

## VOLUMES OF RIGHT RECTANGULAR PRISMS

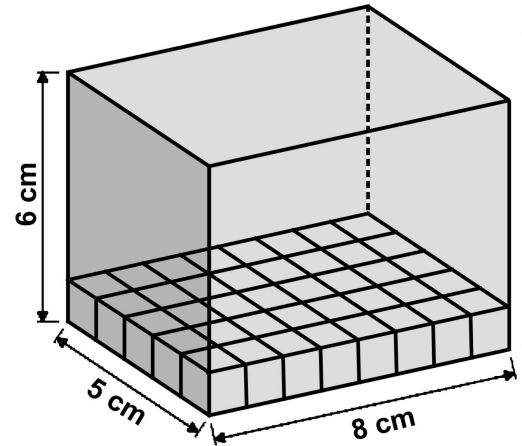
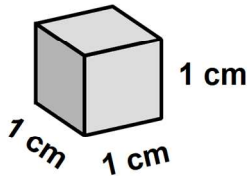
### N-GEN MATH<sup>®</sup> 6



**Volume**, like area, is a **measurement** of space. But, unlike area, **volume** measures space inside of a three-dimensional solid. We often measure the volume of a solid by determining the number of **unit cubes** that fit inside of it.

**Exercise #1:** A rectangular solid is shown below that has a layer of unit cubes in them that have edge lengths that measure 1 centimeter each. An enlarged picture of one such cube is shown.

**unit cube**

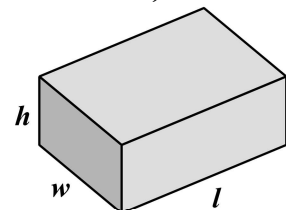


- (a) What is the volume of the small unit cube?
- (b) How many unit cubes lie in the single layer of the solid shown above? How did you determine this?
- (c) Your answer in (b) corresponds to what measurement of the **rectangular base** of this solid?
- (d) How many of these unit cubes will fill the entire solid?
- (e) What is the volume of the solid? Use appropriate units.

### THE VOLUME OF A RIGHT RECTANGULAR PRISM (A.K.A. BOX)

If  $l$ ,  $w$ , and  $h$  represent the length, width, and height of the right rectangular prism then:

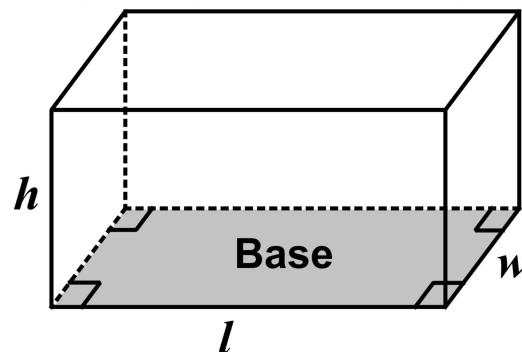
$$V = l \cdot w \cdot h \text{ or just } V = lwh$$



**Exercise #2:** The volume formula for a right rectangular solid is given by  $V = lwh$  as given on the previous page. Sometimes this formula is given as:

$$V = B \cdot h$$

where  $B$  represents the area of the base, which is shaded in the picture. Why are these two formulas the same?

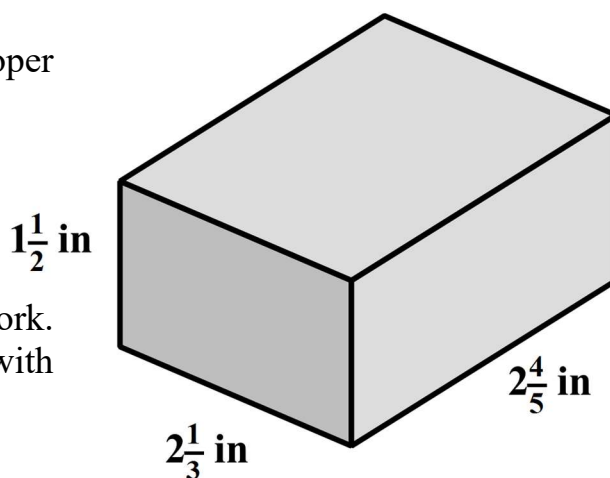


The volume formula for a right rectangular prism works regardless of whether the side lengths are whole numbers or fractions.

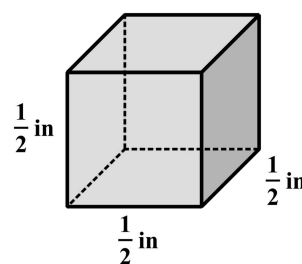
**Exercise #3:** The right rectangular prism shown below has edge lengths that include fractions.

(a) Change each of the solid's edge lengths into improper fractions.

(b) Find the volume of this solid. Show your work. Express your final answer as a mixed number with appropriate units.



**Exercise #4:** If a cube has edge lengths of  $\frac{1}{2}$  inch each, how many of these cubes would fit inside of a unit cube whose edge lengths are 1 inch each? Explain.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

**VOLUMES OF RIGHT RECTANGULAR PRISMS**  
**N-GEN MATH® 6 HOMEWORK**

**FLUENCY**

1. Each face of a right rectangular prism must be a

- (1) rectangle                      (3) square  
(2) triangle                        (4) hexagon

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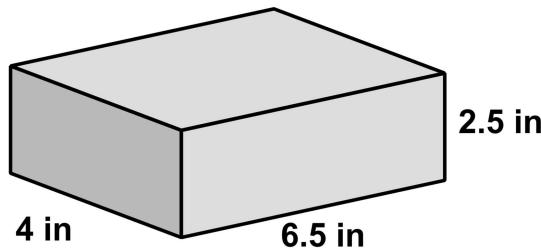
2. The volume of a right rectangular prism is given by the formula  $V = l \cdot w \cdot h$  and also given by  $V = B \cdot h$ . What do the variables  $B$  and  $h$  represent about the prism?

- (1)  $B$  is the perimeter of its base and  $h$  is its height  
(2)  $B$  is the length of its base and  $h$  is its height  
(3)  $B$  is the area of its base and  $h$  is its height  
(4)  $B$  is the depth of its base and  $h$  is its height

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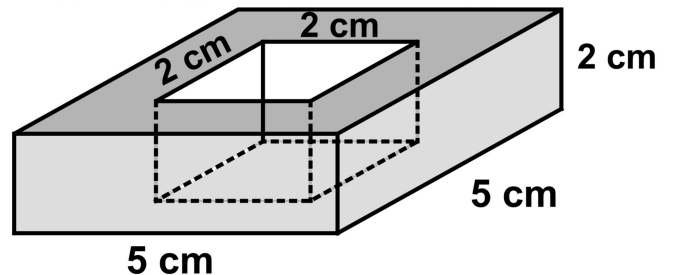
3. A right rectangular prism is shown below. It has a length of 6.5 inches, a width of 4 inches, and a height of 2.5 inches. Which of the following is its volume? Show your work!

- (1)  $28 \text{ in}^3$   
(2)  $35 \text{ in}^3$   
(3)  $48 \text{ in}^3$   
(4)  $65 \text{ in}^3$



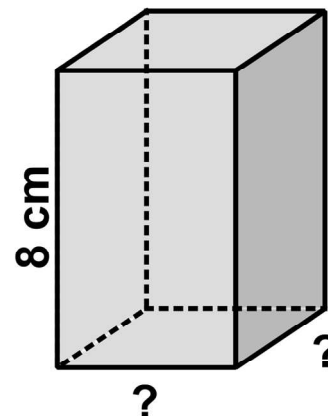
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4. A block of wood measures 5 centimeters by 5 centimeters by 2 centimeters as shown. It has a cube whose edges have lengths of 2 centimeters each removed from the center. How much volume of wood remains after removing the cube? Show your work and use correct units.



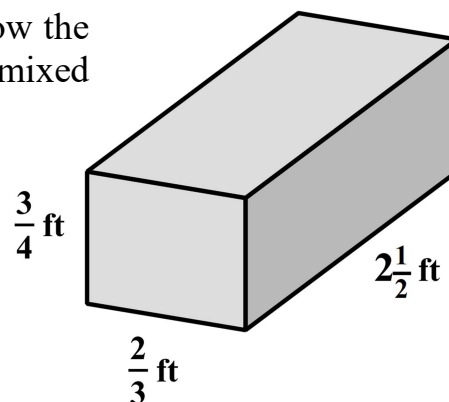
5. A right rectangular prism is shown that has a height of 8 centimeters. The side lengths of the rectangular base have unknown lengths, but the area of the base is 16 square centimeters.

(a) What is the volume of the prism? Show how you found your answer and use appropriate units.



(b) If we knew that the base was a square, how long would its missing side lengths be? Explain.

6. Find the volume of the right rectangular prism pictured. Show the work that leads to your answer. Express your answer in mixed number form and use appropriate units.



7. Which of the following solids below has the larger volume? Show your work to find both and then state which is largest.

