

## 6.2a

# Volume of a Cuboid

### Objectives

- ◆ Use a formula to find the volume of a cuboid (rectangular prism).

### Note

This lesson should seem a natural extension of the previous lessons. Students may have already derived the formula for a cuboid or rectangular prism from the experience with cubes. Finding the volume given just the measurements for each side is more abstract than seeing the cubes.

### Introduce formula

Use multilink cubes or other cubes. Form a rectangle with a single layer of 4 cubes by 2 cubes. Ask students for its volume. Point out that we can find the volume by multiplying the number of cubes along the length by the number of cubes along the width. Also point out that the height is 1 unit.

Add another layer and ask for the volume. Since we know how much is in one layer, we can find the number in both layers by multiplying the number of cubes on one layer by 2.

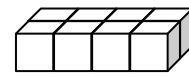
Add another layer and ask for the volume. There are now 3 layers with  $4 \times 2$  in each layer.

The length is 4 units, the width is 2 units, and the height is 3 units. We can find the volume by multiplying these measurements together.

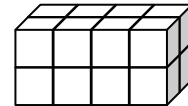
Point out that the order in which we multiply the sides, i.e., which side we take as the first layer, does not matter. It could be the layer on one side or the front instead of the bottom or top.

For example, if we had a height of 5 cubes, we could multiply the height by the width first.  $5 \times 2 \times 4 = 10 \times 4 = 40$ . This is a little easier to calculate mentally than  $4 \times 2 \times 5 = 8 \times 5 = 40$ .

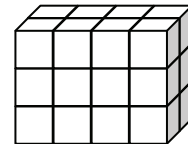
You can repeat with other examples.



Number of cubes:  
 $4 \times 2 \times 1 = 8$

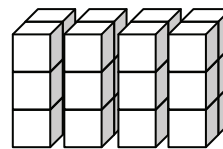


Number of cubes:  
 $4 \times 2 \times 2 = 16$

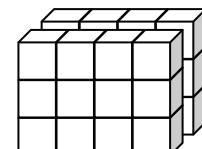


Number of cubes:  
 $4 \times 2 \times 3 = 24$

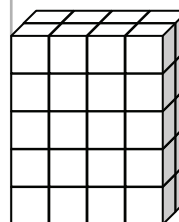
Volume = length  $\times$  width  $\times$  height  
= 4 units  $\times$  2 units  $\times$  3 units  
= 24 cubic units



$2 \times 3 = 6$   
 $6 \times 4 = 24$



$4 \times 3 = 12$   
 $12 \times 2 = 24$



$5 \times 2 = 10$   
 $10 \times 4 = 40$   
Volume = 40 cubic units