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Warm-Up | Introduction to Matter

Lesson Question

Lesson Goals

Examine _____.

Describe the _____ that make up matter.

Determine ways to _____ matter.

Examine the difference Between _____ and _____.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

atom	the smallest _____ of matter
displacement	the _____ of something from its original position
mass	the amount of _____ in an object
matter	the stuff that _____ is made of

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Words to Know

volume	the amount of _____ an object takes up
weight	the downward pull on an object due to _____

Scientific Inquiry

Scientists study the world around them by:

- asking _____ .
- performing _____ .
- collecting _____ .
- providing _____ .
- communicating _____ .

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Matter

Matter makes up [ ] objects and organisms.

Matter is made up of very small particles called [ ].

Atoms

Atoms are the smallest units of [ ].

- Were named by the Greek philosopher Democritus in the fifth century BCE
- Come from the Greek word *atomos*, meaning "[ ]"
- Come in over [ ] types

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Mass

Mass is the amount of [ ] in an object.

- [ ] on the object or organism.
- Is measured in [ ] (kg) or [ ] (g).
- [ ] g = 1 kg

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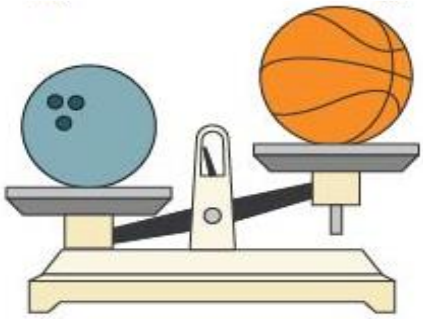
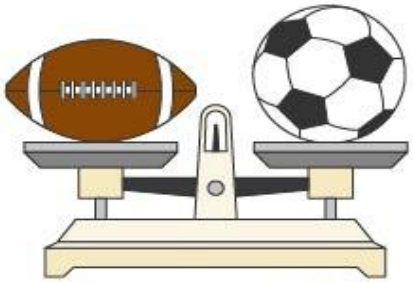
Mass: Comparing the Mass of Objects

The mass of two objects is compared using a pan balance.

- The pan that drops [ ] has the object with [ ] mass. The pointer points [ ] this object.
- The pan that [ ] up has the object with [ ] mass. The pointer points [ ] from this object.
- If the pans are at the same height and the pointer is straight up, the masses of the two objects are about the [ ].

Circle the image that shows objects that have different masses.





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Weight

Weight is the downward pull on an object due to [ ].

- Measured with a spring [ ]
- Measured in [ ] (N) or [ ] (lb)

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Mass vs. Weight

Mass and weight are not the same.

- Mass is the amount of [ ] in an object.
- Weight is the downward pull on an object due to [ ].

The moon's gravity is $\frac{1}{6}$ of the gravity of Earth.

- On Earth, 1 kg has a weight of [ ].
- On the Moon, 1 kg has a weight of [ ].

A person has a greater [ ] on Earth than on the Moon.

A person has the same [ ] on Earth and on the Moon.

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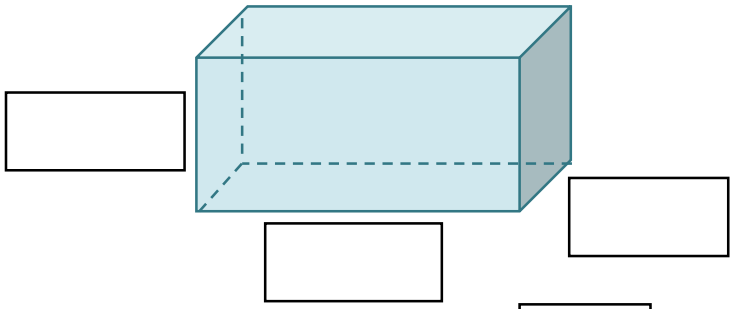
The Volume of Regular Solids: Rectangular Prisms

Volume is the amount of [ ] an object takes up.

The formula for the volume a rectangular prism is [ ].

[ ] $= length \times width \times height$



If we are using centimeters, the answer will be in [ ].

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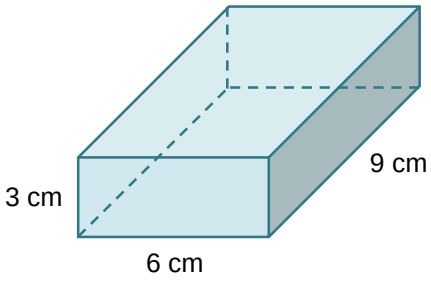
Another way to write the formula for the volume of a rectangular prism is ☐.

- $V =$ ☐
- $B =$ ☐, or $l \times w$

The Volume of Rectangular Prism

Example: What is the volume of a box with a length of 9 cm, a width of 6 cm, and a height of 3 cm?



Step 1: Write the formula for finding the volume of a rectangular prism.

☐

Step 2: Fill the values into the formula and solve.

$$V = \square \text{ cm} \times \square \text{ cm} \times \square$$

$$V = \square \text{ cm}^3$$

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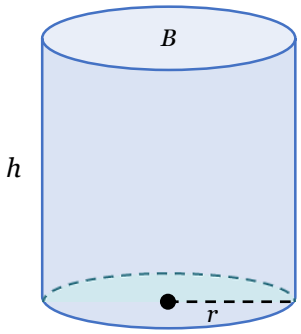
The Volume of Regular Solids: Cylinders

The formula for the volume of a cylinder is $V = Bh$.

- $V =$ ☐
- $B =$ ☐
- $h =$ ☐



The base of a cylinder is a ☐ .

To find the area of a circular base, multiply $\pi \times radius^2$, or ☐.

$\pi =$ ☐

Putting it all together, the formula for the volume a cylinder is $V = (3.14r^2)h$,

or $V =$ ☐ h.

The Volume of Regular Solids: Cones

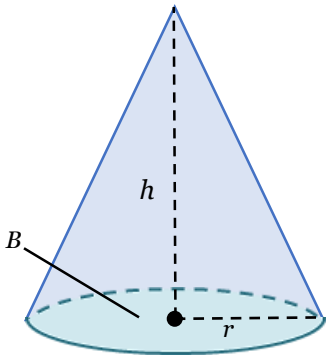
The formula for the volume of a cone is ☐ or $V = \frac{Bh}{3}$.

$V =$ ☐

$B =$ ☐, or $B = \pi r^2$

$h =$ ☐

The height (h) of a cone is measured from the ☐ point of the base to the tip of the cone.



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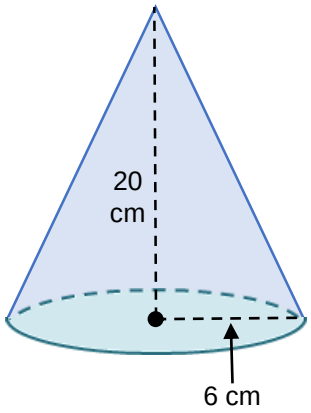
Example: What is the volume of a cone with a height of 20 cm and a radius of 6 cm? Round your answer to the nearest tenth.

Step 1: Write the formula for finding the volume of a cone.



Step 2: Fill the values into the formula and solve.

$$V = \frac{\pi \square^2 \times \square}{\square} = 753.98$$

$$= \square$$

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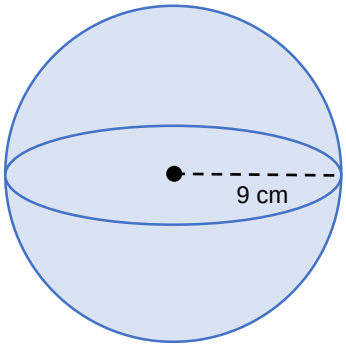
The Volume of Regular Solids: Spheres

The formula for the volume of a sphere is $V = \square$ or $\frac{4\pi r^3}{3}$.

Example: What is the volume of a sphere with a radius of 9 cm?

Round your answer to the nearest tenth.

Step 1: Write the formula for finding the volume of a sphere.



Step 2: Fill the values into the formula and solve.

$\square = 3053.6 = \square$

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The Volume of Irregular Solids

There is no formula for determining the volume of [ ].

The volume of an irregular solid is calculated using the [ ] of water.

A [ ] cylinder is used to measure the volume of an irregular solid.

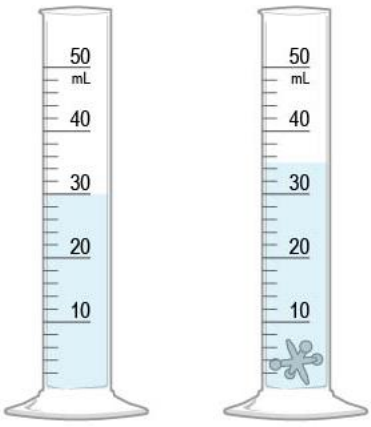
[ ] is the volume of water only.

[ ] is the volume of water and object.

$$\text{final volume} - \text{initial volume} = \text{displacement}$$

$$\text{displacement} = \text{the volume of the irregular solid}$$

Example: Find the volume of a jack.



Step 1: Find the initial volume.

The volume of water only is [ ] mL.

Step 2: Place the object into the cylinder and find the final volume.

The volume of the water and object is [ ] mL.

Step 3: Find the displacement, or the final volume minus the initial volume.

The volume of the jack is $35 \text{ mL} - [\ ] \text{ mL} = [\ ] \text{ mL}$.

$1 \text{ mL} = 1 \text{ cm}^3$, so the final volume of the jack is [3].

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Lesson Question

What is matter?

Answer

Review: Key Concepts

Matter can be measured by:

- _____ , or the amount of matter in an object.
- _____ , or the downward pull on an object due to gravity.
- _____ , or the amount of space that an object takes up.

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Use this space to write any questions or thoughts about this lesson.

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