

**Mathematics**  
**Geometry CP**  
**Unit 9: Area and Volume of Solids**

<b>Essential Understandings</b>	<ul style="list-style-type: none"> <li>▪ Area and volume of solids have many real-life applications.</li> </ul>
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>▪ What is surface area?</li> <li>▪ What is lateral area?</li> <li>▪ What is volume?</li> <li>▪ What are some of the basic geometric solids?</li> <li>▪ How do we find areas and volumes of geometric solids?</li> <li>▪ How can we use area and volume to solve other real-life situations?</li> <li>▪ What are similar solids?</li> <li>▪ What is the relationship between the areas and the volumes of similar solids?</li> </ul>
<b>Essential Knowledge</b>	<ul style="list-style-type: none"> <li>▪ Surface area measures the area of the two-dimensional boundary of the three-dimensional figure.</li> <li>▪ Volume measures the space “inside” the three-dimensional figure.</li> </ul>
<b>Vocabulary</b>	<p><u>Terms:</u></p> <ul style="list-style-type: none"> <li>○ prism, pyramid, cylinder, cone, sphere, great circle, hemisphere, height, lateral height, slant height, area of the base, lateral area, total surface area, volume, similar solids</li> </ul>
<b>Essential Skills</b>	<ul style="list-style-type: none"> <li>▪ Find the lateral area, total surface area, and volume of prisms, pyramids, cylinders, cones, spheres, and hemispheres.</li> <li>▪ Find the surface area and/or volume of solids that are formed by combining other solids (examples: a cone with a hemisphere, or a sphere inscribed in a cylinder).</li> <li>▪ Use proportions to find the areas and volumes of similar solids.</li> </ul>

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<b>Related Maine Learning Results</b>	<p><u>Mathematics</u>  C. Geometry  Geometric Figures  C1.Students justify statements about polygons and solve problems.</p> <ol style="list-style-type: none"> <li>a. Use the properties of triangles to prove theorems about figures and relationships among figures.</li> <li>b. Solve for missing dimensions based on congruence and similarity.</li> <li>c. Use the Pythagorean Theorem in situations where right triangles are created by adding segments to figures.</li> <li>d. Use the distance formula.</li> </ol> <p>C2.Students justify statements about circles and solve problems.</p> <ol style="list-style-type: none"> <li>a. Use the concepts of central and inscribed angles to solve problems and justify statements.</li> <li>b. Use relationships among arc length and circumference, and areas of circles and sectors to solve problems and justify statements.</li> </ol> <p>C3.Students understand and use basic ideas of trigonometry.</p> <ol style="list-style-type: none"> <li>a. Identify and find the value of trigonometric ratios for angles in right triangles.</li> <li>b. Use trigonometry to solve for missing lengths in right triangles.</li> <li>c. Use inverse trigonometric functions to find missing angles in right triangles.</li> </ol> <p>Geometric Measurement  C4.Students find the surface area of three-dimensional figures.</p> <ol style="list-style-type: none"> <li>a. Find the volume and surface area of three-dimensional figures including cones and spheres.</li> <li>b. Determine the effect of changes in linear dimensions on the volume and surface area of similar and other three-dimensional figures.</li> </ol>
<b>Sample Lessons And Activities</b>	<ul style="list-style-type: none"> <li>▪ Give the class various three-dimensional figures and the cost of materials in dollars per square unit. Ask them to calculate the cost to fabricate the figure.</li> </ul>
<b>Sample Classroom Assessment Methods</b>	<ul style="list-style-type: none"> <li>▪ In class work on the overhead and board to model work</li> <li>▪ Group work with other students which is evaluated by peers</li> <li>▪ Quizzes</li> <li>▪ Tests</li> <li>▪ Take-home worksheets and tests</li> </ul>
<b>Sample Resources</b>	<ul style="list-style-type: none"> <li>▪ <u>Publications:</u> <ul style="list-style-type: none"> <li>▪ <u>Geometry</u> - McDougal Littell</li> <li>○ <u>Geometry: Concepts and Skills</u> - McDougal Littell</li> </ul> </li> </ul>

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