High School Geometry FCPS 2025-2026 Math Unit Framework Topic 7

Geometry Topic 7: Similarity	**Estimate Time Frame: 7 Block Days**
Essential Standards: G.9, G.10, G.11 Assessment Resource: enVision Topic 7 and Formative Assessment Lessons: **FAL -** Identifying Similar Triangles / **FAL -** Floodlight Shadows	

FCPS Supporting Links	**Additional Supporting Links**
Pacing Guide enVision Geometry Standards Crosswalk Resource FCPS P-12 Mathematics Guidance Document FCPS Achievement & Trauma-Informed Strategies in the Classroom	Kentucky Academic Standards KSA Blueprint Target of the Standards - conceptual, procedural & application Three-Reads Routine Notice and Wonder Routine **MILC Resources Topic 7- Similarity** ***enVision Geometry Teacher Guide: page 302A to 302D for specific Topic 7 Focus-Coherence-Rigor***

Big Idea
Once an essential number of facts are known, figures can be similar, meaning that all corresponding sides are proportional, and all corresponding angles are congruent.

Essential Questions	**Common Preconceptions/Misconceptions**
•What is the relationship between the sides and angles of similar figures? •How can I use the properties of similar figures to solve algebraic and real-world problems? •How can I prove two triangles are similar? •How can I generalize the properties of similar triangles to solve problems involving parallel segments and angle	• Some students may find highlighting the side(s) of the original triangle is helpful. • Share examples of self-similarity in nature to extend student thinking. A tree has a large trunk and branches, but each has smaller branches. Some seashells have a spiral design, so each section gets smaller as the shell spirals inward. Fractals are based on self-similarity. M.C. Escher prints use many dilations.

bisectors? Theorems/Postulates: Theorems include the Pythagorean Theorem, "A line parallel to one side of a triangle divides the other two proportionally and conversely," and "A segment joining midpoints of a triangle is parallel to the third side and half the length." •Corresponding angles in ~ figures are congruent •Corresponding sides in ~ figures are proportional •Ratio of perimeters in ~ figures = scale factor •Ratio of areas in ~ figures = square of scale factor •AA~ Similarity Theorem •SAS~ Similarity Theorem •SSS~ Similarity Theorem •Side-Splitter Theorem •Corollary to Side-Splitter Theorem •Triangle Angle-Bisector Theorem •Triangle Midsegment Theorem	• Only work with dilations from the origin. • If students do not set up their proportions correctly, ask them to make separate sketches of the two triangles. Ask them to label each triangle with all available information before setting up their proportions to calculate missing lengths.

Standards for Mathematical Practices	Kentucky Interdisciplinary Literacy Practices (KILP)
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. **MP.3. Construct viable arguments and critique the reasoning of others.** MP.4. Model with mathematics. **MP.5. Use appropriate tools strategically.** **MP.6. Attend to precision.** **MP.7. Look for and make use of structure.** MP.8. Look for and express regularity in repeated reasoning. ***enVision Teacher Guide: page 302D for specific Math Practice suggestions***	1. Recognize that text is anything that communicates a message. 2. Employ, develop, and refine schema to understand and create text. 3. View literacy experiences as transactional, interdisciplinary, and transformational. 4. Utilize receptive and expressive language arts to better understand self, others, and the world. **5. Apply strategic practices, with scaffolding and then independently, to approach new literacy tasks.** **6. Collaborate with others to create new meaning.** **7. Utilize digital resources to learn and share with others.** **8. Engage in specialized, discipline-specific literacy practices.** **9. Apply high-level cognitive processes to think deeply and critically about text.** 10. Develop a literacy identity that promotes lifelong learning. *Incorporating texts into math instruction fosters interdisciplinary learning for a more engaging educational experience.*

Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Understand similarity in terms of similarity transformations.		
KY.HS.G.9 Understand properties of dilations. a. Verify the properties that result from the dilations given by a center and a scale factor. b. Verify that a dilation produces an image similar to the pre-image. **MP.5, MP.7, KILP.1, KILP.8**	We are learning to understand the properties of dilations. • I can dilate a figure by a scale factor with a fixed center called the center of dilation. • I can identify similar parts of figures after a dilation using pairs of angles. • I can find the scale factor of similar figures by comparing the image's side lengths to the corresponding side lengths of the	• Topic 7-1 • Topic 7-2 This standard can also be taught with 3-5 in the Transformations Unit.

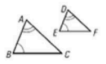
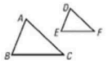
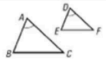
Supporting Standards: KY.HS.N.5, KY.HS.G.2, KY.HS.G.4 □ Conceptual ❑ Procedural ❑ Application	preimage. • I can use a scale factor and center to **verify** a dilation of similar figures. We are learning to use the properties of dilations to solve problems. • I can explain the effects of dilation on objects that do not pass through the center of a figure. • I can use the coordinates of an image under a similarity transformation to **verify** a dilation.	
Cluster: Understand similarity in terms of similarity transformations.		
KY.HS.G.10 Apply the properties of similarity transformations to establish the AA criterion for two triangles to be similar. **MP.3, MP.6, KILP.1, KILP.3, KILP.8** □ Conceptual ❑ Procedural ❑ Application	We are learning to apply the properties of similarity transformations to establish the AA (angle-angle) criterion for determining the similarity between two triangles. • I can use dilations and rigid motions to prove that triangles are similar. • I can use properties of similar triangles to establish the Angle-Angle Similarity Theorem. • I can use the AA criterion to determine whether two triangles are similar.	• Topic 7-3 **The AA Similarity Theorem** If $\angle A \cong \angle D$, *and* $\angle B \cong \angle E$, then $\Delta ABC \sim \Delta DEF$. Use properties of similar figures to solve for missing values (using equations and proportions) Prove triangles similar using AA~, SSS~, and SAS~ Lesson Quiz 7-3 (proving similar) Lesson Quiz 7-3 (using properties)

Cluster: Prove theorems involving similarity.		
KY.HS.G.11 Understand theorems about triangles. a. Apply theorems about triangles. ☐ Conceptual ☐ Procedural ❑ Application b. (+) Prove theorems about triangles. ☐ Conceptual ☐ Procedural ❑ Application c. Use similarity criteria for triangles to solve problems and to prove relationships in geometric figures. **MP.1, MP.3, KILP.1, KILP.3, KILP.8** ☐ Conceptual ☐ Procedural ☐ Application *Supporting Standards: KY.HS.G. 5, KY.HS.G.7 KY.HS.G.10*	We are learning to develop an understanding of theorems about triangles and their applications. ● I can apply theorems related to triangles, including the Pythagorean theorem, the Triangle Sum theorem, the Triangle Inequality theorem, and the Triangle Similarity postulate/theorems. ● I can use the Altitude-on-Hypotenuse theorem to find missing values in right triangles. ● I can verify triangle similarity using SSS ~, SAS~, or AA~. ● I can use triangle similarity criteria to solve problems of missing angle measures and lengths. ● I can use the three proportionality theorems to calculate segment lengths. ● I can use the Triangle Midsegment Theorem to find missing segment/angle measures. We are learning to use triangle theorems to solve problems. ● I can demonstrate the ability to copy a segment, copy an angle, bisect a segment, bisect an angle, and construct perpendicular lines. ● I can use the similarity of triangles divided by a segment parallel to one side to divide the sides of triangles in proportion. ● I can use similarity to divide one side of a	● Topic 7-4 Students demonstrate the ability to copy a segment, copy an angle, bisect a segment, bisect an angle, construct perpendicular lines, including the perpendicular bisector of a line segment, and construct a line parallel to a given line through a point not on the line. **3-ACT Math Task** - Make It Right (baseball diamond connections) (after Lesson 7-4) ● Topic 7-5 to include: side-splitter mid-segment triangle angle bisector Formative Assessment Lessons: **FAL -** Identifying Similar Triangles / **FAL -** Floodlight Shadows

triangle proportionately to the other.
- I can use the geometric mean to solve problems with right triangles.

- I can find missing sides and angles in similar figures.
- I can state the two properties of similar figures.
- I can find the scale factor of similar figures.
- I can find the ratio of the perimeters of similar figures.
- I can find the ratio of the areas of similar figures.

Triangle Similarity Postulate and Theorems:

AA Similarity Postulate	SSS Similarity Theorem	SAS Similarity Theorem
		
Two triangles are similar if they have two pairs of congruent angles.	Two triangles are similar if they have three pairs of proportional sides.	Two triangles are similar if they have two pairs of proportional sides with a congruent included angle.

Attending to the Standards for Mathematical Practice

- Students verify whether figures are similar or not using physical models, transparencies, and geometry software (MP.5, MP.6).
- As they compare similar shapes, they generalize what changes and what stays the same when and use this information to do dilations (MP.7).
- Students prepare illustrations and explanations related to the AA triangle similarity criterion, as well as by considering and discussing properties of similar triangles (MP.3).
- Students identify cases where the AA triangle similarity criterion can be used (MP.1) and routinely use various methods of proof (formal, informal, direct, and indirect) to outline their logic to defend their conjectures (MP.3)

Supporting Standards

KY.HS.N.5 Define appropriate units in context for descriptive modeling. ★ **MP.1, MP.6**

KY.HS.G.2 Representing transformations in the plane.
a. **Describe** transformations as functions taking points in the plane as inputs and giving others as outputs.
b. **Compare** transformations that preserve distance and angle measures to those that do not.
MP.5, MP.7, KILP.7, KILP.8

KY.HS.G.4 Understand the effects of transformations of geometric figures.
a. Given a geometric figure and a rotation, reflection, or translation, **draw** the transformed figure.

b. **Specify** a sequence of transformations that will carry a given figure onto another.
c. **Use** geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure. Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
MP.2, MP.8

KY.HS.G.7 Prove theorems about geometric figures. a. Construct formal proofs to justify lines, angles, and triangle theorems.
b. (+) Construct formal proofs to justify theorems for parallelograms. (Advanced Geometry) **MP.6, MP.7**

Vocabulary

Similarity Vocabulary: ratio, proportion, reflection, rotation, translation, dilation, similar, scale factor, proportionality statement, similarity statement, transversal, angle bisector, cross-product property, extended proportion, geometric mean, golden ratio, indirect measurement, proportion, scale factor, similar figures, Side-Splitter Theorem, Angle Bisector Theorem

Essential Theorems/Postulates by Topic
- Corresponding angles in ~ figures are equal
- Corresponding sides in ~ figures are proportional
- Ratio of perimeters in ~ figures = scale factor
- Ratio of areas in ~ figures = square of scale factor
- AA~ Similarity Theorem
- SAS~ Similarity Theorem
- SSS~ Similarity Theorem
- Side–Splitter Theorem
- Corollary to Side–Splitter Theorem
- Triangle Angle–Bisector Theorem
- Triangle Midsegment Theorem

*Disclaimer: Success Criteria is the evidence students must produce to demonstrate learning. This example is not comprehensive.
** Mathematical Practices (A.MP. 1- 8) should be evidenced at some point throughout each unit, depending on the explored tasks. It is important to note that MP. 2 should support learning in every lesson.
*** Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards

indicated by a star symbol (★). The star symbol sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to *all* standards in that group.