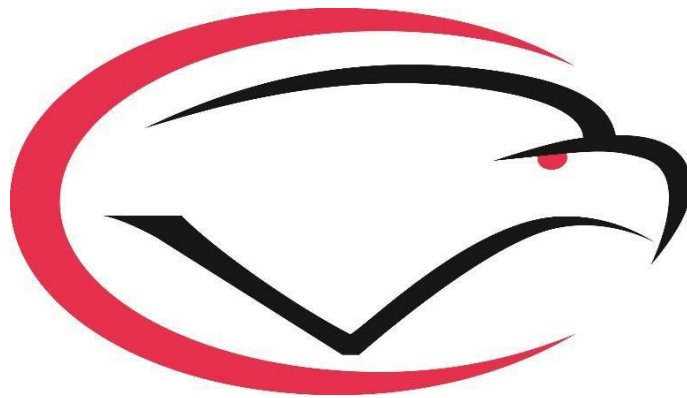# Secondary Curriculum Maps

Cumberland Valley School District

Soaring to Greatness, Committed to Excellence

Geometry

Grade:			SUBJECT
Unit	**Timeline**	**Topics**	**Priority Standards**
Introduction to Geometry	8 weeks	Area & Perimeter	CC.2.3.HS.A.14
		Coordinate Geometry	CC.2.3.HS.A.11
Geometry Foundation	4 weeks	Angle Relationships	CC.2.3.HS.A.3
Transformations, Triangle Congruency, and Similarity	6 weeks	Triangle Congruence Properties	CC.2.3.HS.A.2
		Transformations	CC.2.3.HS.A.1
		Similarity Properties	CC.2.3.HS.A.6
Proofs	5 weeks	Validating Arguments	CC.2.3.HS.A.3
Trigonometry	4 weeks	Trigonometric Functions	CC.2.3.HS.A.7
		Special Right Triangles	CC.2.3.HS.A.7
		Law of Sines	CC.2.3.HS.A.7

Polygons		Volume	CC.2.3.HS.A.12
	4 weeks	Surface Area	CC.2.3.HS.A.12
		Angle Relationships	CC.2.3.HS.A.3
		Spatial Visualization	
Circles	4 weeks	Angles and Arcs	CC.2.3.HS.A.8
		Segments and Lines	CC.2.3.HS.A.8
		Equations of Circles	CC.2.3.HS.A.8

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.11 - Apply coordinate geometry to prove simple geometric theorems algebraically.

Taught in Unit(s)

Explanation/Example of Standard
Students will be able to find slope of a line, the distance between two points of a line, and the midpoint of a line segment following the formulas provided.

Common Misconceptions
Students tend to do change in x over change in y when determining slope. Have students reference formula from notes while completing classwork and homework.

Big Idea(s)	Essential Question(s)
The coordinate plane can be used to derive and apply algebraic concepts.	**How is a coordinate plane used to display and solve algebraic concepts?**

Assessments

Concepts (what students need to know)	Skills (what students must be able to do)
Understand how the steepness of a line and the numerical representation of slope are related. Understand how the slopes of perpendicular and parallel lines are related.	Students will be able to find the slopes of parallel and perpendicular lines. Students will be able to find the distance between two points. Students will be able to find the midpoint of a segment on a coordinate plane.

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.8 - Apply geometric theorems to verify properties of circles.

Taught in Unit(s)

Explanation/Example of Standard
Students will be able to solve for angle and arc measures in circles. Solve for segment and arc lengths in circles.

Common Misconceptions
Students will solve for arc measure instead of arc length. If this happens, remind students to reference notes about the difference between measure and length.

Big Idea(s)	Essential Question(s)
The fundamental properties and relationships for circles can be explored and applied to solve real world problems.	**What are the angle, arc and segment relationships in a circle?**

Assessments	

Concepts (what students need to know)	Skills (what students must be able to do)
Understand how central angles and inscribed angles relate to their arcs. Understand the relationships that exist between segments, lines, angles, and circles.	Student will be able to calculate arc length. Students will be able to calculate the area of a sector.

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.7 - Apply trigonometric ratios to solve problems involving right triangles.
Taught in Unit(s)

Explanation/Example of Standard
Students will be able to solve for angles or side lengths in right and non right triangles using the trigonometric functions.

Common Misconceptions
Students confuse the adjacent and opposite sides with the reference angle. Use a cut out of a triangle to show how the opposite side of the triangle will always be across from the reference angle even when it's rotated. Angle of Depression - Show that an angle of depression will always come from a horizontal line. Believing that Special Right Triangle ratios can be used any time. Show students that a diagram must show that the triangle is either a 45-45-90 or a 30-60-90.

Big Idea(s)	Essential Question(s)
A variety of methods including trigonometric functions, Pythagorean Theorem and special right triangles can be used to find missing parts of right triangles	How are different methods used to solve for a missing part of triangle?

Assessments

Concepts (what students need to know)	Skills (what students must be able to do)
Understand the relationship between the sides in the two Special Right Triangles.

Understand the relationship between the slope of a line and the tangent of the angle that the line makes with the x-axis.

Understand the difference between the Law of Sines and the sine function. | Students will be able to use the rules for Special Right Triangles to find the sides of a right triangle.

Students will be able to find the lengths of sides and the measures of angles in right triangles when you only know two of the six measurements.

Students will be able to prove that a right triangle is formed, given three side lengths. |

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.6 - Verify and apply theorems involving similarity as they relate to plane figures.

Taught in Unit(s)

Explanation/Example of Standard
Students will be able to show that triangles are similar. Students will be able to solve for a missing side in similar figures, and use similarity to solve for area, volume, and perimeter.

Common Misconceptions
Students do not always match up corresponding angles to determine corresponding sides when working with similar triangles. Remind students to mark the congruent angles first to determine corresponding parts.

Big Idea(s)	Essential Question(s)
Similar and congruent figures can be explored and their properties can be applied to various related problems including proportional relationships and proofs.	**What is the difference between congruence and similarity?**

Assessments

Concepts (what students need to know)	Skills (what students must be able to do)
The conclusions that can be made about two figures that are similar. Understand the relationship between lengths, areas, and volumes of similar two-dimensional and three-dimensional figures.	Students will be able to determine when two figures are similar. Students will be able to prove triangles are similar using a minimal number of corresponding parts.

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.3 - Verify and apply geometric theorems as they relate to geometric figures.

Taught in Unit(s)

Explanation/Example of Standard
Students will be able to write a geometric proof.

Common Misconceptions
There are no misconceptions in practice, but this is a new concept for the students and they need a lot of opportunities to practice this new skill. It is important to have the students practice, make mistakes, and correct their mistakes with each other. Peer editing is key!

Big Idea(s)	Essential Question(s)
Clear and logical arguments can be developed to prove or disprove mathematical conjectures in multiple situations, including real world applications.	**How can writing clear and logical arguments assist one in mathematics class as well as in real-world situations?**

Assessments	

Concepts (what students need to know)	Skills (what students must be able to do)
Understand the importance of using logical reasoning and justification when determining the solution to a problem. Understand the difference between a conjecture and a theorem. Know what reasons are valid to use when proving a conjecture is true or false.	Student will be able to write geometric proofs.

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.3 - Verify and apply geometric theorems as they relate to geometric figures.

Taught in Unit(s)

Explanation/Example of Standard
Students will be able to use properties of parallel lines to determine special angle relationships. Students will be able to use properties of polygons to solve for angles measures and area.

Common Misconceptions
Believe the sum of the interior angles for any polygon is either 180 or 360. Show students the formula for solving for the the sum of the interior angles of any polygon and remind it must be used for all different polygons.   Believe that certain pairs of angles are always equal or supplementary, and need to understand that relationship is dependent on the parallel lines existing. Use tracing paper to demonstrate that angles will not be equal when lines are not parallel.

Big Idea(s)	Essential Question(s)
The angle relationships in polygons and parallel lines can be explored and applied in various problems.	**What angle relationships exist when multiple lines intersect?**

Assessments

Concepts (what students need to know)	Skills (what students must be able to do)
Understand the properties that exist among the interior and exterior angles of a triangle. Understand the angle relationships exist when two lines are cut by a transversal. Understand the relationships that can be formed when parallel lines are cut by a transversal. Know the sum of the exterior angles of a polygon.	Students will be able to calculate the sum of the interior angles of a polygon. Students will be able to find the measure of one interior angle of a regular polygon.

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.2 - Apply rigid transformations to determine and explain congruence.

Taught in Unit(s)

Explanation/Example of Standard
Students will be able to determine if two triangles are congruent. Students will be able to write proofs involving congruent triangles. Students will be able to perform transformations on figures on a graph.

Common Misconceptions
Using the triangle congruence properties to show parts are congruent instead of using these properties to show the entire triangles are congruent. Stress that these properties are only used to show triangles are congruent.

Big Idea(s)	Essential Question(s)
Similar and congruent figures can be explored and their properties can be applied to various related problems including proportional relationships and proofs.	**What is the difference between congruence and similarity?**

Assessments

Concepts (what students need to know)	Skills (what students must be able to do)
The conclusions that can be made if two triangles are congruent. Understand the various types of figure transformations that lead to congruence.	Students will be able to determine when two figures are congruent. Students will be able to prove triangles are congruent using a minimal number of corresponding parts.

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.14 - Apply geometric concepts to model and solve real world problems.

Taught in Unit(s)

Explanation/Example of Standard
Example: Student would be able to determine the amount of carpet to install in a room of their home.

Common Misconceptions
When students dissect a problem for area, they use those same dissections for the perimeter instead of using the original sides for the perimeter. Remind students to think about what perimeter means.

Big Idea(s)	Essential Question(s)
The characteristics of polygons can be explored and used to develop the area and perimeter formulas for many polygons.	**How do right triangles relate to other mathematical concepts? (i.e. Solving for area of polygons, Solving for perimeter of polygons, trigonometry)**

Assessments

Concepts (what students need to know)	Skills (what students must be able to do)
How one know if any three lengths will form a triangle. What are the similarities and differences between quadrilaterals. The importance of including appropriate units of measure with a solution.	Students will be able to find the perimeter of a figure. Students will be able to find the area of a figure.

Curriculum Map

CV Priority Standard/PA Academic Standard
CC.2.3.HS.A.12 - Explain volume formulas and use them to solve problems
Taught in Unit(s)

Explanation/Example of Standard
Students will be able to find the volume of 3D figures.

Common Misconceptions
Volume of a Prism - they select the side the figure is sitting on as the base shape instead of the actual base shape. Use 3D models to show how when a figure is rotated the base shape stays the same.

Big Idea(s)	Essential Question(s)
Spatial visualization can be used to develop formulas for the volume and surface area of polyhedra.	**How are three-dimensional concepts communicated on a two-dimensional surface?**

Assessments

Concepts (what students need to know)	Skills (what students must be able to do)
Understand how are prisms and pyramids different Understand how a net would be useful to find surface area of polyhedra?	Students will be able to find the volume of 3-D figures. Students will be able to calculate the surface area of a 3-dimensional figure. Students will be able to apply the use of a net to solve and understand surface area of polyhedra.