# <u>Variables</u>

## Every Experiment should have three different variables listed /described below:

Scientists use an experiment to search for cause and effect. There are many items that could be altered to test the reaction of another. These changing quantities are called **variables**. A variable is any factor, trait, or condition that can exist in differing amounts or types. An experiment usually has three kinds of variables: independent, dependent, and controlled.



The **independent variable** is the one that is changed by the scientist. To insure a fair test, a good experiment has only **ONE** independent variable. As the scientist changes the independent variable, he or she records the data that they collect.

The **dependent variable** is the item that responds to the change of the independent variable. The dependent variable depends on/changes when the independent variable is changed.

For example, if you open a faucet (the independent variable), the quantity of water flowing (dependent variable) changes in response--you observe that the water flow increases. The number of dependent variables in an experiment varies, but there is often more than one.

The **controlled variables** are quantities/items that you want to remain constant and must observe them as carefully as the dependent variables.

For example, if we want to measure how much water flow increases when we open a faucet, it is important to make sure that the water pressure (the controlled variable) is held constant. That's because both the water pressure and the opening of a faucet have an impact on how much water flows. If we change both of them at the same time, we can't be sure how much of the change in water flow is because of the faucet opening and how much because of the water pressure. In other words, it would not be a fair test. Most experiments have more than one controlled variable. Some people refer to controlled variables as "constant variables." In a good experiment, the scientist must be able to **measure** the values for each variable. Weight or mass is an example of a variable that is very easy to measure. However, imagine trying to do an experiment where one of the variables is love. There is no such thing as a "love-meter." You might have a **belief** that someone is in love, but you cannot really be sure, and you would probably have friends that don't agree with you. So, love is not measurable in a scientific sense; therefore, it would be a poor variable to use in an experiment.

(http://www.sciencebuddies.org/science-fair-projects/project_variables.shtml)