Volume Prisms and Cylinders

MCC7.G.6: Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Essential Question: How can you use volume formulas to solve problems?

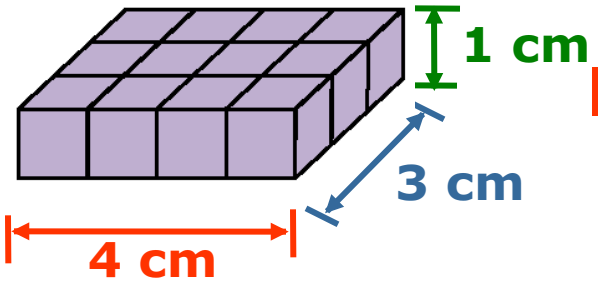
Volume of Prisms and Cylinders

Copy the vocabulary in red into your guided notes.

Any three-dimensional figure can be filled completely with congruent cubes and parts of cubes. The **volume** of a three-dimensional figure is the number of cubes it can hold. Each cube represents a unit of measure called a cubic unit.

Volume of Prisms and Cylinders

To find the volume of a rectangular prism, you can count cubes or multiply the lengths of the edges.

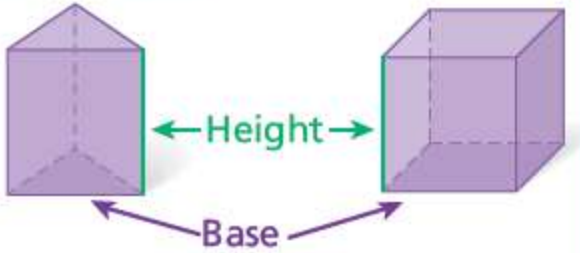


$4\text{ cm} \cdot 3\text{ cm} \cdot 1\text{cm} = 12\text{ cm}^3$

length · width · height = volume

area of base · height = volume

Volume of Prisms and Cylinders

VOLUME OF A PRISM		
The volume V of a prism is the area of its base B times its height h.	$V = Bh$	

Volume of Prisms and Cylinders

Lesson 3: Volume

Essential Question –

- How can I find the volume of different shapes?

Vocabulary –

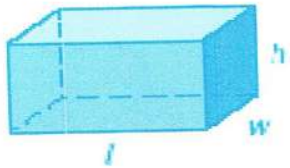
1. Volume - _____

_____.

Volume of a Rectangular Prism

The volume V of a rectangular prism is the _____ of the length, width, and height.

B = area of base
h = height



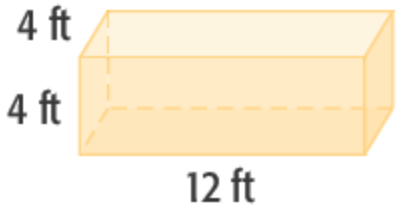
Formula: $V = lwh$ or $V = Bh$

Example 1: Volume of a Rectangular Prism

An aquarium shaped like a rectangular prism has a length of 120 centimeters, a width of 60 centimeters, and a height of 100 centimeters. How much water is needed to fill the aquarium?

Additional Example 1A: Using a Formula to Find the Volume of a Prism

Find the volume of the figure.



$V = Bh$ *Use the formula.*

The base is a square: $B = 4 \cdot 4 = 16$.

$V = 16 \cdot 12$ *Substitute for B and h.*

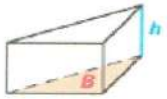
$V = 192$ *Multiply.*

The volume of the prism is 192 ft^3.

Volume of Prisms and Cylinders

Volume of a Triangular Prism

The volume of a prism is the _____ of the _____ of the base and the height.

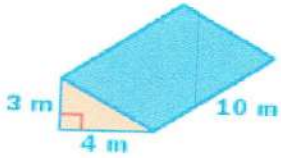


B = area of base
h = height

Formula: $V = Bh$ or $V = \frac{1}{2}(lw)h$

Example 2: Finding the Volume of a Triangular Prism

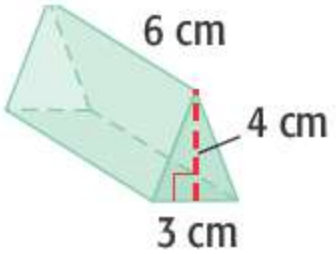
Find the volume.



Volume of Prisms and Cylinders

Additional Example 1B: Using a Formula to Find the Volume of a Prism

Find the volume of the figure.



$V = Bh$ *Use the formula.*

The base is a triangle: $B = 1/2 \cdot 3 \cdot 4 = 6$.

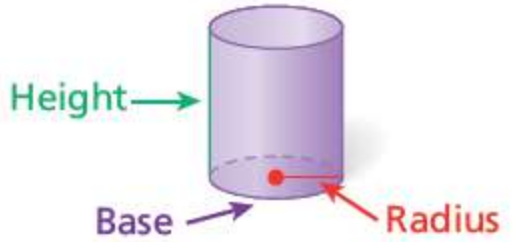
$V = 6 \cdot 6$ *Substitute for B and h.*

$V = 36$ *Multiply.*

The volume of the triangular prism is 36 cm^3.

Volume of Prisms and Cylinders

Finding the volume of a cylinder is similar to finding the volume of a prism.

VOLUME OF A CYLINDER		
The volume V of a cylinder is the area of its base B times its height h.	$V = Bh$ or $V = \pi r^2 h$	

ns and Cylinders

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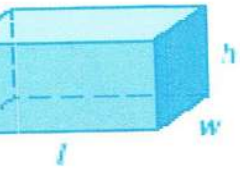


h or V = Bh

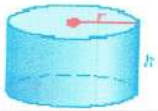
a Rectangular Prism

ke a rectangular
20 centimeters, a
rs, and a height of
much water is
arium?

Volume of a Cylinder

The volume V of a cylinder is the product of the _____ of the base and height

Formula: $V = \pi r^2 h$



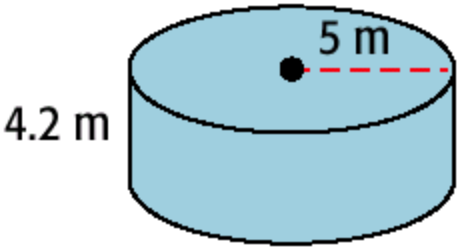
Example 3: Finding the Volume of a Cylinder

Find the volume of the cylinder. Use 3.14 for π.

Volume of Prisms and Cylinders

Additional Example 2: Using a Formula to Find the Volume of a Cylinder

A can of tuna is shaped like a cylinder. Find its volume to the nearest tenth. Use 3.14 for π.



$V = \pi r^2 h$ *Use the formula.*

The radius of the cylinder is 5 m, and the height is 4.2 m

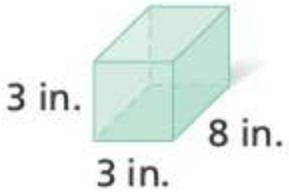
$V \approx 3.14 \cdot 5^2 \cdot 4.2$ *Substitute for r and h.*

$V \approx 329.7$ *Multiply.*

The volume is about 329.7 m^3.

Check It Out: Example 1A

Find the volume of the figure.



$V = Bh$ *Use the formula.*

The base is a square: $B = 3 \cdot 3 = 9$.

$V = 9 \cdot 8$ *Substitute for B and h.*

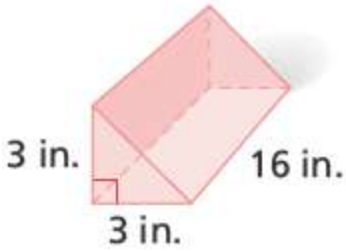
$V = 72$ *Multiply.*

The volume of the prism is 72 in^3.

Volume of Prisms and Cylinders

Check It Out: Example 1B

Find the volume of the figure.



$V = Bh$ *Use the formula.*

The base is a triangle: $B = 1/2 \cdot 3 \cdot 3 = 4.5$.

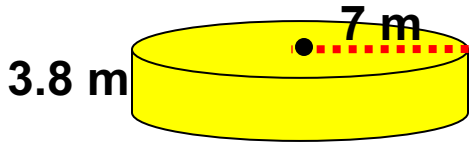
$V = 4.5 \cdot 16$ *Substitute for B and h.*

$V = 72$ *Multiply.*

The volume of the triangular prism is 72 in^3.

Check It Out: Example 2

Find the volume of a cylinder to the nearest tenth. Use 3.14 for π.



$V = \pi r^2 h$ *Use the formula.*

The radius of the cylinder is 7 m, and the height is 3.8 m

$V \approx 3.14 \cdot 7^2 \cdot 3.8$ *Substitute for r and h.*

$V \approx 584.668$ *Multiply.*

The volume is about 584.7 m^3.

Review Video

Worksheet – finish for homework