

# Unit 1 Family Materials

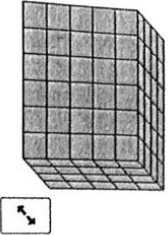
## Finding Volume

### Finding Volume

In this unit, students find the volume of rectangular prisms and figures composed of two prisms.

### Section A: Unit Cubes and Volume

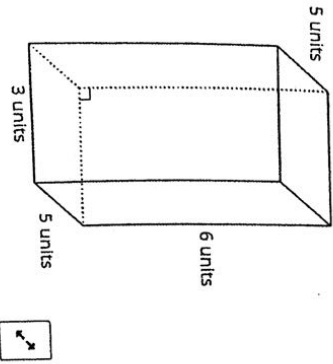
In this section, students learn to call the amount of space an object takes up volume. Volume is measured in cubes. For example, this prism has a volume of 120 cubes.



To find the volume of any prism, students can find the number of cubes in one layer and multiply that number by the number of layers. In this example, students might describe this prism as having 5 layers of 24 cubes. They can find the number of cubes by multiplying 5 and 24. So,  $5 \times 24 = 120$ .

### Section B: Expressions for Finding Volume

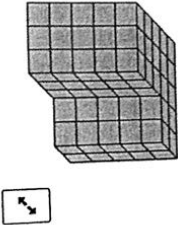
In this section, students find the volume of a rectangular prism by multiplying the side lengths or by multiplying the area of the base by the height.



For example they can multiply the length by width by height, or  $3 \times 5 \times 6$  or they can find the bottom area by multiplying  $3 \times 5$  to get 15 and then multiplying 15 by 6. The volume of this rectangular prism is 90 cubic units.

### Section C: Volume of Solid Figures

In this section, students learn that some figures are made from two rectangular prisms. They break apart these figures and find the volume of each prism. Then, they add the volumes of the two prisms to find the total volume of the figure.

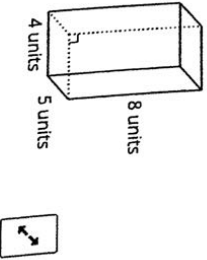
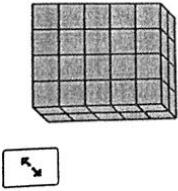


Depending on how they break it apart, they can find the volume in different ways. They could multiply in these ways to find the volume of the figure:

$$(3 \times 3 \times 5) + (5 \times 2 \times 5)$$
$$(3 \times 5 \times 5) + (2 \times 2 \times 5)$$

Try it at home!

Near the end of the unit, find the volume of these figures with your student.



Questions that may be helpful as they work:

- How are the 2 problems the same? How are they different?
- Can you explain or show me how you found the volume?
- How did you know you needed that number or piece of information?

**Area**  
The number of square units that cover a flat figure without gaps or overlaps.

**Cubic Unit**  
A unit cube with side lengths that are standard measurement units that is used to measure volume.

cubic units  
cubic inches in<sup>3</sup>  
cubic meters m<sup>3</sup>  
cubic centimeters cm<sup>3</sup>

**Rectangular Prism**  
A solid figure which has six faces that are rectangles.

**Unit Cube**  
A cube whose sides are 1 unit long, used to measure volume.

**Volume**  
The number of unit cubes that fill a solid figure without gaps or overlap.

**Layers**  
**Side Layers**

**Volume = L x W x H**

**面积**  
miàn jī

**体积单位-立方**  
tǐ jī dān wèi - lì fāng

cubic units  
cubic inches in<sup>3</sup>  
cubic meters m<sup>3</sup>  
cubic centimeters cm<sup>3</sup>

长方体  
cháng fāng tǐ

六个面都是长方形。  
diàn shù èr shí èr 是1的倍数。  
biān cháng fāng tǐ 的边长都是1的倍数。  
biān cháng fāng tǐ 的边长都是1的倍数。

**单位立方体**  
dān wèi lì fāng tǐ

**体积**  
tǐ jī

3x20=60个  
lì fāng tǐ 立方体

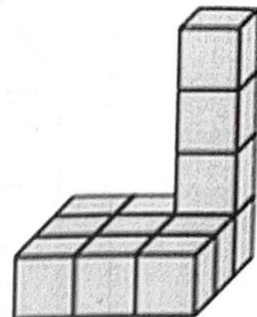
**层数**  
céng shù: 3层  
cáng

**体积 (V) = 长 (l) x 宽 (w) x 高 (h)**

## IM Fifth Grade Unit 1 Sample Questions

1. What is the volume of the figure? Explain or show your reasoning.

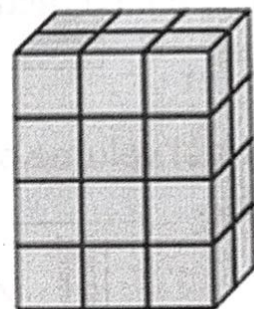
Solution : 12 cubes. Sample reasoning: The figure is made of 12 cubes so its volume is 12 cubes.



2. What is the volume of this rectangular prism? Explain or show your reasoning.

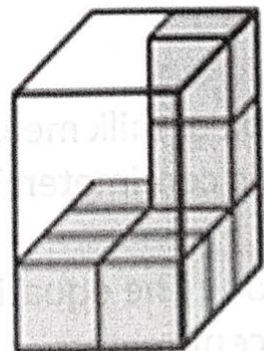
Solution : 24 cubes =  $4 \times 6$

There are 4 top to bottom layers and each layer has 6 cubes..



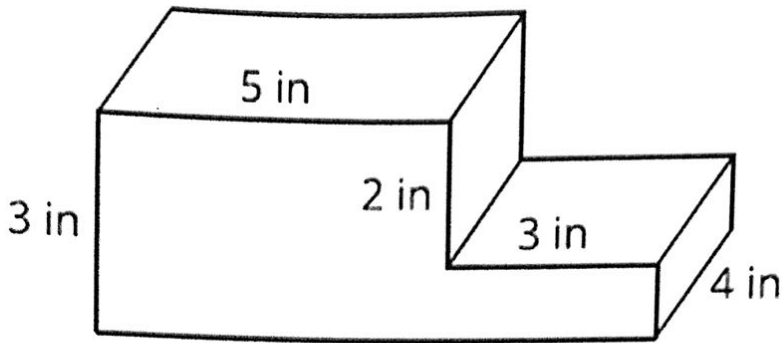
3. Find the volume of each rectangular prism. Explain or show your reasoning.

Solution : 18 cubes. Sample reasoning: There are  $3 \times 2$  or 6 cubes in each layer and 3 top to bottom layers so that's  $3 \times 6$  or 18 cubes.



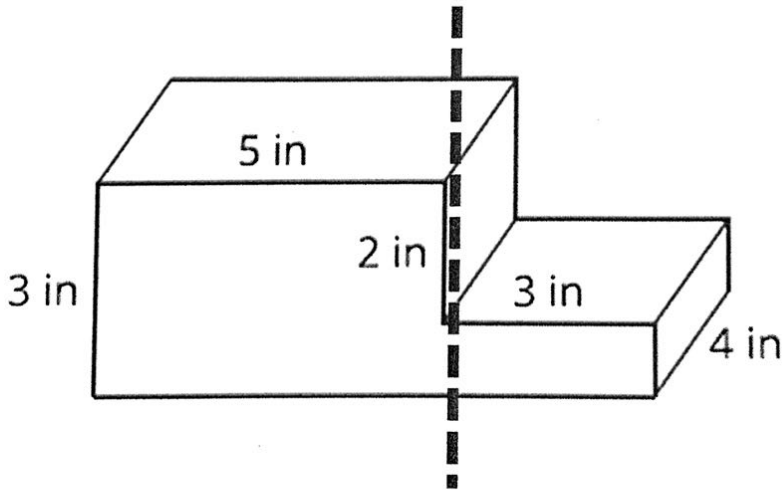
## Fifth Grade Unit 1 Sample Questions

Find the volume of the figure. Explain or show your reasoning.



Solution : I cut the figure into two prisms. The prism on the left side is a 5 inch by 3 inch by 4 inch rectangular prism whose volume is  $5 \times 3 \times 4$  or 60 cubic inches . The prism on the right side is a 3 inch by 1 inch by 4 inch rectangular prism whose volume is  $3 \times 1 \times 4$  or 12 cubic inches.

The total volume of the two prisms together is  $60 + 12 = 72$  cubic inches .



5. A box of milk measures 4 cm by 10 cm by 30 cm. What is its volume in cubic centimeters? Explain or show your reasoning.

Solution : The equation is  $4 \times 10 \times 30 = 1,200$  cubic centimeters.

## IM Fifth Grade Unit 1 Sample Questions

6. What is the volume of this figure? Explain or show your reasoning.

Solution : 64 cubic units. Sample response:

There are 4 layers of 3 by 5 so that is  $4 \times (3 \times 5)$   
or 60 and then 4 extra cubes in front.

top to bottom.

