Geometry CSO Prioritized Curriculum	Essential	Important	Compact
M.O.G.3.1 represent geometric figures, such as points, lines, planes, segments, rays, and angles pictorially with proper identification and distinguish between undefined and defined terms.	X		
MA.O.G.3.2 differentiate and apply inductive and deductive reasoning, justify conclusions in real-world settings.	X		
MA.O.G.3.3 use the basic concepts of symbolic logic including identifying the converse, inverse, and contra-positive of a conditional statement and test the validity of conclusions with methods that include Venn Diagrams.			X
MA.O.G.3.4 validate conclusions by constructing logical arguments using both formal and informal methods with direct and indirect reasoning.		X	
MA.O.G.3.5 construct formal and informal proofs by applying definitions, theorems, and postulates related to such topics as • complementary • supplementary • vertical angles • angles formed by perpendicular lines, and justify the steps.	X		
M.O.G.3.6 compare and contrast the relationships between angles formed by two lines cut by a transversal when lines are parallel and when they are not parallel, and use the results to develop concepts that will justify parallelism.		X	
M.O.G.3.7 make conjectures and justify congruence relationships with an emphasis on triangles and employ these relationships to solve problems.	X		
M.O.G.3.8 identify general properties of and compare and contrast the properties of convex and concave quadrilaterals • parallelograms • rectangles • rhombuses • squares • trapezoids		X	
M.O.G.3.9 identify a real life situation that involves similarity in two or three dimensions; pose a question; make a hypothesis as to the answer, develop, justify, and implement a method to collect, organize, and analyze related data; generalize the results to make a conclusion; compare the hypothesis and the conclusion; present the project numerically, analytically, graphically and verbally using the predictive and analytic tools of algebra and geometry (with and without technology).		X	

M.O.G.3.10 investigate measures of angles and lengths of segments to determine the existence of a triangle (triangle inequality) and to establish the relationship between the measures of the angles and the length of the sides (with and without technology).	X		
M.O.G.3.11 verify and justify the basis for the trigonometric ratios by applying properties of similar triangles and use the results to find inaccessible heights and distances. Using the ratios of similar triangles to find unknown side lengths and angle measures, construct a physical model that illustrates the use of a scale drawing in a real-world situation.			X
M.O.G.3.12 apply the Pythagorean Theorem and its converse to solve real-world problems and derive the special right triangle relationships (i.e. 30-60-90, 45-45-90).	X		
M.O.G.3.13 investigate measures of angles formed by chords, tangents, and secants of a circle and draw conclusions for the relationship to its arcs.	X		
M.O.G.3.14 find angle measures of interior and exterior angles; given a polygon, find the length of sides from given data; and use properties of regular polygons to find any unknown measurements of sides or angles.	X		
M.O.G.3.15 develop properties of tessellating figures and use those properties to tessellate the plane.		X	
M.O.G.3.16 derive and justify formulas for area, perimeter, surface area, and volume using nets and apply them to solve real-world problems.	X		
M.O.G.3.17 apply concepts of analytical geometry such as formulas for distance, slope, and midpoint and apply these to finding dimensions of polygons on the coordinate plane.	X		
M.O.G.3.18 construct a triangle's medians, altitudes, angle, and perpendicular bisectors using various methods; and develop logical concepts about their relationships to be used in solving real-world problems.		X	
M.O.G.3.19 create and apply concepts using transformational geometry and laws of symmetry, of a • reflection • translation • rotation • glide • reflection • dilation of a figure and develop logical arguments for congruency and similarity.			X
M.O.G.3.20 compare and contrast Euclidean geometry to other geometries (i.e. spherical, elliptic) using various forms of communication such as development of physical models, oral or written reports.			X
M.O.G.3.21 approximate the area of irregularly shaped regions based on the approximations and the attributes of the related region, develop a formula for finding the area of irregularly shaped regions. Plan, organize and present results by justifying conclusions.		X	

Fayette County Schools
Mathematics Learning Map

Geometry — 1st Nine Weeks

Unit EQ	What significance is there to the understanding of undefined terms?	How can direct reasoning, indirect reasoning, and conditional reasoning be used to justify conclusions and to justify arguments?		Why is it important to justify steps when constructing formal and informal proofs?	How are Euclidean geometry and other geometries alike and how are they different?	How are the skills of comparing, contrasting, and constructing formal and informal proofs used in the real-world?		In what ways are the formulas for area, perimeter, and surface area used to solve real-world problems?
Benchmark CSO's	M.O.G.3.1 represent geometric figures, such as points, lines, planes, segments, rays, and angles pictorially with proper identification and distinguish between undefined and defined terms.	MA.O.G.3.2 differentiate and apply inductive and deductive reasoning, justify conclusions in real-world settings.	MA.O.G.3.3 use the basic concepts of symbolic logic including identifying the converse, inverse, and contra-positive of a conditional statement and test the validity of conclusions with methods that include Venn Diagrams.	M.O.G.3.5 construct formal and informal proofs by applying definitions, theorems, and postulates related to such topics as • complementary • supplementary • vertical angles • angles formed by perpendicular lines, and justify the steps.	M.O.G.3.20 compare and contrast Euclidean geometry to other geometries (i.e. spherical, elliptic) using various forms of communication such as development of physical models, oral or written reports.	M.O.G.3.6 compare and contrast the relationships between angles formed by two lines cut by a transversal when lines are parallel and when they are not parallel, and use the results to develop concepts that will justify parallelism.	M.O.G.3.8 identify general properties of and compare and contrast the properties of convex and concave quadrilaterals • parallelograms • rectangles • rhombuses • squares trapezoids.	M.O.G3.16 Derive and justify formulas for area, perimeter, surface area, and volume using nets and apply them to solve real-world problems.
Standards Based Math Unit	Carnegie Learning Textbook Geometry – Chapter 1					Carnegie Learning Textbook Geometry – Chapter 2		Carnegie Learning Book Geometry– Ch 3
21st Century Online Resources	WVDE Online Geometry Unit 1 (Days 1-3, 6-10) I Can Statements Teach21 Unit Plans http://www.techsteps.com/ Core Project – Geometry – Dilation Effects							http://www.techsteps.com/ Activities – Perimeter Area Connerction

Lesson EQ's	1. How is the use of one-dimensional figures influenced by their properties? 2. How are points, lines, planes, segments, rays, and angles labeled? 3. How are points, lines, planes, segments, rays, and angles represented?	1. What are the characteristic of inductive and deductive reasoning? 2. How are conclusions justified? 3. How are inductive and deductive reasoning used to justify conclusions? 4. What are the differences in direct and indirect reasoning?	1. How can Venn Diagrams be used to test the validity of a conclusion? 2. What are the basic concepts of logic? 3. How are the basic concepts of logic used to draw conclusions?	1. What are the properties of vertical angles, corresponding angles, and alternate angles?	1. What are the main characteristics of Euclidean geometry? 2. What are the main characteristics of geometries other than Euclidean?	1. What are the possible relationships that could exist between two lines? 2. What is the difference between alternate interior angles and alternate exterior angles? 3. What do alternate interior angles and alternate exterior angles have in common? 4. What is the difference between same-side interior angles and same-side exterior angles? 5. What do same-side interior angles and same-side exterior angles have in common?	1. What is the difference in concave and convex quadrilaterals? 2. How are concave and convex quadrilaterals alike? 3. What are the general properties of quadrilaterals?	1. How is the area formula for a rectangle related to the area formulas for a triangle, a square, and a circle? 2. How is the area formula for the base of a cone, a cylinder, and a pyramid related to the volume of the shape? 3. How can nets be used to derive and justify area, perimeter, and volume?

Vocabulary:

Chapter 1:

Point, Line, Collinear Points, Plane, Skew Lines, Ray
Coplanar Lines, Segments, Angle, Congruent Angles, Bisect
Angle Bisector, Supplementary Angles, Complementary Angles, Segment Bisector
Perpendicular Bisector, Adjacent Angles, Linear Pair, Vertical Angles, Inductive Reasoning
Deductive Reasoning, Conditional Statement, Theorem, Hypothesis, Conclusion
Truth Table, Postulate, Construction Proof, Paragraph Proof, Two-column Proof, Vertical Angle Theorem
Flow Chart Proof

Chapter 2:

Transversal, Interior Angles, Exterior Angles, Alternate Interior Angles, Corresponding Angles
Conjecture, Converse, Adjacent Sides, Consecutive Sides, Diagonal
Convex, Concave, Reflex Angle, Polygon, Irregular Polygon
Counterexample

Chapter 3:

Altitude of a Parallelogram, Height of a Parallelogram, Bases of a Trapezoid, Legs of a Trapezoid
Isosceles Trapezoid, Congruent Polygon, Apothem, Irrational Number
Concentric Circles, Annulus, Composite Figure

Fayette County Schools
Mathematics Learning Map

Geometry — 2nd Nine Weeks

Unit EQ	What impact does the existence of triangles have on your life?	What some practical uses of the Pythagorean Theorem?	How can technology enhance the problem solving process and how can it limit the problem solving process?	How are congruent triangles and similar triangles alike? How are they different?	
Benchmark CSO's	M.O.G.3.10 investigate measures of angles and lengths of segments to determine the existence of a triangle (triangle inequality) and to establish the relationship between the measures of the angles and the length of the sides (with and without technology).	M.O.G.3.12 apply the Pythagorean Theorem and its converse to solve real-world problems and derive the special right triangle relationships (i.e. 30-60-90, 45-45-90).	M.O.G.3.9 Identify a real-life situation that involves similarity in two or three dimensions; pose a question; make a hypothesis as to the answer, develop, justify, and implement a method to collect, organize, and analyze related data; generalize the results to make a conclusion; compare the hypothesis and the conclusion; present the project numerically, analytically, graphically and verbally using the predictive and analytic tools of algebra and geometry (with and without technology).	MA.O.G.3.4 validate conclusions by constructing logical arguments using both formal and informal methods with direct and indirect reasoning.	M.O.G.3.7 make conjectures and justify congruence relationships with an emphasis on triangles and employ these relationships to solve problems.
Standards Based Math Unit	Carnegie Learning Geometry - Chapter 4		Carnegie Learning Geometry – Chapter 5	Carnegie Learning Geometry - Chapter 6	
21st Century Online Resources	I Can Statements			*Online Geometry - Unit 2* - Teach21 Unit Plans	

Lesson EQ's	1. How can the existence of a triangle be determined based on the length of the potential sides? 2. What relationships exist between the measure of the angles of a triangle and the measure of the sides of the triangle? 3. How can the measures of angles and the lengths of segments be used to determine the existence of a triangle?	1. How can the special right triangles be recognized? 2. How can the special right triangle relationships be derived?	1. What are the analytic tools of algebra and geometry? 2. What are the benefits of presenting data numerically, analytically, graphically, and verbally? 3. How are congruence and similarity alike and how are they different?	1. How are logical arguments used to validate conclusions?	1. How do you justify a congruence relationship?

Vocabulary:

Chapter 4: Remote Interior Angles, Radical Expression, Auxillary Line

Chapter 5: Scale Model, Included Angle, Included Side, Indirect Measurement, Probability, Means, Proportion

Chapter 6: Corresponding Parts of Congruent Triangles are Congruent, Inverse, Contrapositive, Direct Proof, Indirect Proof

Fayette County Schools

Mathematics Learning Map

Geometry — 3rd Nine Weeks

Unit EQ	What are the benefits of using a scale model? What relationships exist between trigonometric ratios, similar triangles, and inaccessible heights and distances?	What practical uses are there for knowing the measures of angles of polygons and of being capable of finding unknown measurements of sides or angles of a polygon?		How can the knowledge of formulas for finding area of regular polygons be used to approximate the area of irregularly-shaped regions?
Benchmark CSO's	M.O.G3.11 Verify and justify the basis for the trigonometric ratios by applying properties of similar triangles and use the results to find inaccessible heights and distances. Using the ratios of similar triangles to find unknown side lengths and angles measures, construct a physical model that illustrates the use of a scale drawing in a real-world situation.	M.O.G3.14 Find angle measures of interior and exterior angles; given a polygon, find the length of sides from given data; and use properties of regular polygons to find any unknown measurements of sides or angles.	M.O.G3.17 Apply concepts of analytical geometry such as formulas for distance, slope, and midpoint and apply these to finding dimensions of polygons on the coordinate plane.	M.O.G.3.21 approximate the area of irregularly shaped regions based on the approximations and the attributes of the related region, develop a formula for finding the area of irregularly shaped regions. Plan, organize and present results by justifying conclusions.
Standards Based Math Unit	Carnegie Learning Geometry - Chapter 7	Carnegie Learning Geometry – Chapter 8	Carnegie Learning Geometry – Chapter 9	
21st Century Online Resources	I Can Statements			WVDE Online Geometry Unit 7 – Lesson 3 Teach21 Unit Plans
Lesson EQ's	1. How can the properties of triangles be used to determine the trigonometric ratios? 2. How can trigonometry be used to find inaccessible heights and distances?	1. How can the measures of the angles of a polygon be determined?	1. How can the distance formula be used to determine the length of the sides of a triangle on a coordinate plane? 2. How can formulas for distance, slope, and midpoint be used to find dimensions of	1. What constitutes an irregularly shaped region? 2. How are geometric formulas derived?

			polygons? 3. How can you justify that slopes are undefined or zero? 4. What is the relationship between horizontal and vertical lines and how can this relationship be proven? 5. How can you formally prove that lines are parallel and/or perpendicular?	

Vocabulary:

Chapter 7: Tangent, Cotangent, Inverse Tangent, Sine, Cosecant, Inverse Sine, Cosine, Trigonometric Ratios, Secant, Inverse Cosine, Angle of Elevation, Angles of Depression

Chapter 8: Base Angles of a Trapezoid, Biconditional Statement, Interior Angle of a Polygon, Isosceles Trapezoid

Chapter 9: Distance Formula, Midpoint, Midpoint Formula, Slope, Point-Slope Form, Slope-Intercept Form, Inscribed Triangle, Midsegment of a Triangle, Concurrent, Point of Concurrency, Incenter, Circumcenter, Median, Centroid, Orthocenter, Midsegment of a Trapezoid

Online Unit 7: Irregularly Shaped Region

Fayette County Schools
Mathematics Learning Map

Geometry — 4th Nine Weeks

Unit EQ	What situations would result in the pre-image and the image being the same point?	What relationship(s) exists between circles, lines, and the angles formed by the lines?	How can geometric formulas be used to solve real-world problems?
Benchmark CSO's	M.O.G.3.19 apply concepts using transformational geometry and laws of symmetry, of a • reflection • translation • rotation • glide • reflection • dilation of a figure and develop logical arguments for congruency and similarity.	M.O.G.3.13 investigate measures of angles formed by chords, tangents, and secants of a circle and draw conclusions for the relationship to its arcs.	M.O.G3.16 Derive and justify formulas for area, perimeter, surface area, and volume using nets and apply them to solve real-world problems.
Standards Based Math Unit	Carnegie Learning Geometry – Chapter 10	Carnegie Learning Geometry – Chapter 11	Carnegie Learning Geometry – Chapter 12
21st Century Online Resources	I Can Statements *WVDE Online* *Geometry Unit 3* Teach21 Instructional Guide http://www.techsteps.com/ Activities – Geometry – Reflections	*WVDE Online* *Geometry Unit 5* Teach21 Instructional Guide	*WVDE Online* *Geometry Unit 4* Teach21 Unit Plans – http://www.techsteps.com/ Activities – Geometry – Volume of a Square Pyramid
Lesson EQ's	1. What is a transformation? 2. Which reflection(s) changes (change) the x-coordinate and how does it change? 3. Which reflection(s) changes (change) the y-coordinate and how does it change?	1. What are the properties of chords, secants, and tangents of a circle?	1. How is the area formula for a rectangle related to the area formulas for a triangle, a square, and a circle? 2. How is the area formula for the base of a cone, a cylinder, and a pyramid related to the volume of the shape? 3. How can nets be used to derive and justify formulas for area, perimeter,and volume?

Vocabulary:

Chapter 10:

Transformation	Image	Preimage	Reflection	Line of Reflecion
Isometry	Rotation	Translation	Vector	Initial Point
Terminal Point	Dilation	Scale Factor	Line of Symmetry	Rotational Symmetry
Vertical Symmetry	Horizontal Symmetry		Fractal	Tessellation

Chapter 11:

Chord	Secant of a Circle		Tangent of a circle	Point of Tangency
Central Angle	Inscribed Angle	Arc	Major Arc	Minor Arc
Semicircle	Intercepted Arc	Inscribed Polygon	Circumscribed Polygon	Arc Length
Sector of a Circle	Segment of a Circle			

Chapter 12:

Polyhedron	Net	Prism	Pyramid	Cylinder
Cone	Sphere	Cross Section	Annulus	