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Today's Goal: Figure out how scientists use measurements to design experiments to solve problems.

How do you measure a photo finish?

Image Source: Pearson Chemistry

Sprint times are often measured to the nearest hundredth of a second (0.01 s). Chemistry also requires making accurate and often very small measurements. A **measurement** is a quantity that has both a number and a unit. Your height (66 inches), your age (15 years), and your body temperature (37°C) are examples of measurements.

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Design of Experiments: Measurements

Experiment 1: Examine Physical Properties

List 3 safety precautions for this experiment:
1.

2.

3.

Sample	State of Matter	Color	Predicted Melting Point (oC)	Predicted Boiling Point (oC)

Reflection:
Write a step-by-step procedure describing how you did your measurements

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Experiment 2: Measure Dimensions (Length, Width, Height)

List 3 safety precautions for this experiment:

1.

2.

3.

Sample	Length	Width	Height

Reflection:

Write a step-by-step procedure describing how you did your measurements

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Experiment 3: Measure Mass

List 3 safety precautions for this experiment:
1.

2.

3.

Sample	Triple Beam Balance Mass (g)

Reflection:
Write a step-by-step procedure describing how you did your measurements

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Experiment 4: Measuring Volume of Liquids
List 3 safety precautions for this experiment:
1.

2.

3.

Type of Graduated Cylinder (mL)	Smallest Increment	Volume of Water (mL)

Reflection:
Write a step-by-step procedure describing how you did your measurements

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Experiment 5: Design an experiment to measure the volume of your cubes using water

Sample	Volume of Water (mL)	Volume of Water and Sample (mL)	Volume of Water Displaced (mL)

Reflection

1. Read "Units of Measurement" article like a scientist
2. In the space below summarize what you learned from reading "Units of Measurement" like a scientist

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Design of Experiments: Identifying Variables

You will conduct computer experiments to investigate how changing the type of material, mass and volume influence an object's ability to float by following the procedure below:

1. Select 3 materials to investigate and answer the questions below.
2. Which materials float and why?
3. Which materials sink and why?
4. What do you observe when you investigate different materials with the same mass?
5. What do you observe when you investigate different materials with the same mass?

Summarize the results of your computer simulations in the table below.

Material	Sinks	Floats	Why?