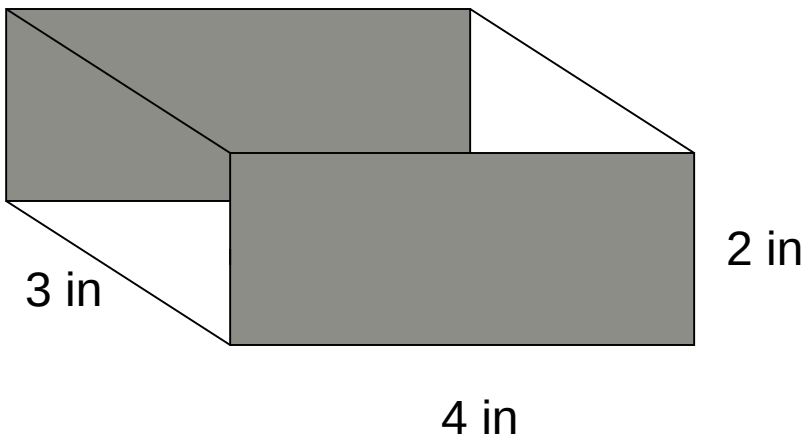
VOLUME OF PRISMS

Lesson 9-4

Volume

The *volume* of a three-dimensional figure is the amount that fills the figure. The volume is given in cubic units.

Consider this rectangular prism.



If we cut it into cubic units, it would look like this:

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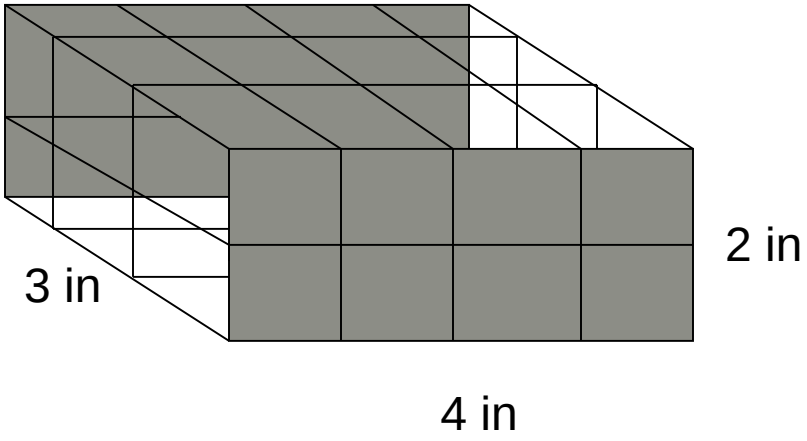


Volume of a Prism

Words The volume V of a prism is the product of the area of the base and the height of the prism.

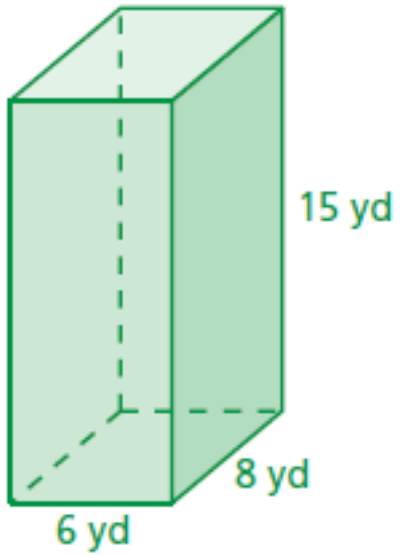
Algebra $V = Bh$

Area of base

Height of prism

EXAMPLE 1 Finding the Volume of a Prism

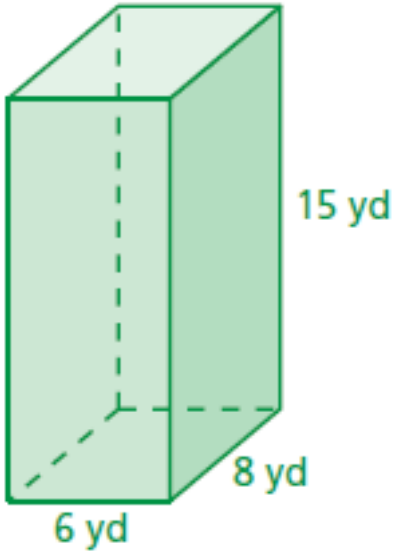
Find the volume of the prism.



EXAMPLE 1 Finding the Volume of a Prism

Find the volume of the prism.

$V = Bh$ Write formula for volume.

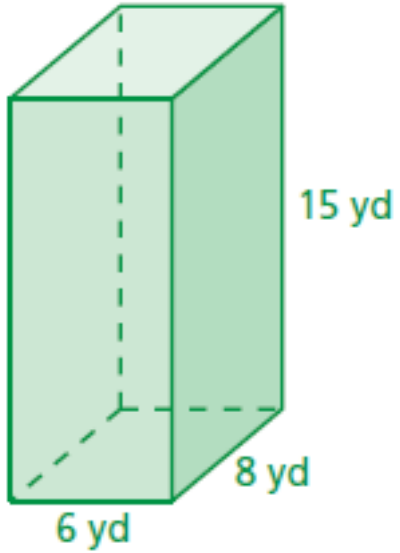


EXAMPLE 1 Finding the Volume of a Prism

Find the volume of the prism.

$V = Bh$ Write formula for volume.

$= 6(8) \cdot 15$ Substitute.



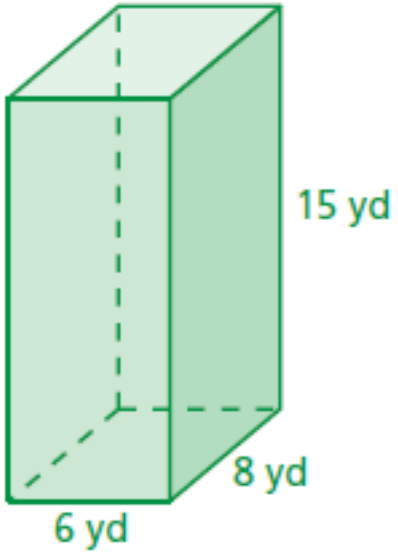
EXAMPLE 1 Finding the Volume of a Prism

Find the volume of the prism.

$V = Bh$ Write formula for volume.

$= 6(8) \cdot 15$ Substitute.

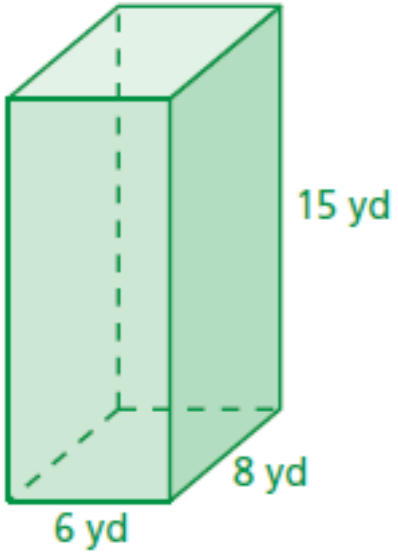
$= 48 \cdot 15$ Simplify.



EXAMPLE 1 Finding the Volume of a Prism

Find the volume of the prism.

$V = Bh$	Write formula for volume.
$= 6(8) \cdot 15$	Substitute.
$= 48 \cdot 15$	Simplify.
$= 720$	Multiply.



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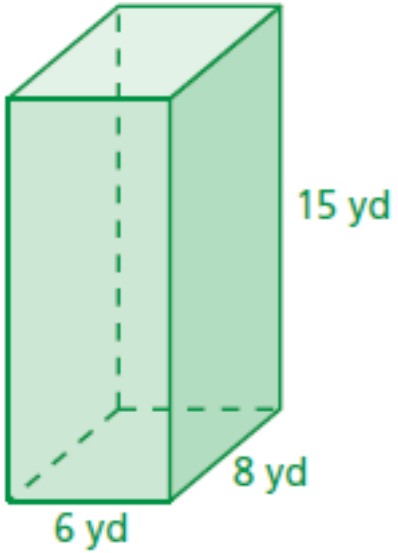
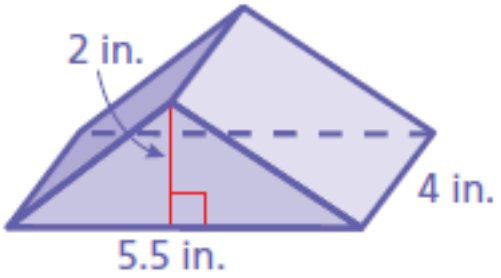


$V = Bh$	Write formula for volume.
$= 6(8) \cdot 15$	Substitute.
$= 48 \cdot 15$	Simplify.
$= 720$	Multiply.

The volume is 720 cubic yards.

EXAMPLE 2 Finding the Volume of a Prism

Find the volume of the prism.



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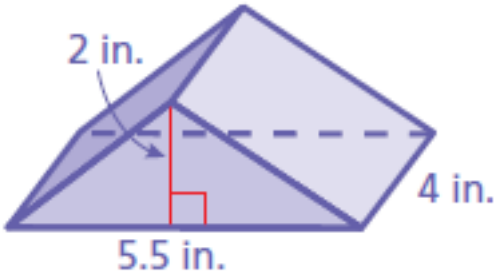
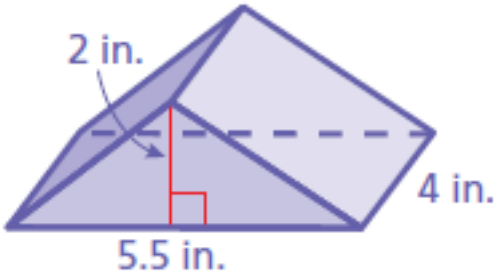


EXAMPLE 2 Finding the Volume of a Prism

Find the volume of the prism.

$V = Bh$ Write formula for volume.

$= \frac{1}{2}(5.5)(2) \cdot 4$ Substitute.



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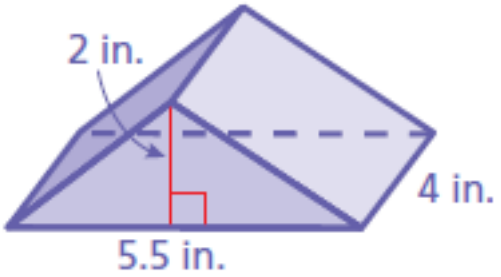

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$V = Bh$ Write formula for volume.

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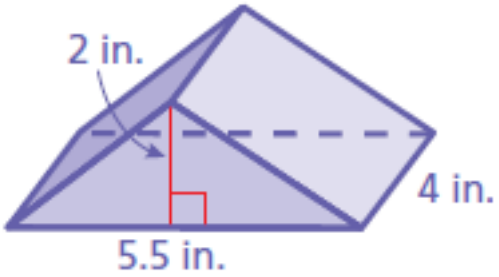
$= 5.5 \cdot 4$ Simplify.

$= 22$ Multiply.



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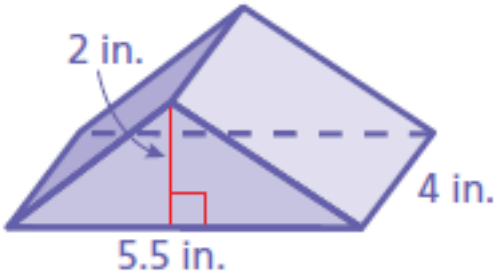
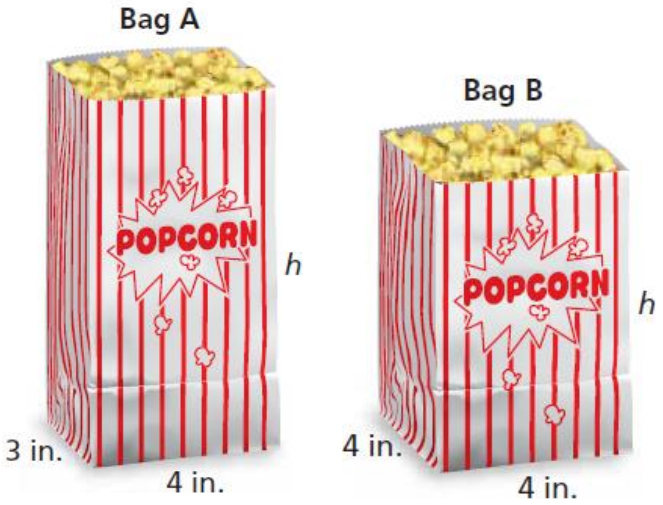


The volume is 22 cubic inches.

EXAMPLE 3 Real-Life Application

A movie theater designs two bags to hold 96 cubic inches of popcorn. (a) Find the height of each bag. (b) Which bag should the theater choose to reduce the amount of paper needed? Explain.



a. Find the height of each bag.

Bag A

$$V = Bh$$
$$96 = 4(3)(h)$$
$$96 = 12h$$
$$8 = h$$

Bag B

$$V = Bh$$
$$96 = 4(4)(h)$$
$$96 = 16h$$
$$6 = h$$

b. To determine the amount of paper needed, find the surface area of each bag. Do not include the top base.

Bag A

$$S = \ell w + 2\ell h + 2wh$$
$$= 4(3) + 2(4)(8) + 2(3)(8)$$
$$= 12 + 64 + 48$$
$$= 124 \text{ in.}^2$$

Bag B

$$S = \ell w + 2\ell h + 2wh$$
$$= 4(4) + 2(4)(6) + 2(4)(6)$$
$$= 16 + 48 + 48$$
$$= 112 \text{ in.}^2$$

The surface area of Bag B is less than the surface area of Bag A. So, the theater should choose Bag B.