

Laboratory: Measurement

Materials

For each pair of students

Flour
Standard measuring cups (1 cup, $\frac{1}{2}$ cup, $\frac{1}{3}$ cup and $\frac{1}{4}$ cup)
Digital balance

All the data for this activity should be recorded directly into your laboratory notebook. We will be using excel for the statistical analysis and everyone will receive a copy of the class data.

To do:

Flour: mass and volume

1. Place a paper towel on the balance. Zero the balance. Carefully measure out $\frac{1}{2}$ cup of flour any way that you can with the measuring tools you have available. For example - if you only have a 1 cup measure then you will need to estimate a half cup. Record the mass of $\frac{1}{2}$ cup of flour. Return the flour to the container. **Each person should do this one time.**

Questions to answer in your summary (in the laboratory notebook)

1. Using data from the entire class, what is the average mass of $\frac{1}{2}$ cup of flour?
2. What is the range of values obtained for the mass of $\frac{1}{2}$ cup of flour?
3. Did you notice any characteristics of data related to how the measurement was made?
4. Was one method of measuring flour more consistent than others?
5. Do you think measuring flour using these kinds of cups will allow a precise amount of flour to be used in a recipe?

Water: graduated cylinders

1. Pour water into your graduated cylinder to a level between the 10.0 and 15.0 mL mark. Record the amount of water in the cylinder to the nearest tenth of a milliliter. Be sure to measure from the bottom of the meniscus.
2. Pour the water into the large graduated cylinder in the front of the classroom.

Questions to answer in your summary (in the laboratory notebook)

1. Add up the total volume of water as the sum of the values reported by each team. Compare this total to the total amount of water in the large cylinder. Are these values the same? If not, account for the differences.
2. What is a meniscus? Describe how to correctly read the volume of a liquid in a graduated cylinder.

The data obtained in these two activities will be collected and made available to everyone so that an analysis of the aggregate data can be performed.