

Name _____ period _____ date _____

SIGNIFICANT FIGURES LAB

In chemistry, we try to measure everything as accurately as we can with the equipment we are given. Whenever we write down a measurement, the number of digits we write down reflects how good our instruments are.

This is important in science because when we read somebody else's data, we like to have an idea about precision that they were able to achieve. If we use the wrong number of digits in our answers, we might fool people into believing that imprecise data is extremely precise or vice versa.

After performing this experiment and analyzing the data, you should be able to do the following:

1. Explain how the number of significant figures in a measured value depends on the least count of the measurement instrument.
2. Correctly use an instrument with a scale for measurements.
3. Understand the difference between devices that make the same kind of measurement, and know how to select the appropriate device for the experiment being conducted.

Procedures

In this lab, you will be measuring length, volume and mass using common laboratory equipment. For each of these tools, you should write down your answer with the correct number of significant figures. There are six stations. You and your partner should rotate throughout the six stations until all data is collected.

Station 1: Measuring mass with a triple beam balance

Use the triple beam balance to find the following weights. Be sure to use the proper number of significant figures and units in your answer.

1. What is the mass of the nickel? _____
2. What is the mass of the battery? _____

Station 2: Measuring mass with a four- beam balance

Use the four beam balance to find the following weights. Be sure to use the proper number of significant figures and units in your answer.

1. What is the mass of the nickel? _____
2. What is the mass of the battery? _____

Station 3: Measuring volume with a 50 mL graduated cylinder

Record the volume of the liquid in the graduated cylinder. Be sure to use the proper number of significant figures and units in your answer.

Volume in the 50 mL graduated cylinder: _____

Station 4: Measuring volume with a 10 mL graduated cylinder

Record the volume of the liquid in the graduated cylinder. Be sure to use the proper number of significant figures and units in your answer.

Volume in the 10 mL graduated cylinder: _____

Station 5: Measuring distance with a ruler

Use the ruler at the lab station to find the following lengths. Be sure to use the proper number of significant figures and units in your answer.

1. What is the length of the pencil? _____
2. What is the length of the paper clip? _____

Station 6: Measuring distance with a ruler

Use the ruler at the lab station to find the following lengths. Be sure to use the proper number of significant figures and units in your answer.

1. What is the length of the pencil? _____
2. What is the length of the paper clip? _____

Post-lab questions:

1. Why can't we write numbers to as many significant figures as we want? For example, if we use an ordinary ruler, why is it wrong to write down "0.928772546 centimeters"? Explain.
2. If we had an accurate enough instrument, is there any reason that we couldn't write down a value to 10 decimals (as in the number 0.1234567890)? Explain.
3. If the numerical value of 5, 5.0 and 5.00 are the same, why is it necessary to include the zeros in measurements?
4. Why must we include units with a measurement?
5. Can uncertainty in measurements ever be completely eliminated? Explain.