

**ACPS Pacing Guide/Mathematics: Geometry**  
**Text: Geometry, Concepts and Skills (McDougal Littell)**

**2003 Virginia SOL Testing Blueprint**

SOL Strand	Number of Test Items	Percent of Total (approx.)
Lines and Angles	11	24
Triangles and Logic	12	27
Polygons & Circles	10	22
Three-Dimensional Figures	6	13
Coordinate Relations & Transformations	6	13

**Dates of ACPS Quarters**

	Starts	Ends	Test Dates
First Quarter			
Second Quarter			
Third Quarter			
Fourth Quarter			

**FIRST QUARTER: Chapters 1 to 3**

**Chapter 1 – Basics of Geometry**

Section	SOL	Section Title	Resources
1.1		Finding and Describing Patterns	
1.2	G.3, G.11	Inductive Reasoning	
1.3	G.11	Points, Lines, and Planes	Geometer’s Sketchpad
1.4	G.3	Sketching Intersections	Geometer’s Sketchpad
1.5	G.2a	Segments and Their Measures	Geometer’s Sketchpad
1.6	G.3	Angles and Their Measures	Geometer’s Sketchpad

## Chapter 2 – Segments and Angles

Section	SOL	Section Title	Resources
2.1	G.2a	Segment Bisectors	Geometer's Sketchpad
2.2	G.11 a	Angle Bisectors	Activity: Folding Angle Bisectors
2.3	G.3, G.6	Complementary and Supplementary Angles	
2.4	G.3, G.6	Vertical Angles	Geometer's Sketchpad
2.5	G.1b, d	If-Then Statements and Deductive Reasoning	
2.6	G.1	Properties of Equality and Congruence	

## Chapter 3 – Parallel and Perpendicular Lines

Section	SOL	Section Title	Resources
3.1	G.4	Relationships Between Lines	Activity: Lines in Space, Geometer's Sketchpad
3.2	G.4	Theorems about Perpendicular Lines	
3.3	G.3, G.4	Angles Formed by Transversals	
3.4	G.1a, G.4	Parallel Lines and Transversals	Activity: Parallel Lines and Angles p. 126
3.5	G.1a, G.4	Showing Lines are Parallel	
3.6	G.11, G.4	Using Perpendicular and Parallel Lines	Geometer's Sketchpad Technology Activity p. 150
3.7	G.1	Translations	Geometer's Sketchpad

## Second Quarter: Chapters 4 to 6

### Chapter 4 – Triangle Relationships

Section	SOL	Section Title	Resources
4.1		Classifying Triangles	
4.2	G.6, G.9	Angle Measures of Triangles	
4.3	G.5a	Isosceles and Equilateral Triangles	Geometer's Sketchpad
4.4	G.7, G.2a	The Pythagorean Theorem and the Distance Formula	
4.5	G.7	The Converse of the Pythagorean Theorem	
4.6	G.11	Medians of Triangles	Activity: p. 206
4.7	G.6	Triangle Inequalities	

### Chapter 5 – Congruent Triangles

Section	SOL	Section Title	Resources
5.1	G.5a	Congruence and Triangles	
5.2	G.5b	Proving Triangles are Congruent: SSS and SAS	Activity: Congruent Triangles p. 240
5.3	G.5b	Proving Triangles are Congruent: ASA and AAS	Geometer's Sketchpad
5.4	G.5b	Hypotenuse-Leg Congruence Theorem: HL	
5.5	G.5b	Using Congruent Triangles	
5.6	G.11	Angle Bisectors and Perpendicular Bisectors	Activity: Investigating Bisectors p. 272
5.7	G.2a, b,c	Reflections and Symmetry	Activity: Reflections and Rotations p. 640

## Chapter 6 – Quadrilaterals

Section	SOL	Section Title	Resources
6.1	G.8a, b, c	Polygons	
6.2	G.8a, b,c	Properties of Parallelograms	Parallelogram Activity p. 309
6.3	G.8a	Showing Quadrilaterals are Parallelograms	Technology Activity p. 324
6.4	G.8a, b, c	Rhombuses, Rectangles, and Squares	
6.5	G.8 a, b,c	Trapezoids	Geometer's Sketchpad Technology Activity p. 331
6.6	G.8a, b, c	Reasoning About Special Quadrilaterals	

## Third Quarter: Chapters 7 to 9

### Chapter 7 – Similarity

Section	SOL	Section Title	Resources
7.1	G.5, G.14 a	Ratio and Proportions	Similarity Activity p. 364
7.2	G.5a, b, G.1a	Similar Polygons	
7.3	G.5a, b, G.14	Showing Triangles are Similar: AA	
7.4	G.5a, G.14	Showing Triangles are Similar: SSS and SAS	
7.5	G.5a, b, G.14	Proportions and Similar Triangles	
7.6		Dilations	

### Chapter 8 – Polygons and Area

Section	SOL	Section Title	Resources
8.1	G.9	Classifying Polygons	Geometer's Sketchpad
8.2	G.9	Angles in Polygons	
8.3	G.14	Area of Squares and Rectangles	
8.4	G.14 a,b	Area of Triangles	Triangle Area Activity: p. 430
8.5	G.14 a,b	Area of Parallelogram	
8.6	G.14 a,b	Area of Trapezoid	
8.7	G.10	Circumference and Area of Circles	Activity: Finding the Area of Circles p. 451

## Chapter 9 – Surface Area and Volume

Section	SOL	Section Title	Resources
9.1	S.12	Solid Figures	Geometer's Sketchpad
9.2	G.13	Surface Area of Prisms and Cylinders	Surface Area Activity p. 481
9.3	G.13	Surface Area of Pyramids and Cones	
9.4	G.13	Volume of Prisms	
9.5	G.13	Volume of Pyramids and Cones	Volume Activity p. 508
9.6	G.13	Surface Area and Volume of Spheres	

## Fourth Quarter: Chapters 10 to 11

### Chapter 10 – Right Triangles and Trigonometry

Section	SOL	Section Title	Resources
10.1	G.7	Simplifying Square Roots	Activity: Right Triangle Bingo p. 582
10.2	G.7	45- 45-90 Triangles	
10.3	G.7	30-60-90 Triangles	
10.4	G.7	Tangent Ratio	
10.5	G.7	Sine and Cosine Ratios	
10.6	G.7	Solving Right Triangles	

### Chapter 11 – Circles

Section	SOL	Section Title	Resources
11.1	G.10	Parts of a Circle	Activity: Circle (Tangent) p. 594
11.2	G.10	Properties of Tangents	
11.3	G.10	Arcs and Central Angles	
11.4	G.10	Arcs and Chords	
11.5	G.10	Inscribed Angles and Polygons	Activity: Inscribed Angles p. 613
11.6	G.10	Properties of Chords	
11.7	G.10	Equations of Circles	
11.8	G.2c	Rotations	

## Geometry SOL Objectives and Essential Knowledge and Skills

SOL Number & Strand	2001 SOL Objective
<p>G.1 Triangles and Logic</p>	<p><b>Student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include</b></p> <ul style="list-style-type: none"> <li>a) identifying the converse, inverse, and contrapositive of a conditional statement;</li> <li>b) translating a short verbal argument into symbolic form;</li> <li>c) diagramming arguments involving quantifiers (all , no, none, some), using Venn diagrams; and</li> <li>d) using valid forms of deductive reasoning, including the law of syllogism.</li> </ul> <p><b>Essential Knowledge and Skills</b></p> <ul style="list-style-type: none"> <li>a) Identify the converse, inverse, and contrapositive of a conditional statement.</li> <li>b) Translate short verbal arguments into symbolic form, such as <math>(p \_ q)</math> and <math>(\sim p \_ \sim q)</math>.</li> <li>c) Use and interpret Venn diagrams.</li> <li>d) Determine the validity of a logical argument.</li> <li>e) Use valid forms of deductive reasoning, including the law of syllogism.</li> <li>f) Select and use various types of reasoning and methods of proof, as appropriate.</li> </ul>
<p>G.2 Coordinate Relations and Transformations</p>	<p><b>Student will use pictorial representations, including computer software and coordinate methods to solve problems involving symmetry and transformations. This will include</b></p> <ul style="list-style-type: none"> <li>a) <b>Investigating and using formulas for finding distance, midpoint, and slope;</b></li> <li>b) <b>investigating symmetry and determining whether a figure is symmetric with respect to a line or a point;</b></li> </ul> <p><b>and</b></p> <ul style="list-style-type: none"> <li>c) <b>Determining whether a figure has been translated, reflected, or rotated.</b></li> </ul> <p><b>Essential Knowledge and Skills</b></p> <ul style="list-style-type: none"> <li>a) Apply the distance formula to find the length of a line segment when given the coordinates of the endpoints.</li> <li>b) Find the coordinates of the midpoint of a segment, using the midpoint formula.</li> <li>c) Find the slope of a line, given the graph or the coordinates of two points on the line.</li> <li>d) Determine whether a figure has point symmetry, line symmetry, or neither.</li> <li>e) Given an image and preimage, identify the transformation that has taken place as a reflection, rotation, or translation.</li> </ul>

<p>G.3 Lines and Angles</p>	<p><b>Student will solve practical problems involving complementary, supplementary, and congruent angles that include vertical angles, angles formed when parallel lines are cut by a transversal, and angles in polygons</b></p> <p><b>Essential Knowledge and Skills</b></p> <p>a) Classify the types of angles formed by two lines and a transversal.  b) State the relationships between pairs of angles, including a linear pair, vertical angles, corresponding angles, alternate interior angles, same-side (consecutive) interior angles, complementary angles, and supplementary angles.  c) Solve practical problems involving intersecting and parallel lines in a plane.  d) Find the sum of the measures of the interior and exterior angles of a convex polygon.  e) Find the measure of each interior and exterior angle of a regular polygon.  f) Solve practical problems by using the relationships between pairs of angles such as vertical angles, corresponding angles, alternate interior angles, same-side interior angles, complementary angles, and supplementary angles.</p>
<p>G.4 Lines and Angles</p>	<p><b>Student will use the relationships between angles formed by two lines cut by a transversal to determine if two lines are parallel and verify, using algebraic and coordinate methods as well as deductive proofs.</b></p> <p><b>Essential Knowledge and Skills</b></p> <p>a) Use properties, postulates, and theorems to determine whether two lines are parallel.  b) Use algebraic, coordinate, and deductive methods to determine whether two lines are parallel.</p>
<p>G.5 Triangles and Logic</p>	<p><b>Student will</b></p> <p><b>a) investigate and identify congruence and similarity relationships between triangles; and</b>  <b>b) prove two triangles are congruent or similar given information in the form of a figure or statement, using algebraic and coordinate as well as deductive proofs.</b></p> <p><b>Essential Knowledge and Skills</b></p> <p>a) Use definitions, postulates, and theorems to determine whether triangles are congruent.  b) Use definitions, postulates, and theorems to determine whether triangles are similar.  c) Use algebraic methods, such as properties of proportions, to prove that triangles are similar.  d) Use coordinate methods, such as the distance formula and the slope formula, to prove two triangles are congruent.</p>

<p>G.6 Measurement</p>	<p><b>Student, given information concerning the lengths of sides and /or measures of angles, will apply the triangle inequality properties to determine whether a triangle exists and to order sides and angles. These concepts will be considered in the context of practical situations.</b></p> <p><b>Essential Knowledge and Skills</b></p> <ul style="list-style-type: none"> <li>a) Measure angles of less than <math>360^0</math> to the nearest degree, using appropriate tools.</li> <li>b) Identify and describe the relationships among the angles formed by two intersecting lines.</li> <li>c) Identify and describe pairs of angles that are vertical.</li> <li>d) Identify and describe pairs of angles that are supplementary.</li> <li>e) Identify and describe pairs of angles that are complementary.</li> </ul>
<p>G.7 Triangles and Logic</p>	<p><b>Student will solve practical problems involving right triangles by using the Pythagorean Theorem and its converse, properties of special right triangles, and right triangle trigonometry. Calculators will be used to solve problems and find decimal approximations for the solutions.</b></p> <p><b>Essential Knowledge and Skills</b></p> <ul style="list-style-type: none"> <li>a) Given the lengths of two sides of a right triangle, use the Pythagorean Theorem to find the length of the third side.</li> <li>b) Determine whether a triangle formed with three given lengths is a right triangle.</li> <li>c) Solve for missing lengths in geometric figures, using properties of 45_, -45_, -90_ triangles.</li> <li>d) Solve for missing lengths in geometric figures, using properties of 30_-60_-90_ triangles.</li> <li>e) Solve problems involving right triangles, using sine, cosine, and tangent ratios.</li> <li>f) Solve practical problems, using right triangle trigonometry and properties of right triangles.</li> </ul>
<p>G.8 Polygons and Circles</p>	<p><b>Student will</b></p> <ul style="list-style-type: none"> <li>a) investigate and identify properties of quadrilaterals involving opposite sides and angles, consecutive sides and angles, and diagonals;</li> <li>b) prove these properties of quadrilaterals involving opposite sides and angles, and diagonals;</li> <li>c) use properties of quadrilaterals to solve practical problems.</li> </ul> <p><b>Essential Knowledge and Skills</b></p> <ul style="list-style-type: none"> <li>a) Solve practical problems, using the properties specific to parallelograms, rectangles, rhombi, squares, and trapezoids.</li> <li>b) Prove that quadrilaterals have specific properties, using coordinate and algebraic methods, such as the distance formula, slope, and midpoint formula.</li> <li>c) Prove the properties of quadrilaterals, using deductive reasoning.</li> </ul>

<p>G.9 Polygons and Circles</p>	<p><b>Student will use measures of interior and exterior angles of polygons to solve problems. Tessellations and tiling problems will be used to make connections to art, construction, and nature.</b></p> <p><b>Essential Knowledge and Skills</b>  a) Solve problems involving the measures of interior and exterior angles of polygons.  b) Identify tessellations in art, construction, and nature.</p>
<p>G.10 Polygons and Circles</p>	<p><b>Student will investigate and use the properties of angles, arcs, chords, tangents, and secants to solve problems involving circles. Problems will include finding the area of a sector and applications of architecture, art, and construction.</b></p> <p><b>Essential Knowledge and Skills</b>  a) Given two intersecting chords or two intersecting tangents, find missing lengths.  b) Calculate the area of a sector of a circle, using proportions.  c) Given the measure of a central angle in degrees and the radius of the circle, find the related arc length.  d) Solve practical problems associated with circles, using properties of angles and arcs.</p>
<p>G.11 Lines and Angles</p>	<p><b>Student will construct, using a compass and straightedge, a line segment congruent to a given line segment, the bisector of a line segment, a perpendicular to a given line from a point not on the line, a perpendicular to a given line at a point on the line, the bisector of a given angle, and an angle congruent to a given angle.</b></p> <p><b>Essential Knowledge and Skills</b>  Construct:  a) a line segment congruent to a given line segment;  b) the bisector of a line segment;  c) a perpendicular to a given line from a point not on the line;  d) a perpendicular to a given line at a point on the line;  e) the bisector of a given angle; and  f) an angle congruent to a given angle.</p>

<p>G.12 Three-Dimensional Figures</p>	<p><b>Student will make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional representation of a three-dimensional object. Models and representations will include scale drawings, perspective drawings, blueprints, or computer simulations.</b></p> <p><b>Essential Knowledge and Skills</b></p> <p>c) Use properties of three-dimensional objects to make models.  d) Make a model of a three-dimensional figure from a two-dimensional drawing.  e) Make a two-dimensional representation of a three-dimensional object.  f) Solve problems, using scale drawings, perspective drawings, blueprints, or computer drawings as models of three-dimensional objects.  g) Identify a three-dimensional object from different positions, such as the top view, side view, and front view.</p>
<p>G.13 Three-Dimensional Figures</p>	<p><b>Student will use formulas for surface area and volume of three-dimensional objects to solve practical problems. Calculators will be used to find decimal approximations for results.</b></p> <p><b>Essential Knowledge and Skills</b></p> <p>d) Find the total surface area of cylinders, prisms, pyramids, cones, and spheres, using the appropriate formulas.  e) Calculate the volume of cylinders, prisms, pyramids, cones, and spheres, using the appropriate formulas.  f) Solve practical problems involving total surface area and volume of cylinders, prisms, pyramids, cones, and spheres as well as combinations of three-dimensional figures.</p>
<p>G.14 Three-Dimensional Figures</p>	<p><b>Student, given similar geometric objects, will use proportional reasoning to solve practical problems; investigate relationships between linear, square, and cubic measures; and describe how changes in one of the measures of the object affect the others.</b></p> <p><b>Essential Knowledge and Skills</b></p> <p>a) Compare perimeters and areas of similar two-dimensional figures, using proportions.  b) Describe how a change in one measure affects other measures of an object. Measures of an object may include perimeter, area, total surface area, and volume.  c) Solve practical problems involving similar objects.</p>