

MEASURING

Measuring Volume

Volume refers to how much space something takes up. To find out, you can measure regularly shaped solid objects with a ruler, then multiply their length, width, and height in centimeters. This gives the volume in cubic centimeters (cm^3). A cubic centimeter is the same thing as a milliliter (mL).

Graduated cylinders are valuable for finding the volume of both regularly shaped and irregularly shaped solid objects that are small enough to fit inside the cylinder. Measure the increase in the liquid's level after you add the object to the cylinder.

Follow these tips when using a graduated cylinder.

- For accurate readings, place the graduated cylinder on a flat surface.
- Keep your eyes level with the surface of the liquid when you read the scale on the graduated cylinder.
- The surface of the liquid in a graduated cylinder is usually curved. Read the volume of the liquid at the bottom of the curve, or the meniscus.

1. Use the metric ruler to measure the regularly shaped solid object.

- a. Length of object: _____ cm
- b. Width of object: _____ cm
- c. Height of object: _____ cm
- d. Length \times Width \times Height: _____ cm^3
- e. Volume of object: _____ mL

2. Using the smallest graduated cylinder the object fits into, measure the volume of the regularly shaped solid object. Be sure to fill the graduated cylinder with an amount of water that will completely cover the object.

- a. Height of water in graduated cylinder without object: _____ mL
- b. Height of water in graduated cylinder with object: _____ mL
- c. Volume of object (**b** – **a**): _____ mL

MATERIALS

- regularly shaped solid object
- irregularly shaped solid object
- 100 mL or 250 mL graduated cylinder
- tap water
- metric ruler

Name _____

Period _____

Date _____

3. Using the same procedure from question 2 on the previous page, measure the volume of the irregularly shaped solid object.
- a. Height of water in graduated cylinder without object: _____ mL
- b. Height of water in graduated cylinder with object: _____ mL
- c. Volume of object (**b** – **a**): _____ mL
4. When you used the ruler to determine the volume of the regularly shaped solid object, you performed a *direct measurement*. When you determined its volume using the graduated cylinder, you performed an *indirect measurement*. Think about what you measured each time. Explain the difference between a direct and an indirect measurement.

Challenge Look up the word *displacement* in a dictionary.

- a. Definition: _____
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- b. How does this word apply to your indirect measurement of volume?
