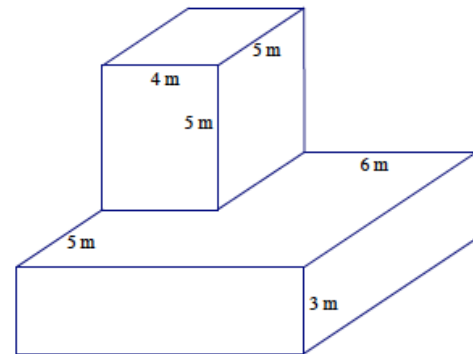# Lesson 26: Volume of Composite Three-Dimensional Objects
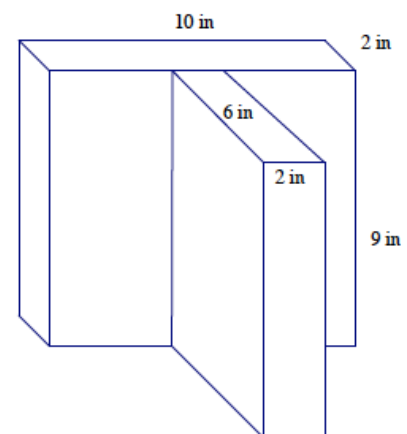
Classwork

Example 1

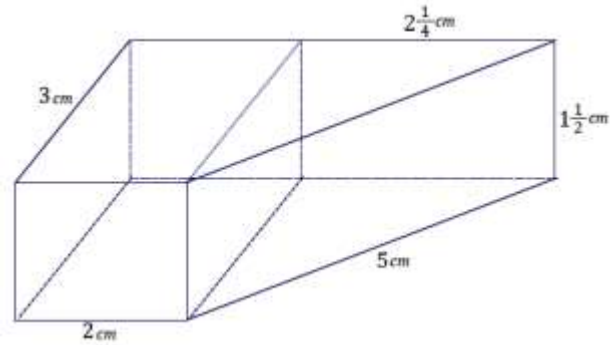Find the volume of the following three-dimensional object composed of two right rectangular prisms.

Exercise 1

Find the volume of the following three-dimensional figure composed of two right rectangular prisms.
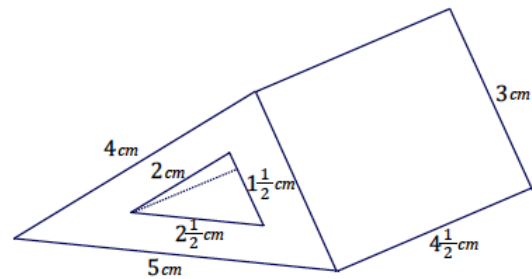
Exercise 2

The right trapezoidal prism is composed of a right rectangular prism joined with a right triangular prism. Find the volume of the right trapezoidal prism shown in the diagram using two different strategies.


Example 2

Find the volume of the right prism shown in the diagram whose base is the region between two right triangles. Use two different strategies.

Example 3

A box with a length of 2 ft., a width of 1.5 ft., and a height of 1.25 ft. contains fragile electronic equipment that is packed inside a larger box with three inches of styrofoam cushioning material on each side (above, below, left side, right side, front, and back).

    a. Give the dimensions of the larger box.

    b. Design styrofoam right rectangular prisms that could be placed around the box to provide the cushioning; i.e., give the dimensions and how many of each size are needed.

    c. Find the volume of the styrofoam cushioning material by adding the volumes of the right rectangular prisms in the previous question.

    d. Find the volume of the styrofoam cushioning material by computing the difference between the volume of the larger box and the volume of the smaller box.

Problem Set

1. Find the volume of the three-dimensional object composed of right rectangular prisms.
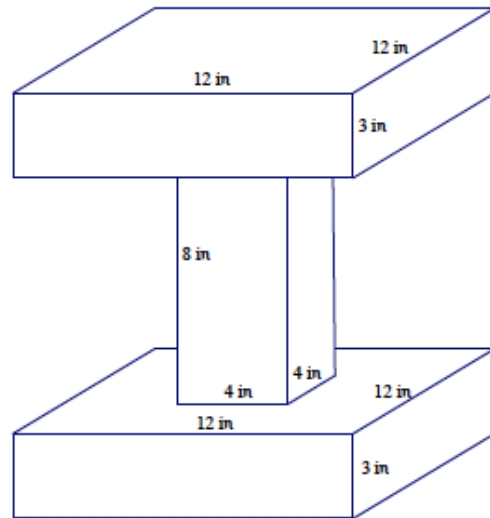
2. A smaller cube is stacked on top of a larger cube. An edge of the smaller cube measures $\frac{1}{2}$ cm in length, while the larger cube has an edge length three times as long. What is the total volume of the object?
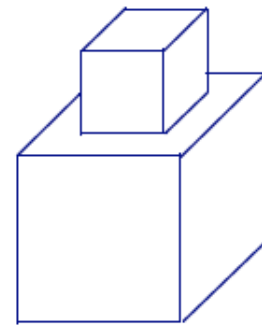
3. Two students are finding the volume of a prism with a rhombus base but are provided different information regarding the prism. One student receives Figure 1, while the other receives Figure 2.
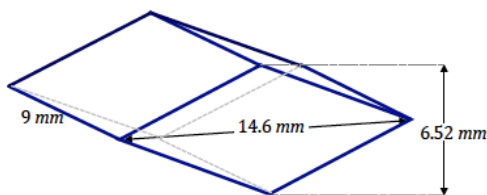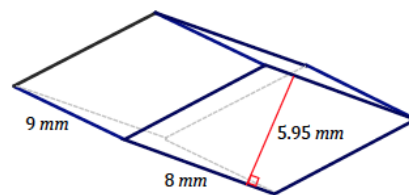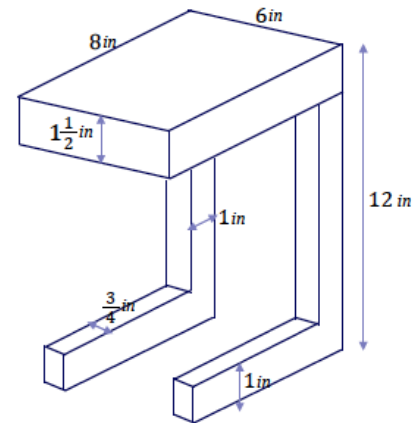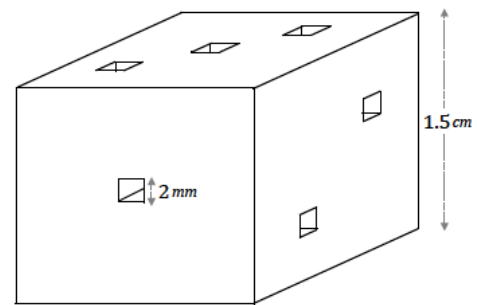

Figure 1

Figure 2

   a. Find the expression that represents the volume in each case; show that the volumes are equal.

   b. How does each calculation differ in the context of how the prism is viewed?

4. Find the volume of wood needed to construct the following side table composed of right rectangular prisms.

5. A plastic die (singular for dice) of a game has an edge length of 1.5 cm. Each face of the cube has the number of cubic cut outs as its marker is supposed to indicate (i.e., the face marked 3 has 3 cut outs). What is the volume of the die?

6. A wooden cube with edge length 6 inches has square holes (holes in the shape of right rectangular prisms) cut through the centers of each of the three sides as shown in the figure. Find the volume of the resulting solid if the square for the holes has an edge length of 1 inch.
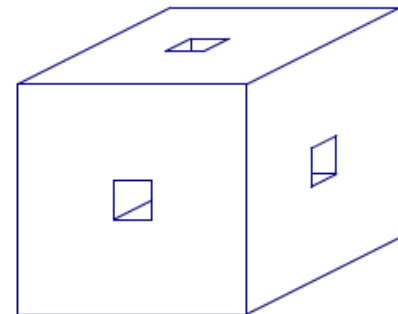
7. A right rectangular prism has each of its dimensions (length, width, and height) increased by 50%. By what percent is its volume increased?

8. A solid is created by putting together right rectangular prisms. If each of the side lengths is increase by 40%, by what percent is the volume increased?