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

8th Grade Topic 8: Solve Problems Involving Surface Area and Volume	Estimate Time Frame: 15 days
Essential Standards: 8.G.9 Assessment Resource: enVision Topic 8	

FCPS Supporting Links	Additional Supporting Links
Pacing Guide 8th Grade Topic 8 Standards Resource with Sample Formative Assessments enVision 8th Grade Topic 2 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 Involving Surface Area and Volume** ***enVision Teacher Guide: pages 426A to 426D for specific Topic 8 Focus-Coherence-Rigor***

Big Ideas
Solve real-world mathematical problems involving the volume of cylinders, cones, and spheres.

Essential Questions	Common Preconceptions/Misconceptions
How are the formulas for cylinder, cone, and sphere volume related? Can the surfaces of a cone and a cylinder be used to find the surface area of each figure?	Volume- Format of correct answer (in terms of pi, correct units, correct rounding). Identifying radius when given diameter, exponents in the formula.

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 426E for specific Topic 8 Math Practice suggestions***	1. Recognize that text is anything that communicates a message. 2. Employ, develop, and refine schemas 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: Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.		
KY.8.G.9 Apply the formulas for the volumes and surface areas of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. ❑ **Conceptual** ❑ **Procedural** ❑ **Application** Formulas from Test Nav KY Practice Tests	We are learning how to find the volume of three-dimensional figures to solve mathematical and real-life problems. • I can use the formula for the volume of a cylinder $V= \pi r^2 h$, to solve problems. • I can use the formula for the volume of a cone $V= \frac{1}{3} \pi r^2 h$ to solve problems. • I can use the formula for the volume of a sphere $V = 4/3\pi r^2 h$, to solve problems. • I can use the formulas for the surface area of cones, cylinders, and spheres to solve problems.	• Topic 8 Lesson 8-2 • Topic 8: Let's Investigate! Shrinkflation (replaces example 3 from Topic 8 Lesson 8-2) • Topic 8 Lesson 8-3 • Topic 8 Lesson 8-4 • Topic 8 Lesson 8-1 • 3-Act Task: Measure Up • enVision Language Support Handbook

Figure	Volume	Surface Area
Cone	$V = \frac{1}{3}\pi r^2 h$	$SA = \pi r \left(r + \sqrt{(r^2 + h^2)}\right)$
Cylinder	$V = \pi r^2 h$	$SA = 2\pi rh + 2\pi r^2$
Sphere	$V = \frac{4}{3}\pi r^3$	$SA = 4\pi r^2$

Coherence KY.7.G.4→ KY.8.G.9→ KY.HS.G.25

MP.1, MP.7, MP.8, KILP.3, KILP.5, KILP.9

Attending to the Standards for Mathematical Practice

Students may confuse the three formulas if they try to apply them to a specific shape. Investigations into the derivations of the volume formulas enhance student understanding of them (MP.1).
Students examining structure in real-world problems to apply the correct volume formula (if needed) begin to see where these structures are helpful in real life (MP.7).
If students can successfully compare volumes of similar shapes, for example, which of two storage tanks can hold the most fuel, they begin to use repeated reasoning in the real world (MP.8).

Supporting Standards

N/A

Vocabulary

area - interior space of a two-dimensional object
cone - a solid or hollow object that tapers from a circular or roughly circular base to a point
cylinder - a solid or hollow object having the shape of a cylinder
diameter - distance from one point, across the circle, through the center
height - vertical distance from the top to the base
pi - mathematical constant with an approximation of 3.14
radius - the distance from the edge of a circle to the center
right triangle – A triangle in which one angle is a right angle. The relation between the sides and angles of a right triangle is the basis for trigonometry.

sphere - a round, solid figure with every point equidistant from its center
Volume - the space occupied within the boundaries of a three-dimensional figure

*****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.