

## Unit G - Area, Surface Area, Volume

### Overview

This short unit on area, surface area and volume gives students an opportunity to apply the Geometry they have learned throughout the year. Formulas are provided to students so they focus can be on application and complex thinking rather than recall of formulas. Students solve a variety of application problems that involve surface area, area and/or volume.

**21<sup>st</sup> Century Capacities:** Analyzing, Presentation

### Stage 1 - Desired Results

<p><b>ESTABLISHED GOALS/ STANDARDS</b></p> <p><b>MP 1</b> Make sense of problems and persevere in solving them</p> <p><b>MP3</b> Construct viable arguments and critique the reasoning of others</p> <p><b>MP6</b> Attend to precision</p> <p><b>MP7</b> Look for and make use of structure</p> <p>CCSS.MATH.CONTENT.HSA.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.</p> <p>CCSS.MATH.CONTENT.HSA.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.</p> <p>CCSS.MATH.CONTENT.HSG.GMD.A.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle,</p>	<div style="background-color: #D3D3D3; text-align: center; padding: 5px;"><b>Transfer:</b></div> <p><i>Students will be able to independently use their learning in new situations to...</i></p> <ol style="list-style-type: none"> <li>1. Draw conclusions about graphs, shapes, equations, or objects. (Presentation)</li> <li>2. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (Analyzing)</li> <li>3. Apply familiar mathematical concepts to a new problem or apply a new concept to rework a familiar problem.</li> </ol> <div style="background-color: #D3D3D3; text-align: center; padding: 5px;"><b>Meaning:</b></div> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top; padding: 5px;"> <p><b>UNDERSTANDINGS:</b> <i>Students will understand that:</i></p> <ol style="list-style-type: none"> <li>1. Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.</li> <li>2. Mathematicians apply the mathematics they know to solve problems occurring in everyday life.</li> <li>3. Mathematicians use geometric models, and spatial sense to interpret and make sense of the physical environment.</li> </ol> </td> <td style="width: 50%; border: none; vertical-align: top; padding: 5px;"> <p><b>ESSENTIAL QUESTIONS:</b> <i>Students will explore &amp; address these recurring questions:</i></p> <ol style="list-style-type: none"> <li>A. How can I break a problem down into manageable parts?</li> <li>B. Does this solution make sense? If not, what do I do?</li> <li>C. How can I use what I know in the world?</li> </ol> </td> </tr> </table>	<p><b>UNDERSTANDINGS:</b> <i>Students will understand that:</i></p> <ol style="list-style-type: none"> <li>1. Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.</li> <li>2. Mathematicians apply the mathematics they know to solve problems occurring in everyday life.</li> <li>3. Mathematicians use geometric models, and spatial sense to interpret and make sense of the physical environment.</li> </ol>	<p><b>ESSENTIAL QUESTIONS:</b> <i>Students will explore &amp; address these recurring questions:</i></p> <ol style="list-style-type: none"> <li>A. How can I break a problem down into manageable parts?</li> <li>B. Does this solution make sense? If not, what do I do?</li> <li>C. How can I use what I know in the world?</li> </ol>
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## Geometry Level 2 Curriculum

volume of a cylinder, pyramid, and cone.	<b>Acquisition:</b>	
	<i>Students will know...</i>	<i>Students will be skilled at...</i>
<p>CCSS.MATH.CONTENT.HSG.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).*</p> <p>CCSS.MATH.CONTENT.HSG.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*</p> <p>CCSS.MATH.CONTENT.HSG.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*</p>	<ol style="list-style-type: none"> <li>1. The formulas for the area of a rectangle, parallelogram, triangle, trapezoid, circle</li> <li>2. That the volume of a cone (or pyramid) with an equal base and height of a cylinder (or prism) is <math>\frac{1}{3}</math> the volume of the cylinder (or prism)</li> <li>3. Changing the length of a side by <math>k</math> changes the area by <math>k^2</math> and the volume by <math>k^3</math></li> <li>4. Vocabulary: bases, faces, edges, lateral faces, slant height, lateral edges</li> </ol>	<ol style="list-style-type: none"> <li>1. Applying formulas to solve problems about surface area, area and volume</li> <li>2. Using nets to find surface area of 3D objects</li> <li>3. Converting between cubic inches and cubic feet, square inches and square feet or other similar conversions</li> </ol>