

Geometry/Geometry Honors Pacing Guide

Focus: Second Quarter

First Quarter	Second Quarter	Third Quarter	Fourth Quarter
<p>Unit 1: Geometry Basics 2.5 weeks/6 blocks</p> <p>Unit 2: Logic and Reasoning 2.5 weeks/6 blocks</p> <p>Unit 3: Parallel and Perpendicular Lines 3 weeks/8 blocks</p>	<p>Unit 4: Triangles and Triangle Congruence 2 weeks/5 blocks Pages 2-5</p> <ul style="list-style-type: none"> The students will determine triangle congruency using the congruence postulates/theorems. <p>Unit 5: Similar Triangles 2.5 weeks/6 blocks Pages 6-11</p> <ul style="list-style-type: none"> The students will determine triangle similarity using the postulates/theorems of similarity. <p>Unit 6: Properties of Triangles 3 weeks/8 blocks Pages 12-15</p> <ul style="list-style-type: none"> The students, given information, will determine whether a triangle exists, and be able to identify the special segments and their points of concurrency. 	<p>Unit 7: Right Triangles 3 weeks/8 blocks</p> <p>Unit 8: Polygons 3 weeks/8 blocks</p> <p>Unit 9: Circles 3 weeks/8 blocks</p>	<p>Unit 10: Solids 2 weeks/5 blocks</p> <p>Unit 11: Transformations 2.5 weeks/6 blocks</p> <p>Unit 12: Constructions 1 week/3 blocks</p> <p>Unit 13: Geometry Extensions <i>Honors</i></p>

Document Definitions	<p>Essential Understandings- This section delineates the key concepts, ideas and mathematical relationships that all students should grasp to demonstrate an understanding of the Standards of Learning.</p> <p>Correlated Standards- The essential standards for previous grade level or course and /or next grade level or course.</p> <p>Essential - Standard, benchmark, or indicator from the VDOE Standards of Learning document. In the absence of VDOE standards for a given course, content to testing such as AP and IB can be labeled Essential.</p> <p>Expected - Standard, benchmark, or indicator added by the FCPS Program of Studies to provide a context, a bridge, or an enhancement to the Essential SBIs.</p> <p>Extended - Standard, benchmark, or indicator added by the FCPS Program of Studies generally used to differentiate instruction for advanced learners. These indicators must be taught in Honors classes.</p>
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Essential Understandings

- Congruence has real-world applications in a variety of areas, including art, architecture, and the sciences.
- Congruence does not depend on the position of the triangle.
- Concepts of logic can demonstrate congruence or similarity.
- Congruent figures are also similar, but similar figures are not necessarily congruent.

Vocabulary: acute triangle, adjacent sides, base, base angles, congruence theorems: AAS, ASA, HL, SAS, SSS; congruent figures, corresponding sides, corresponding angles, CPCTC, equiangular triangle, equilateral triangle, interior angle, exterior angle, hypotenuse, isosceles triangle, legs, obtuse triangle, right triangle, scalene triangle, vertex angle

Correlated Standards

Course Level Below	Current Course Level
<p>Standard G6.12 The student will determine congruence of segments, angles, and polygons.</p>	<p>STANDARD GEOM.6 <u>The student, given information in the form of a figure or statement, will prove two triangles are congruent, using algebraic and coordinate methods as well as deductive proofs.</u></p> <p>From STANDARD GEOM.1 <u>The student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include</u> a) <u>identifying the converse, inverse, and contrapositive of a conditional statement;</u></p>

Textbook Correlation

Indicators	Textbook Resources	Additional Resources
Essential 6.a.1 6.a.2 6.a.3	4-1, 4-2, 4-3, 4-4, 4-6, 4-7 4-2, 4-6 (see problem sets), VA-4 4-6 (see problem set)	Pearson 4-2 Think About a Plan Worksheet VDOE – Congruent Triangles – Triangles
Expected 6.a.4 6.a.5	4-1 4-2, 4-3, 4-4, 4-6, 4-7, VA-4	
Extended 1.a.6	4-1, 4-2, 4-3, 4-4, 4-5, 4-7, VA-4	

Standard GEOM.6

The student, given information in the form of a figure or statement, will prove two triangles are congruent, using algebraic and coordinate methods as well as deductive proofs.

ESSENTIAL KNOWLEDGE AND SKILLS

FCPS TEACHER NOTES

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

Essential

- 6.a.1 Use definitions/postulates/theorems to prove triangles congruent.
- 6.a.2 Use coordinate methods, such as the distance formula and the slope formula, to prove two triangles are congruent.
- 6.a.3 Use algebraic methods to prove two triangles are congruent.

Expected

- 6.a.4 Map corresponding parts (angles and sides) of congruent figures onto each other.
- 6.a.5 Plan and write proofs utilizing the triangle congruence postulates (SSS, SAS, ASA), the triangle congruence theorems (AAS, HL), and the congruence of corresponding parts of congruent triangles (CPCTC).

Unit 4: Triangles and Triangle Congruence

STRAND: TRIANGLES AND LOGIC

STANDARD GEOM.1

The student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include

- a) **identifying the converse, inverse, and contrapositive of a conditional statement;**
- b) translating a short verbal argument into symbolic form (Unit 2);
- c) using Venn diagrams to represent set relationships (Unit 2); and
- d) using deductive reasoning (Unit 2).

ESSENTIAL KNOWLEDGE AND SKILLS

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

Extended

- 1.a.6 Write a formal geometric proof including algebraic, coordinate, and deductive proofs with no more than four steps.

FCPS TEACHER NOTES

Essential Understandings

- Similarity has real-world applications in a variety of areas, including art, architecture, and the sciences.
- Similarity does not depend on the position of the triangle.
- Congruent figures are also similar, but similar figures are not necessarily congruent.
- A constant ratio exists between corresponding lengths of sides of similar figures.
- Proportional reasoning is integral to comparing attribute measures in similar objects.

Vocabulary: extremes, geometric mean, means, proportion, ratio, scale factor, similar polygons

Correlated Standards

Course Level Below	Current Course Level
<p>Standard G7.6 The student will determine whether plane figures – quadrilaterals and triangles – are similar and write proportions to express the relationships between corresponding sides of similar figures.</p>	<p>From STANDARD GEOM. 5 <u>The student, given information concerning the lengths of sides and/or measures of angles in triangles, will</u> e) <u>solve real-world problems</u></p> <p>STANDARD GEOM.7 <u>The student, given information in the form of a figure or statement, will prove two triangles are similar, using algebraic and coordinate methods as well as deductive proofs.</u></p> <p>From STANDARD GEOM.14 <u>The student will use similar geometric objects in two- or three-dimensions to</u> a) <u>compare ratios between side lengths, perimeters, areas, and volumes (Unit 10);</u> b) <u>solve real-world problems about similar geometric objects.</u></p> <p>From STANDARD GEOM.1 <u>The student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include</u> a) <u>identifying the converse, inverse, and contrapositive of a conditional statement</u></p>

Textbook Correlation

Indicators	Textbook Resources	Additional Resources
Essential 5.e.1 7.a.1 7.a.2 7.a.3 14.a.1 14.b.1, 14.c.1 14.d.1	No Correlation 7-2, 7-3, 7-4 7-3 (see Problem Set #24-26) 7-3 (see Problem Set #32), VA-4 7-2 (Challenge Question #48), 7-3, 10-4 No Correlation 7-2, 7-3, 7-4, 7-5	VDOE – Similar Triangles – Triangles Pearson 7-3 Enrichment Worksheet
Expected 7.a.4 7.a.5 7.a.6 14.a.2	7-2, 7-3, 7-4, 7-5 7-1, 7-3, 7-4, 7-5 7-2 7-4	
Extended 1.a.6	7-3, 7-4, 7-5	

STANDARD GEOM.5

The student, given information concerning the lengths of sides and/or measures of angles in triangles, will

- a) order the sides by length, given the angle measures (Unit 6);
- b) order the angles by degree measure, given the side lengths (Unit 6);
- c) determine whether a triangle exists (Unit 6); and
- d) determine the range in which the length of the third side must lie (Unit 6).
- e) **solve real-world problems given information about the lengths of sides and/or measures of angles in triangles.**

These concepts will be considered in the context of real-world situations.

ESSENTIAL KNOWLEDGE AND SKILLS	FCPS TEACHER NOTES
<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>Essential</p> <p>5.e.1 Solve real-world problems given information about the lengths of sides and/or measures of angles in triangles.</p>	

STANDARD GEOM.7

The student, given information in the form of a figure or statement, will prove two triangles are similar, using algebraic and coordinate methods as well as deductive proofs.

ESSENTIAL KNOWLEDGE AND SKILLS

FCPS TEACHER NOTES

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

Essential

- 7.a.1 Use definitions, postulates, and theorems to prove triangles similar.
- 7.a.2 Use algebraic methods to prove that triangles are similar.
- 7.a.3 Use coordinate methods, such as the distance formula, to prove two triangles are similar.

Expected

- 7.a.4 Solve practical problems using congruence and similarity.
- 7.a.5 Solve practical problems using properties of proportions and other algebraic methods.
- 7.a.6 Map corresponding parts (angles and sides) of congruent figures onto each other.

STRAND: THREE DIMENSIONAL FIGURES

STANDARD GEOM.14

The student will use similar geometric objects in two- or three-dimensions to

- a) **compare ratios between side lengths, perimeters**, areas, and volumes (Unit 10);
- b) determine how changes in one or more dimensions of an object affect area and/or volume of the object (Unit 10);
- c) determine how changes in area and/or volume of an object affect one or more dimensions of the object (Unit 10); and
- d) **solve real-world problems about similar geometric objects.**

ESSENTIAL KNOWLEDGE AND SKILLS	FCPS TEACHER NOTES
<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>Essential</p> <p>14.a.1 Compare ratios between side lengths, perimeters, areas, and volumes (Unit 10), given two similar figures.</p> <p>14.b.1 Describe how changes in one or more dimensions affect other derived measures (perimeter, area, total surface area, and volume(Unit 10)) of an object.</p> <p>14.c.1 Describe how changes in one or more measures (perimeter, area, total surface area, and volume(Unit 10)) affect other measures of an object.</p> <p>14.d.1 Solve real-world problems involving measured attributes of similar objects.</p> <p>Expected</p> <p>14.a.2 Find the lengths of sides of similar geometric objects using proportions including the geometric mean.</p>	

Unit 5: Triangles and Triangle Congruence

STRAND: TRIANGLES AND LOGIC

STANDARD GEOM.1

The student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include

- a) **identifying the converse, inverse, and contrapositive of a conditional statement;**
- b) translating a short verbal argument into symbolic form (Unit 2);
- c) using Venn diagrams to represent set relationships (Unit 2); and
- d) using deductive reasoning (Unit 2).

ESSENTIAL KNOWLEDGE AND SKILLS

FCPS TEACHER NOTES

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

Extended

- 1.a.6 Write a formal geometric proof including algebraic, coordinate, and deductive proofs with no more than four steps.

Essential Understandings

- The longest side of a triangle is opposite the largest angle of the triangle and the shortest side is opposite the smallest angle.
- In a triangle, the length of two sides and the included angle determine the length of the side opposite the angle.
- In order for a triangle to exist, the length of each side must be within a range that is determined by the lengths of the other two sides.

Vocabulary: altitude, angle bisector (triangle), centroid, circumcenter, concurrent, equidistant, hinge theorem, incenter, inscribe, median, midsegment (triangle), orthocenter, perpendicular bisector (segment, triangle), point of concurrency

Correlated Standards

Course Level Below	Current Course Level
	<p>STANDARD GEOM.5 <u>The student, given information concerning the lengths of sides and/or measures of angles in triangles, will</u></p> <p>a) <u>order the sides by length, given the angle measures;</u> b) <u>order the angles by degree measure, given the side lengths;</u> c) <u>determine whether a triangle exists; and</u> d) <u>determine the range in which the length of the third side must lie.</u> <u>These concepts will be considered in the context of real-world situations.</u></p> <p>From STANDARD GEOM.1 <u>The student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include</u> a) <u>identifying the converse, inverse, and contrapositive of a conditional statement</u></p>

Textbook Correlation

Indicators	Textbook Resources	Additional Resources
Essential 5.a.1, 5.b.1, 5.c.1, 5.d.1, 5.e.1	5-6	VDOE – How Many Triangles? – Triangles
Expected 5.f.1	1-6 (Constructions), 3-6 (Constructions), 5-2, 5-3, 5-4	
5.f.2	5-2 (Concept Byte), 5-3, 5-4	
5.f.3	5-1	
Extended 5.f.4	5-3, 5-4	
1.a.6	5-2, 5-5	

STANDARD GEOM.5

The student, given information in the form of a figure or statement, will prove two triangles are congruent, using algebraic and coordinate methods as well as deductive proofs.

ESSENTIAL KNOWLEDGE AND SKILLS	FCPS TEACHER NOTES
<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>Essential</p> <p>5.a.1 Order the sides of a triangle by their lengths when given the measures of the angles.</p> <p>5.b.1 Order the angles of a triangle by their measures when given the lengths of the sides.</p> <p>5.c.1 Given the lengths of three segments, determine whether a triangle could be formed.</p> <p>5.d.1 Given the lengths of two sides of a triangle, determine the range in which the length of the third side must lie.</p> <p>5.e.1 Solve real-world problems given information about the lengths of sides and/or measures of angles in triangles.</p> <p>Expected</p> <p>5.f.1 Identify and investigate medians, altitudes, perpendicular bisectors of sides, angle bisectors, and transversals parallel to one side of a triangle and construct using a straight- edge and compass.</p> <p>5.f.2 Investigate the points of concurrency in a triangle (centroid, incenter, circumcenter, orthocenter) through paper folding and be able to construct the points using a compass and straight-edge.</p> <p>5.f.3 Determine the midsegments of a triangle, and use related properties.</p> <p>Extended</p> <p>5.f.4 Given the coordinates of the vertices of a triangle, find the coordinates of the points of concurrency using algebraic equations.</p>	

STRAND: TRIANGLES AND LOGIC

STANDARD GEOM.1

The student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include

- a) identifying the converse, inverse, and contrapositive of a conditional statement;**
- b) translating a short verbal argument into symbolic form (Unit 2);
- c) using Venn diagrams to represent set relationships (Unit 2); and
- d) using deductive reasoning (Unit 2).

ESSENTIAL KNOWLEDGE AND SKILLS	FCPS TEACHER NOTES
<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>Extended</p> <p>1.a.6 Write a formal geometric proof including algebraic, coordinate, and deductive proofs with no more than four steps.</p>	