High School Geometry FCPS 2025-2026 Math Unit Framework Topic 11

Geometry Topic 11: 3-D Models	Estimate Time Frame: 4 Block Days
Essential Standards: G.25, G.27 Assessment Resource: enVision Topic #11 Performance Task (use as a mini-test grade).	

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 11** ***enVision Geometry Teacher Guide: page 466A to 466D for specific Topic 11 Focus-Coherence-Rigor***

Big Idea
3D geometry offers the tools and principles necessary to navigate and shape the world around us.

Essential Questions	Common Preconceptions/Misconceptions
•How are three-dimensional figures and polygons related? •How can I use volume to model and solve real-world problems? •How are the prism/cylinder and cone/pyramid formulas alike? •How is the volume of a sphere related to the volumes of other solids? **Theorems/Postulates:**	• Students use previously learned definitions, theorems, postulates, and properties of lines, angles, and triangles to draw conclusions and to make inferences. • Remind students that a cylinder has two circular faces, or sides, connected by a curved surface, while a prism has two faces that are congruent polygons, and the other faces are rectangles. • Prisms are named according to the shape of the two congruent polygons. • Note - No Cavalieri's Principle for General Geometry (right solids only, no oblique)

•Euler's Formula •Volume of a prism, cylinder, pyramid, cone, and sphere	• Cavalieri's Principle is only in Advanced Geometry- see Standard G.26 (+) standard.	
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 466D for specific 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: Explain volume formulas and use them to solve problems.		
KY.HS.G.25 Analyze and determine the validity of arguments for the formulas for the various figures and shapes. b. Find the volume of a sphere, prism, cylinder, pyramid, and cone. **MP.3, MP.7, KILP.1, KILP.6, KILP.8** *Supporting Standard: KY.HS.G.26 (+), KY.HS.G.30*	We are learning to analyze and determine the validity of arguments for the formulas used to calculate measurements of various figures and shapes. • I can identify the volume formulas of a sphere, prism, cylinder, pyramid, and cone. • I can analyze and critique the rationale behind the formula for finding the volume of	• Topic 11-2 • Topic 11-3 • Topic 11-4 Students may use dissection arguments, Cavalieri's principle, and informal limit

☐ Conceptual ☐ Procedural ☐ Application	a sphere, demonstrating an understanding of its connection to the formula for the volume of a cylinder.	arguments to find the values for these figures. ***Cavalieri's Principle is only in Adv. Geom - see Standard G.26 (+)**
KY.HS.G.27 Use volume formulas to solve problems for cylinders, pyramids, cones, spheres, prisms ★ **MP.4, MP.6, KILP.2, KILP.6, KILP.9** *Supporting Standard: KY.HS.G.28, KY.HS.G.29, KY.HS.G.30* ☐ Conceptual ☐ Procedural ☐ Application	We are learning to use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. ● I can use the appropriate formula for volume based on the figure. ● I can use volume formulas for cylinders, pyramids, cones, and spheres to solve contextual problems.	● Topic 11-1 ● Exploration: Euler's Formula (MILC) ● Topic 11-2 ● Topic 11-3 ● Topic 11-4 ● 3 ACT Math Task: "Box 'em Up" General Prism: $V = Bh$ Right Circular Cylinder: $V = \pi r^2 h$ Pyramid: $V = \frac{1}{3}Bh$ Right Circular Cone: $V = \frac{1}{3}\pi r^2 h$ Sphere: $V = \frac{4}{3}\pi r^3$

Attending to the Standards for Mathematical Practice

- As students analyze volume formulas, they look for relationships between the shapes and the related formulas (MP.7).
- Students critique different explanations or justifications for the formulas (MP.3).
- Students recognize various situations for which these formulas would apply and use them to solve real-world problems, posing their own real-world problems when possible (MP.4).

Supporting Standards

KY.HS.G.26 (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. **MP.2, MP.5**

KY.HS.G.28 Identify the shapes of two-dimensional cross-sections of three-dimensional objects and identify three-dimensional objects generated by rotations of two-dimensional objects. **MP.5, MP.7**

KY.HS.G.29 Use geometric shapes, their measures, and their properties to describe objects in real-world settings. **MP.1, MP.4**

KY.HS.G.30 Apply concepts of density based on area and volume in modeling situations, using appropriate units of measurement. **MP.4, MP.6**

Vocabulary

cylinder, prism, pyramid, cone, sphere, hemisphere, area, volume, slant height, edge, vertex, side, altitude, cross section

•Euler's Formula

•Volume of the prism, cylinder, pyramid, cone, and sphere

*****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.