

#### Vertical Progression:

5 <sup>th</sup> Grade	<p><b>5.MD.C Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.</b></p> <ul style="list-style-type: none"> <li>○ <b>5.MD.C.5</b> Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</li> <li>○ <b>5.MD.C.5.a</b> Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.</li> <li>○ <b>5.MD.C.5.b</b> Apply the formulas <math>V = l \times w \times h</math> and <math>V = b \times h</math> for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.</li> <li>○ <b>5.MD.C.5.c</b> Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.</li> </ul>
6 <sup>th</sup> Grade	<p><b>ELG 6.8 Solve real-world and mathematical problems involving area, surface area, and volume.</b></p> <ul style="list-style-type: none"> <li>○ <b>6.G.A.1</b> Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.</li> <li>○ <b>6.G.A.2</b> Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas <math>V = l w h</math> and <math>V = b h</math> to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.</li> <li>○ <b>6.G.A.4</b> Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.</li> </ul>
7 <sup>th</sup> Grade	<p><b>ELG 7.6 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.</b></p> <ul style="list-style-type: none"> <li>○ <b>7.G.B.4</b> Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.</li> <li>○ <b>7.G.B.5</b> Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.</li> <li>○ <b>7.G.B.6</b> 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.</li> </ul>
8 <sup>th</sup> Grade	<p><b>ELG 8.9 Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.</b></p> <ul style="list-style-type: none"> <li>○ <b>8.G.C.9</b> Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</li> </ul>

#### Students will demonstrate command of the ELG by:

- Knowing the formulas for the area and circumference of a circle and using them to solve problems.
- Showing the relationship between the circumference and area of a circle.
- Writing and solving equations to find an unknown angle in a figure using supplementary, complementary, vertical and adjacent angles.
- Solving real-world problems involving area, volume, and surface area of objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

#### Vocabulary:

- |                        |                        |                     |
|------------------------|------------------------|---------------------|
| • adjacent angles      | • polygon              | • three-dimensional |
| • area of circle       | • quadrilateral        | • two-dimensional   |
| • circumference        | • right prism          | • vertical angles   |
| • complementary angles | • supplementary angles |                     |
| • cube                 | • surface area         |                     |

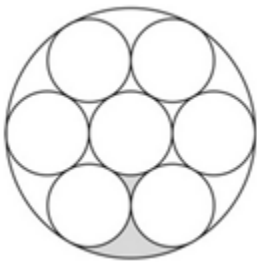
#### Sample Instructional/Assessment Tasks:

##### 1) Standard(s): 7.G.B.4

Source: <https://www.illustrativemathematics.org/content-standards/7/G/B/4/tasks/34>

##### Item Prompt:

The figure below is composed of eight circles, seven small circles and one large circle containing them all. Neighboring circles only share one point, and two regions between the smaller circles have been shaded. Each small circle has a radius of 5 cm.



Calculate:

- The area of the large circle.
- The area of the shaded part of the figure.

##### Correct answer(s)

- Area(large circle)= $225\pi$  cm<sup>2</sup>
- Area (shaded) =  $\frac{25\pi}{3}$  cm<sup>2</sup>

#### 2) Standard(s): 7.G.B.6

- 1) Source: <https://www.illustrativemathematics.org/content-standards/7/G/B/6/tasks/266>

**Item Prompt:**

The 7th graders at Sunview Middle School were helping to renovate a playground for the kindergartners at a nearby elementary school. City regulations require that the sand underneath the swings be at least 15 inches deep. The sand under both swing sets was only 12 inches deep when they started.

The rectangular area under the small swing set measures 9 feet by 12 feet and required 40 bags of sand to increase the depth by 3 inches. How many bags of sand will the students need to cover the rectangular area under the large swing set if it is 1.5 times as long and 1.5 times as wide as the area under the small swing set?

**Correct Answer:**

90 bags of sand