

Parts of an Experiment

The following parts of an experiment should be included in most science projects and should be identified in the written paper. Correlations and other atypical designs are exceptions.

1. The **independent variable** is the variable that is intentionally changed in the experiment, such as the temperature of the water in which an effervescent tablet was dissolved.
2. The **levels of the independent variable** are the different values of the independent variable, such as using water at 10°, 20°, 30°, 40°, and 50° C. The levels of the independent variable can also be thought of as the experimental groups that are set up.
3. The **dependent variable** is the variable that responds to the changes in the independent variable. For example, the time it takes for the tablets to dissolve in the different temperatures of water is the dependent variable.
4. The **control** is the standard against which the researcher compares the results from each treatment group (level) in the experiment. For example, the control might be the room temperature water, which is about 20° C. In many cases, there will not be a true control. The researcher could then set one of the groups as the standard and measure the other groups against that standard.
5. The **repeated trials** are the number of times the experiment is repeated to determine how the independent variable affected the results. For example, if the researcher tried dissolving the tablet seven different times in each temperature of water, he/she would have seven repeated trials. If 10 different plants are used for each treatment, then there are 10 repeated trials.

Constants are the things that are kept the same each time one of the trials in the experiment is repeated. For example, constants could include the amount of water used, the brand of effervescent tablet used, the type of water used, and the fact that the water was not stirred. As many outside factors as possible should be kept constant in an experiment so that the researcher can be sure that any changes that occur do so because of the independent variable.