

Learning to Use Scientific Tools: Graduated Cylinders

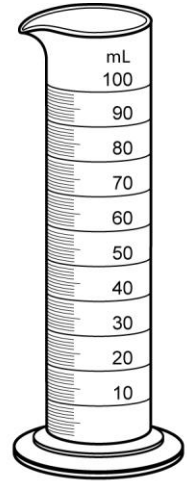
Objective:

In this activity, you will practice using a graduated cylinder to learn how scientists use graduated cylinders in their investigations.

Suggested Materials

Per Group:

- graduated cylinder
- water
- ball of clay



Graduated Cylinder

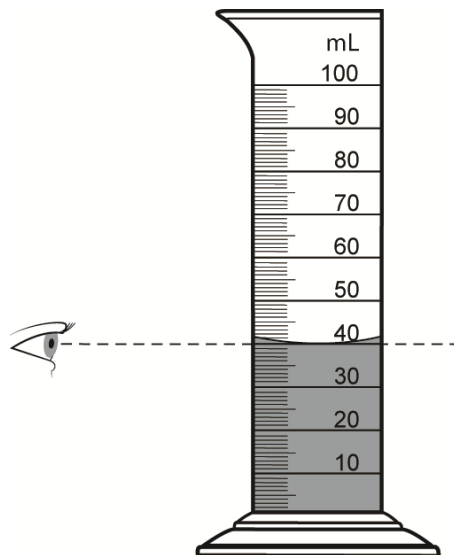
What is a graduated cylinder?

A graduated cylinder is a tool that scientists use to measure volume. Volume is the amount of space something takes up. You can use a graduated cylinder to measure the volume of a liquid. You can also use a graduated cylinder to measure the volume of solids like small rocks. Volumes measured with a graduated cylinder are usually in milliliters, abbreviated as *ml* or *mL*.

How do I use a graduated cylinder?

To measure the volume of a liquid, follow these steps:

- 1) Pour the liquid carefully into the graduated cylinder.
- 2) Look carefully across the cylinder with your eye level with the liquid. The liquid at the top will curve up and form a meniscus.
- 3) Read the volume from the bottom of the meniscus. Record the volume.



To measure the volume of a solid object, such as a small rock, follow these steps:

- 1) Fill the graduated cylinder about halfway up. This is the starting volume.
- 2) Measure and record the starting volume. (Remember to read the volume at the bottom of the meniscus.)
- 3) Then place the solid object into the graduated cylinder.
- 4) Read and record the volume again. This is the final volume.
- 5) Subtract the starting volume from the final volume. This will give you the volume of your object.

$$(\text{volume of water and object}) - (\text{volume of water only}) = \text{volume of object}$$

Practice using a graduated cylinder

Practice using a graduated cylinder. Your teacher will give you a liquid and a solid to measure. Record your measurements and write answers to the questions below in your science notebook.

- 1) Pour the liquid into the graduated cylinder. Measure and record the volume. Compare your measurement to classmates' measurements.
- 2) Now use the graduated cylinder to figure out the volume of a ball of clay. Before you begin, make a plan. Write out the steps you plan to follow.
- 3) Follow your plan to measure the volume of the ball of clay. What is the volume of the ball of clay?
- 4) If you change the shape of the clay, will the volume change or stay the same? Explain your reasoning. Then test your prediction.
- 5) If you make a ball with a different amount of clay, will the volume be the same or different? Explain your reasoning. Then test your prediction.