

### ELG 6.8: Solve real-world and mathematical problems involving area, surface area, and volume.

#### Vertical Progression:

4 <sup>th</sup> Grade	<p><b>4.MD.A Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</b></p> <ul style="list-style-type: none"> <li>○ <b>4.MD.A.3</b> Apply the area and perimeter formulas for rectangles in real world and mathematical problems.</li> </ul>
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.4</b> Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.</li> <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> <p><b>5.G.A Graph points on the coordinate plane to solve real-world and mathematical problems.</b></p> <ul style="list-style-type: none"> <li>○ <b>5.G.A.2</b> Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.</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.3</b> Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques 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> </ul>

### ELG 6.8: Solve real-world and mathematical problems involving area, surface area, and volume.

- **7.G.B.6** 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.

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

- Finding the area of any triangle.
- Finding the area of rectangles, parallelograms, rhombi, squares.
- Finding the area of other figures that can be decomposed into triangles or quadrilaterals.
- Solving real-world and mathematical problems involving area, surface area, and volume.
- Finding the volume of a right rectangular prism with fractional edge lengths.
- Applying the volume formulas to solve problems.
- Drawing nets for three-dimensional figures made up of rectangles and triangles and using these to find the surface area.
- Plotting the vertices of a polygon in the coordinate plane and find the lengths of horizontal and/or vertical sides.

#### Vocabulary:

- altitude
- area
- base
- decompose
- net
- parallelogram
- polygon
- quadrilateral
- rectangular prism
- right prism
- rhombus
- surface area
- vertex
- volume

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**Sample Instructional/Assessment Tasks:**

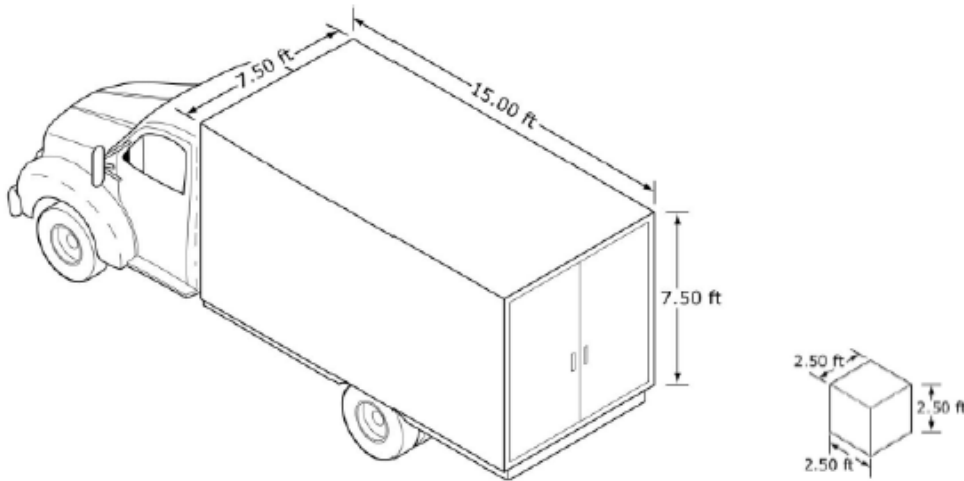
**1) Standard(s): Standard: 6.G.2**

**Source:** Smarter Balanced released item

**Item Prompt:**

Cube-shaped boxes will be loaded into the cargo hold of a truck.

- The edges of each box measure 2.5 feet.
- The cargo hold of the truck is in the shape of a rectangular prism.
- The dimensions of the cargo hold are 7.5 feet by 15.0 feet by 7.5 feet.



- What is the volume, in cubic feet, of the cargo hold of the truck?
- How many boxes will it take to completely fill the cargo hold of the truck?

**Correct Answer:**

843.7 cubic feet, 54 boxes

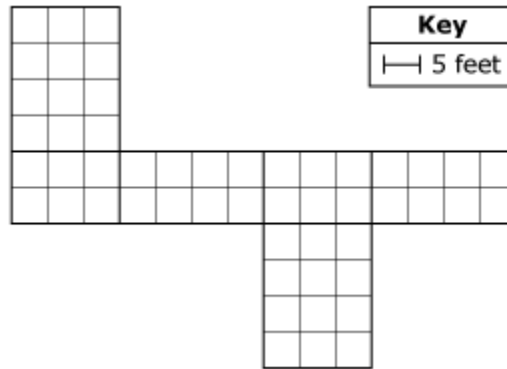
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2) Standard(s): 6.G.4

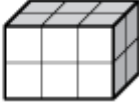

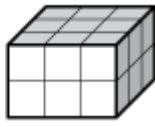
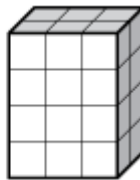
Source: [www.parconline.org](http://www.parconline.org)

**Item Prompt:**

This is a net of a right-rectangular prism.



Part A: Which prism can be made using the net?

- A. 
- B. 
- C. 
- D. 

Part B

What is the surface area, in square feet, of the prism?

square feet

**Solution:**

D; 1300 square feet