

Scientific Method – Reference Document

Science is not about the “right” answer. What’s important is that you can demonstrate a solid process and interpret/justify the reasons for your results.

The scientific method is a consistently accurate means of testing a question. We will use this method for all of our formal labs.

Experiment Titles:

- Are written in the following format:
 - “The Effect of (Independent Variable) on the (Dependent Variable).”

7-step version of the scientific method:

- Scientific Question
 - What are you trying to learn or discover?
- Background Research
 - What information already exists about your question? What have others already discovered?
- Hypothesis
 - An educated guess
 - Use an “if... then... because” statement
 - “If” refers to the independent variable (the thing we’re changing on purpose)
 - “Then” refers to the dependent variable (the thing we’re trying to influence/manipulate/measure)
 - “Because” refers to why you think this effect will occur (your scientific justification/explanation)
- Materials
 - List exactly what you need
 - What size, concentration, quantity, etc.
- Procedure
 - Numbered steps with exact quantities
 - An experiment to test your hypothesis
 - A good procedure has several controlled variables, one independent variable, and one dependent variable
- Results
 - Well organized – tables, graphs, etc.
- Conclusion
 - Must address your hypothesis
 - Was your educated guess correct? Why or why not?
 - Must consider any mistakes that were made
 - There is no such thing as the perfect lab procedure
 - Did errors affect your results? If so, how?

Experimental Variables:

- A variable is anything that can change the outcome of the experiment.
- 3 Types of Experimental Variables
 - Independent Variable – something that is intentionally changed by the scientist
 - In order for an experiment to be ‘fair’ it can have only 1 independent variable.
 - Dependent Variable – something that might be affected by the change in the independent variable
 - What is observed or measured
 - Controlled Variable – a variable that is not changed
 - The more of these in your experiment, the less likely you are to have errors