

# Unit 5: Two- and Three-Dimensional Geometry (Revised)

<b>Unit #:</b>	APSDO-00026350	<b>Duration:</b>	4.0 Week(s)	<b>Date(s)</b>	
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**Grade(s)**  
 7, 7 (Honors)

**Subject(s)**  
 Mathematics

## Unit Focus

In this unit, students will focus on angle measure, surface area, and volume. Students describe the two-dimensional figures that are the cross-sections of three-dimensional figures. Students develop formulas for surface area and volume of various solids and write conjecture to find the least surface area. Students in honors will solve higher-order application problems with a variety of unknowns. Students will need to make connections from other units on highly-conceptual problems. Primary instructional materials for this unit include Connected Math Project: Filling and Wrapping, CMP Common Core Supplemental Materials.

## Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
<p><b>Common Core</b>  <i>Mathematics: 7</i></p> <ul style="list-style-type: none"> <li>Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. <i>CCSS.MATH.CONTENT.7.G.A.3</i></li> <li>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. <i>CCSS.MATH.CONTENT.7.G.B.6</i></li> </ul>	<p><b>T1</b> (T10) Describe, classify, and compare objects/numbers and sets of objects/numbers.</p> <p><b>T2</b> (T41) Compose/decompose shapes or attributes to form new shapes.</p> <p><b>T3</b> (T44) Apply appropriate theorems and formulas to determine the unknown.</p> <p><b>T4</b> (T50) Based on an understanding of any problem, initiate a plan, execute it and evaluate the reasonableness of the solution.</p> <p><b>T5</b> (T51) Examine alternate methods to accurately and efficiently solve problems.</p> <p><b>T6</b> (T52) Use appropriate tools strategically to deepen understanding of mathematical concepts.</p> <p><b>T7</b> (T53) Articulate how mathematical concepts relate to one another in the context of a problem or in the theoretical sense.</p>	
	<b>Meaning</b>	
	<b>Understanding(s)</b>	<b>Essential Question(s)</b>

- Attend to precision. *CCSS.MATH.MP.6*
- Make sense of problems and persevere in solving them. *CCSS.MATH.MP.1*
- Reason abstractly and quantitatively. *CCSS.MATH.MP.2*

*Mathematics: 8*

- Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. *CCSS.MATH.CONTENT.8.G.C.9*

- U1** (U400) Objects in the world can be described by their shape.
- U2** (U401) Every shape has properties that define it.
- U3** (U406) Every geometric theorem or formula is an established relationship that can be applied to a specific set of figures.
- U4** (U410) Given a 2-D shape and its scale, mathematicians can compute its area and perimeter.
- U5** (U413) Given a 3-D shape and its scale, mathematicians can compute its surface area and volume.
- U6** (U414) 3-D shapes can be categorized by the number and nature of their surfaces.
- U7** (U500) Effective problem solvers work to understand the problem before trying to solve it.
- U8** (U510) Every problem is a member of a category of problems that has a similar structure and set of characteristics.
- U9** (U550) Attention to detail, such as specifying units of measure and labeling, leads to clarity in expressing mathematical information.

- Q1** (Q400) What kinds of attributes/characteristics would I use to describe this object? What category do they belong to?
- Q2** (Q401) How do these shapes (categories of shapes) compare with one another?
- Q3** (Q405) How do I use measurements about the shape to calculate additional information about it?
- Q4** (Q406) What is the theorem/formula necessary to solve this problem? (Gr. 5-12)
- Q5** (Q407) How much space does this shape (2-D and 3-D) take up/enclose? (Gr. 5-12)
- Q6** (Q501) What do I picture/visualize when I look at this problem?
- Q7** (Q511) What characteristics/attributes define this type of problem?
- Q8** (Q550) Did I use clear language (symbols, labels, terms, units of measure and significant digits) to explain my reasoning to others?

### Acquisition of Knowledge and Skill

#### Knowledge

#### Skill(s)

##### **S1**

Apply strategies for finding surface area and volume

##### **S2**

Apply surface area and volume formulas

##### **S3**

Draw nets

##### **S4**

		<p>Draw 3-D sketches</p> <p><b>S5</b></p> <p>Solve problems involving surface area and volume</p> <p><b>S6</b></p> <p>Identify the volume relationship between cylinders, pyramids, spheres and cones</p> <p><b>S7</b></p> <p>Identify 2-D figures by slicing 3-D figures</p> <p><b>S8</b></p> <p>Understand volume is “filling”</p> <p><b>S9</b></p> <p>Understand surface area is “wrapping”</p> <p><b>S10</b></p> <p>Understand surface area may change, while volume stays the same for given situations (least surface area)</p> <p><b>S11</b></p> <p>Understand varying dimensions changes surface area and volume of cylinders and prisms</p>
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