Sources of Experimental Error

In many scientific experiments, errors may occur that affect the outcome of an experiment. Sometimes the difficulty lies in determining what the sources of error are. This document will attempt to illustrate some possible sources of error that should be considered. This list is by no means complete… just some ideas for you to think about.

BALANCES
1) Were the balances zeroed? Could something have happened during the experiment to change this?
2) Were you weighing hot objects? Don't do this, since convection currents in motion around the object may result in inaccurate readings.

CIRCUITS
1) Were there any sources of additional resistance?

COLOUR INTERPRETATION
1) Were changes in colour difficult to differentiate, and what made them that way?

ESTIMATION
1) When told to pour approximately 10 mL of a solution, did you overestimate or underestimate?

EXTERNAL FACTORS
1) Could the external temperature/pressure have had an effect on the results?

GRADUATED CYLINDERS
1) Did you make your readings with your eye at the same level as the bottom of the meniscus (i.e., the lens-shaped surface formed by the water in the cylinder)?
2) Did you wait for all the liquid that splashed up onto the sides of the cylinder to settle before taking your reading?

MATERIALS WITH MANUFACTURER-STATED VALUES
1) Is there anything which may have caused the stated values to have changed?

MEASUREMENTS
1) Were you measurements limited by how finely the scale was divided?

METERS
1) Was the meter properly zeroed?
2) Were there any other factors which may have affected the value being recorded?

Authored by Gordon Wong