

### 3D Figures

#### 10.1 Investigate Cross Sections and Rotations

	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
<b>Identify objects (G.GMD.4)</b>	<p>Can extend thinking beyond the standard, including tasks that may involve one of the following:</p> <ul style="list-style-type: none"> <li>• Designing</li> <li>• Connecting</li> <li>• Synthesizing</li> </ul>	<p>Identify the shapes of two dimensional cross sections of three dimensional objects <b>and</b> identify three dimensional objects generated by rotations of two dimensional objects.</p>	<p>Identify the shapes of two dimensional cross sections of three dimensional objects <u>or</u> identify three dimensional objects generated by rotations of two dimensional objects.</p>		<p>Little evidence of reasoning or application to solve the problem</p> <p>Does not meet the criteria in a level 1</p>
<b>Use Shapes (G.MG.1} Solve design problems (G.MG.3)</b>	<ul style="list-style-type: none"> <li>• Applying</li> <li>• Justifying</li> <li>• Critiquing</li> <li>• Analyzing</li> <li>• Creating</li> <li>• Proving</li> </ul>	<p>Describe objects in context of a situation using geometric shapes their measures, and properties <b>and use them to solve problems related to</b></p>	<p>Describe objects in context of a situation using geometric shapes, <b>their measures, and properties</b></p>	<p>Describe objects in context of a situation using geometric shapes</p>	

G.GMD.4 Identify the shapes of two dimensional cross sections of three dimensional objects, and identify three dimensional objects generated by rotations of two dimensional objects.

G.MG.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). ★

G.MG.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). ★

### 3D Figures

#### 10.2 Develop and apply volume formulas

	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
<p><b>Use Shapes and apply density concepts (G.MG.1, G.MG.2) Solve design problems (G.MG.3)</b></p>	<p>Can extend thinking beyond the standard, including tasks that may involve one of the following:</p> <ul style="list-style-type: none"> <li>• Designing</li> <li>• Connecting</li> </ul>	<p>Describe objects in context of a situation using geometric shapes and use them to solve problems related to</p> <ul style="list-style-type: none"> <li>• <u>density based</u> on area and volume</li> <li>• design problems (ie. maximum volume, minimum cost, etc.)</li> </ul>	<p>Describe objects in context of a situation using geometric shapes and use them to solve problems related to</p> <ul style="list-style-type: none"> <li>• area and volume</li> <li>• <u>design problems</u></li> </ul>	<p>Describe objects in context of a situation using geometric shapes and use them to solve problems related to</p> <ul style="list-style-type: none"> <li>• <u>area and volume</u></li> </ul>	<p>Little evidence of reasoning or application to solve the problem</p> <p>Does not meet the criteria in a level 1</p>
<p><b>Explain Formulas (G.GMD.1)</b></p> <p><b>Use Volume Formulas (G.GMD.3)</b></p>	<ul style="list-style-type: none"> <li>• Synthesizing</li> <li>• Applying</li> <li>• Justifying</li> <li>• Critiquing</li> <li>• Analyzing</li> <li>• Creating</li> <li>• Proving</li> </ul>	<p>Explain the formulas for <u>all of the following</u></p> <ul style="list-style-type: none"> <li>• volume of a cylinder</li> <li>• volume of a pyramid</li> <li>• volume of a cone</li> </ul> <p>using dissection arguments, cross sections of three dimensional objects, and Cavalieri’s principle</p> <p>Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems in context of a situation.</p>	<p>Explain the formulas for <u>2 of the following</u></p> <ul style="list-style-type: none"> <li>• volume of a cylinder</li> <li>• volume of a pyramid</li> <li>• volume of a cone</li> </ul> <p>using dissection arguments, cross sections of three dimensional objects, and Cavalieri’s principle</p> <p>Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems <u>in context of a situation.</u></p>	<p>Explain the formulas <u>for 1 of the following</u></p> <ul style="list-style-type: none"> <li>• volume of a cylinder</li> <li>• volume of a pyramid</li> <li>• volume of a cone</li> </ul> <p>using dissection arguments, cross sections of three dimensional objects, and Cavalieri’s principle</p> <p><u>Use volume formulas</u> for cylinders, pyramids, cones, and spheres to solve problems</p>	

G.MG.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). ★

G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). ★

G.MG.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). ★

G.GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri’s principle, and *informal limit arguments*.

G.GMD.2 (+) Give an informal argument using Cavalieri’s principle for the formulas for the volume of a sphere and other solid figures.

G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. ★