Grade: 7 FCPS 2025-2026 Math Grade 7 Topic 8

7th Grade Topic 8 : Solve Problems Involving Geometry	Estimate Time Frame: 22 days
Essential Standards: 7.G.1, 7.G.2, 7.G.3, 7.G.4, 7.G.5, 7.G.6 Supporting Standards: 7.EE.3 Assessment Resource: enVision Topic 8	

FCPS Supporting Links	Additional Supporting Links
Pacing Guide 7th Grade Topic 8 Standards Resource with Sample Formative Assessments enVision 7th Grade Topic 8 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 8: Solve Problems Using Geometry** ***enVision Teacher Guide: page 424A to 424D for specific Topic 8 Focus-Coherence-Rigor***

Big Ideas
Draw, construct and describe geometrical figures and describe the relationships between them. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Essential Questions	Common Preconceptions/Misconceptions
How can geometry be used to solve problems? How is the circumference of a circle used to derive the area of a circle? How are area and volume properties related?	Initially, students may struggle with moving from a concrete understanding of a real-world situation to a miniature version, or vice versa; hands-on measurements and the use of technology can assist students with this abstract idea. Students may confuse vocabulary words introduced in 7.G.5 (*supplementary, complementary, vertical,* and *adjacent*.) Having students make a foldable

	where they can make the correct distinction can be helpful. Students may mischaracterize the volume and surface area of three-dimensional shapes, leading them to develop ways to decide whether a situation calls for the volume of a figure, or the surface area of a figure. Using nets and other appropriate tools gives students a structure to foster a greater understanding of the surface area.	
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 424E for specific Topic 8 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: Draw, construct and describe geometrical figures and describe the relationships between them.		
KY.7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and	We are learning to use scale drawings of geometric figures. • I can find actual lengths using a scale drawing.	• Topic 1 Lesson 8-1 • enVision Language Support Handbook

areas from a scale drawing and reproducing a scale drawing at a different scale. ❑ Conceptual ❑ **Procedural** ❑ **Application** **Clarifications:** Emphasize converting values from one given measurement to another based on a given scale factor. For example, 1 inch on the scale drawing equals how many feet in real life based on the scale factor given. Students reproduce a given drawing based on a scale factor. Coherence KY.6.G.1→KY.7.G.1→KY.8.EE.6 **MP.1, MP.2, MP.5, KILP.5, KILP.8**	• I can use scale factors to solve area problems. • I can convert a scale drawing to a different scale. • I can reproduce a drawing based on a different scale factor.	
KY.7.G.2 Draw (freehand, with ruler and protractor and with technology) geometric shapes with given conditions. ❑ **Conceptual** ❑ **Procedural** ❑ Application **Clarifications:** Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. Coherence KY.7.G.2→KY.8.G.1 **MP.6, MP.7, KILP.2, KILP.7**	We are learning to construct geometric figures. • I can construct triangles from three angle measures using a ruler, protractor, or technology given certain conditions. • I can construct triangles from three side measures using a ruler, protractor, or technology given certain conditions. • I can determine the number of triangles that can be formed given certain side lengths and angle measures.	• Topic 8 Lesson 8-2 • Topic 8 Lesson 8-3 • enVision Language Support Handbook

Attending to the Standards for Mathematical Practice

Students extend their knowledge of proportional reasoning to solve problems involving dimensions and area. Proper use of tools help them understand the conditions by which three side lengths will determine one triangle or no triangle. Students have opportunities to reflect on the appropriateness of a tool for a particular task (MP.5). Initially, students may struggle with moving from a concrete understanding of a real-world situation to a miniature version, or vice versa; hands-on measurements and the use of technology can assist students with this

abstract idea. In many cases, students make sense of new and different contexts and engage in significant struggle to solve problems (MP.1, MP.2). Students begin to understand it may not be possible to draw a certain shape with given measurements, or, if possible, may not yield a unique shape and reason why this may be the case (MP.7). By finding the constraints that exist in the Triangle Inequality Theorem, for example, a student determines precisely when a triangle may or may not exist (MP.6).

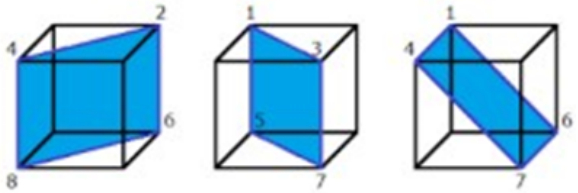
Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Solve real-life and mathematical problems involving angle measure, area, surface area and volume.		
KY.7.G.5 Apply supplementary, complementary, vertical, and adjacent angles properties in a multi-step problem to write and solve simple equations for an unknown angle in a figure. ☐**Conceptual** ☐**Procedural** ☐**Application** **Clarifications:** Emphasis is on the relationships between the various angles listed to find missing angles based on the relationships and to write and solve equations to find unknown angles. Coherence KY.4.MD.7 →KY.7.G.5 →KY.8.G.5 **MP.3, MP.6, MP.7, KILP.2, KILP.8**	We are learning to use angle relationships to solve problems. • I can apply properties of supplementary, complementary, vertical, and adjacent angles to find the measures of missing angles. • I can apply the properties of angles to write and solve equations. • I can substitute a variable value in to find the angle measure. • I can recognize the relationship between angles formed by intersecting lines and rays.	• Topic 8 Lesson 8-4 • Topic 8: Let's Investigate! What's the Angle?(do in place of Lesson 8-4) • enVision Language Support Handbook
KY.7.G.4 Use formulas for the area and circumference of circles and their relationships. Clarifications: **Circle Formulas: C=dπ $C = 2r\pi$ A=πr2** Note: Calculating the radius or diameter of a circle given its area is not expected, as finding the square root of a number is reserved for 8th grade. ☐**Conceptual** ☐**Procedural** ☐**Application**	We are learning to solve problems involving the circumference of a circle. • I can use the formula *Circumference = πd* or *2πr* to calculate the circumference of a circle. • I can determine the radius or diameter using the circumference formula. • I can identify the relationship between the circumference and diameter of a circle.	• Topic 8 Lesson 8-5 • Topic 8: Let's Investigate! Target the Area (do before Lesson 8-6) • Lesson 8-6 • 3-Act Math Topic 8: Whole Lotta Dough • enVision Language Support Handbook

a. Apply the formulas for the area and circumference of a circle to solve real-world and mathematical problems. Clarifications: Both area and circumference are represented; students recognize when the circumference is needed and when the area is needed. b. Explore and understand the relationship between a circle's radius, diameter, circumference, and area. Clarifications: Emphasis is on calculating the area given diameter, finding the circumference given radius or diameter, and finding the radius or diameter given circumference. Special attention is given to the relationship between diameter and circumference as a ratio that leads to pi. Coherence KY.7.G.4 → KY.8.G.9 **MP.1, MP.2, MP.8, KILP.2, KILP.5, KILP.8** *Supporting Standard KY.7.EE.3*	We are learning to solve problems involving the area of a circle. • I can use the formula *Area* = πr^2 to calculate a circle's area when given diameter or radius.	

Attending to the Standards for Mathematical Practice

A student who merely memorizes the area and circumference formulas for a circle or the area, volume and surface area formulas of other shapes does not have a deep, conceptual understanding of the basis for these equations. Exploring the relationships between radius, diameter, area and circumference limits the confusion inherent in rote memorization, because students are given a context to the concepts (MP.2, MP.8). Solving real-world situations involving these quantities gives the student context for their understanding of the mathematics (MP.1). In addition, precise drawing or manipulation of technology lends itself to generate definitions (MP.6).

Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Draw, construct and describe geometrical figures and describe the relationships between them.		

KY.7.G.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. ☒ **Conceptual** ❑ Procedural ❑ Application **Clarifications:** Cross sections may be taken from horizontal, vertical and oblique angles, such a  **MP.5, MP.6, KILP.7, KILP.8**	We are learning to describe cross-sections of three-dimensional figures. • I can describe the 2-dimensional figure formed when slicing a right rectangular prism or pyramid horizontally, vertically, or diagonally (cross-section).	• Topic 8 Lesson 8-7 • enVision Language Support Handbook

Attending to the Standards for Mathematical Practice
By emphasizing the differences in various slicing planes, students accurately represent the resulting sections (MP.6).

Essential Standards	**Sample Learning Intentions & Success Criteria**	**HQIR/Resource Considerations**
Cluster: Solve real-life and mathematical problems involving angle measure, area, surface area and volume.		

KY.7.G.6 Solve problems involving the area of two-dimensional objects and the surface area and volume of three-dimensional objects.
 	
❑ Conceptual ☒ **Procedural** ☒ **Application**
 	
a. Solve real-world and mathematical problems involving the area of two-dimensional objects composed of triangles, quadrilaterals, and other polygons.
	We are learning to solve problems involving the area of two-dimensional figures and surface area.
	• I can find the area of composite 2-dimensional figures by finding the sum of the areas of each part.
	• I can find the surface area of a 3-dimensional figure by finding the sum of areas of each part of its net.
	
	We are learning to solve problems involving
		• ❗ 6th Grade Book Lesson 7-4
		• ❗ Optional resources to support using nets
		  • 6th Grade Book - Topic 7: Let's Investigate! Nothing but Net
		  • 6th Grade Book - 3-Act Math Topic 7: That's a Wrap

Clarifications: Emphasis is on finding the area of composite figures composed of convex polygons. b. Solve real-world and mathematical problems involving volume and surface area, using nets of three-dimensional objects, including cubes, pyramids, and right prisms. Clarifications: Students understand volume and surface area are two different quantities used to describe the same three-dimensional figure. Building upon their understanding of area, students use nets of three dimensional objects to conceptualize surface area. Students calculate with appropriate units, using nets as a possible strategy for calculation as well as formulas for volume and surface area, where appropriate. Coherence KY.6.G.4→ KY.7.G.6 → KY.8.G.6 **MP.3, MP.4, MP.5, KILP.1, KILP.3, KILP.9** *Supporting Standard KY.7.EE.3*	the volume of three-dimensional objects. • I can use the area of the base and height of a 3-dimensional figure to find its volume. • I can find the missing dimension when given the volume of a figure.	• 6th Grade Book - Topic 7: Let's Investigate! On the Surface • enVision Language Support Handbook ***Return to 7th Grade Book*** • Topic 8 Lesson 8-8 • Topic 8 Lesson 8-9 • Brainingcamp Task "Pick's Theorem" • enVision Language Support Handbook

Attending to the Standards for Mathematical Practice

Students continue their work from grade 6 from solving area problems involving triangles and rectangles to those involving more complex shapes, such as rhombi or trapezoids (MP.4). Students may mischaracterize volume and surface area of three dimensional shapes, leading them to develop ways to decide upon whether a situation calls for the volume of a figure, or the surface area of a figure (MP.3). The use of nets and other appropriate tools gives students a structure to foster greater understanding of the concept of surface area (MP.5).

Supporting Standards

KY.7.EE.3 Solve real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. **MP.1, MP.4, MP.6**

Clarifications: Students solve multi-step real-world and mathematical problems containing integers, fractions, and decimals, using previously acquired skills around converting fractions, decimals, and percentages and using properties of operations to find equivalent forms of expressions when needed. Students solidify understanding by checking their solutions for reasonableness using estimation strategies such as rounding, compatible numbers, and benchmark numbers.

☐ **Conceptual** ☐ **Procedural** ☐ **Application**

Vocabulary

adjacent angles - Two angles that share both a side and a vertex.
angle - The union of two rays with a common endpoint, called the vertex.
area - The number of square units that covers a shape or figure.
circle - A closed curve with all its points in one plane and the same distance from a fixed point, the center.
circumference - Distance around a circle; its perimeter.
Complementary angles - Two angles whose sum is 90 degrees.
composite figure - A combination of two or more geometric shapes.
congruence - Two plane or solid figures are congruent if they have the same size and shape.
cross-section - The intersection of a 3-dimensional body with a plane.
diameter - A line segment drawn from one edge of the circle through the center to the other side.
radius - A line segment drawn from the center of a circle to any point on a circle; half the diameter.
scale drawing - A drawing that is a reduction or enlargement of the original.
scale factor - A number that multiplies some quantity; the ratio of any two corresponding lengths in two similar geometric figures.
Supplementary angles - Two angles are supplementary if their sum is 180 degrees.
surface area - For a three-dimensional figure, the sum of the areas of all the faces.
vertical angle - when two lines intersect, the angles opposite each other are vertical angles and they have equal measures.

*****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.