

## Bottle Volume Project

Objective – Students will be able to describe and distinguish accuracy and precision by comparing measuring devices.

Key Vocabulary – Estimate,

Materials needed – 3 plastic bottles of different sizes, beaker, graduated cylinder, funnel, paper, pencil

Procedure:

Students will work in teams of three. Students will draw a data table with three rows and three columns. The columns will be labeled Estimate, Graduated beaker, and Graduated cylinder.

Students will estimate the volume (in  $\text{cm}^3$ ) of one of the 3 plastic bottles by using a metric ruler and record the results. Students will then fill one of the plastic bottles with water and pour the water into the beaker. Students will read and record the volume of water (in mL) in the beaker. Students will pour the water from the beaker into a graduated cylinder (using the funnel) – and read and record the volume of water (in mL). Students will repeat this process for each of the other two bottles. Each student must estimate and measure the volume of 1 bottle.

Time Estimate: 45 minutes

## Challenge: Students will calculate percent error

You **MUST** use the percent error formula below when performing percent error calculations for your lab reports. This version of the formula indicates whether your experimental value is less than or greater than the true value. If it is less than the true value, the percent error will be negative. If it is greater than the true value, the percent error will be positive.

$$\% \text{ error} = \frac{(\text{experimental value}) - (\text{true value})}{\text{true value}} \times 100$$

Remember, experimental value is what you recorded/calculated based on your own experiment in the lab. The true value is the textbook/literature value. You're hoping that if everything goes perfectly in lab (which almost never happens), your experimental value will be very close to the true value.

## Scaffold: Students will only measure liquid volume