



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 your 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?



METER STICKS

- 1) What could affect the accuracy of the measurement?
- 2) If you measured from the end of a meter stick, was the end worn or chewed up?
- 3) Was there anything in the experiment which made measurement difficult?

MOVING OBJECTS

- 1) Were there any sources of friction which may have affected movement? Where could friction occur?
- 2) Were there any other factors which may have affected movement (i.e., making the object go faster or slower than expected)?
- 3) Was the object travelling in a straight line, and if it wasn't, how would your results be affected?

POWER SUPPLIES

- 1) Might there have been random fluctuations in the AC supply?

PURITY OF MATERIALS

- 1) Is it possible your sample was impure or somehow became impure during the experiment?

THERMOMETERS

- 1) Was the temperature changing too fast during the temperature-taking process?
- 2) Were there any possible external sources of heat gain/loss?

TIMING

- 1) Could something have happened in the experiment which would increase or decrease the time recorded?
- 2) Was human reaction time of any significance?

