

THE SCIENTIFIC METHOD

The scientific method is a logical way of solving problems. Scientists use this method to gather and test information.

Question/Purpose

Before experimenting, scientists start by posing a question. The question must be stated clearly so that the purpose of the experiment or activity is understood.

Hypothesis

A hypothesis is a prediction that **forecasts how one variable might affect a second variable**, a reasonable guess about an outcome. Hypotheses are based on observations and research. A hypothesis should also include a reasonable explanation as to why the prediction was made.

Equipment

An experiment should contain a list of all materials necessary to perform all of the steps involved.

Procedure

The procedure should be a numbered step by step list that explains how to complete the experiment. It should be clear and specific so that anyone else could perform the same experiment.

Variables

While performing an experiment, a scientist starts with a control group. The control group is a starting point, it is something to which the results can be compared. After the control is established there is a condition or issue that will be tested. There are two variables (changes) that are used in testing: an independent variable and a dependent variable. An independent variable is something that a scientist chooses to change in an experiment. **The scientist sets the value of the independent variable.** The dependent variable is what you predict will change when the independent variable is changed. It is what is being measured or observed. **The dependent variable changes because of the change in the independent variable, the scientist can not set the value.** Every experiment involves some constant conditions. Constant conditions are **factors that remain the same** throughout an experiment. Measuring equipment is not listed as a constant condition.

Observations

Observation is an essential science skill. It involves use of the five senses: smell, sight, touch, taste, and hearing, to record information. Data gathering is also an important part of experimentation. Data is measurements or specific values recorded throughout the experiment.

Conclusion/Discussion

Conclusions are drawn from the information obtained during an experiment. A conclusion tells whether or not the data collected supports the hypothesis. If a conclusion does not support the hypothesis it may inspire further research on a topic. Conclusions usually contain information about sources of error that may of occurred during the experiment or changes that need to be made next time the experiment is conducted.