade 6, students worked with properties of the coordinate plane. In grade 7, they worked with corresponding lengths and the relationships between those lengths. Students used similar figures and scale to find an unknown length. In a previous unit, students worked with transformations to identify congruent figures. They verified experimentally the properties of rotations, translations, and reflections. Students described the effect of dilations on a two-dimensional figure using coordinates.

Current Learning:
According to *PARCC Model Content Frameworks,* this is a major cluster and critical area.
In this unit, students expand on their knowledge of angle relationships to analyze angles measures.

Future Learning:
In high school, students will experiment with transformations in the plane. They will understand congruence in terms of rigid motions. Students will be using concepts of similarity and congruence to prove theorems and make geometric constructions. Later in eighth grade students will use this to work with similar figures.

Mathematical Practices
SMP 4 Model with mathematics.
SMP 6 Attend to precision.
SMP 7 Look for and make use of structure.

Standard	Emphasis / Standard	Notes
Understand congruence and similarity using physical models, transparencies or geometry software.	🟩8.G.5	

Student Target(s) / Performance Indicators:	Standards:	Notes:
Use informal arguments to establish facts about… • angle sum and exterior angle of triangles • angles created by a transversal • angle-angle criterion for similarity of triangles	🟩8.G.5	

Scoring Criteria:

Geometry			
4 – Distinguished	**3 – Proficient**	**2 – Developing**	**1 – Emerging**
II. Use informal arguments to establish facts about angles.			
I can ● Use **multiple arguments** to accurately justify the **correct** value of missing angle measurements.	I can ● Use mathematical vocabulary and theorems to justify the value of a missing angle measurement.	I can ● Use mathematical vocabulary and theorems to justify the value of a missing angle measurement with gaps in my reasoning.	I can ● Use mathematical terminology inappropriately to justify the value of a missing angle measurement.

■ *major standards*   ■ *supporting*   ● *additional standard*

Trimester 3

Unit 10: Volume	*Time: MAX 10 days (~50 minutes per day)*

Essential Questions:
- What is the relationship between the volume of a cylinder and a cone?
- Why is the area of a circle needed to find the volume of a cylinder, sphere, and cone?
- When would you need to find the volume of a cylinder in the real world?
- When would you need to find the volume of a sphere in the real world?
- When would you need to find the volume of a cone in the real world?

Prior Learning:
In grade 6, students found the area of triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes. They applied techniques in the context of solving real-world and mathematical problems. Students used nets to find surface area. They used cubes to find volume and compared results using formulas.
In grade 7, students worked with angle measure, area, surface area, and volume. They acquired a well-developed set of geometric measurement skills.

Current Learning:
In grade 8, this is an additional cluster. Students know the formulas for the volume of cones, cylinders, and spheres. They use the formulas to work and solve mathematical and real-world problems.

Future Learning:
In high school, students will explain volume formulas and use them to solve problems. They will give informal arguments for the volume of a cylinder, pyramid, cone, spheres, and other solid figures. Students will use volume formulas to solve problems. These skills, along with proportional reasoning and multistep numerical problem solving, can be combined and used in flexible ways as part of modeling during high school.

Mathematical Practices
SMP 1 Make sense of problems and persevere in solving them.
SMP 6 Attend to precision.
SMP 8 Look for and express regularity in repeated reasoning.

Standard	Emphasis / Standard	Notes
Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.	⦾ 8.G.9	
Student Target(s) / Performance Indicators:	**Standards:**	**Notes:**
Solve real-world and mathematical problems by finding volume of… • cylinders • cones	⦾ 8.G.9	

● spheres	

Scoring Criteria:

Geometry			
4 - Distinguished	**3 - Proficient**	**2 - Developing**	**1 - Emerging**
IV. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.			
I can ● **Showing detailed work accurately** solve problems involving volume of cylinders, cones and spheres. ● Precisely use labels/units appropriately throughout based on the context of the problem.	I can ● **Accurately** solve problems involving volume of cylinders, cones and spheres. ● Use labels/units appropriately*.	I can ● Correctly substitute into the volume formula, and then calculate with errors. ● Use labels/units.	I can ● Apply values to variables in the formulas. ● Omitted labels/units throughout.

🟩 *major standards*　🟦 *supporting*　🟡 *additional standard*