

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Understanding Dependent and Independent Variables

As part of the scientific process, researchers, scientists and even ordinary people conduct experiments every day to find out more about the world we live in. An experiment needs to be carefully designed to make sure it accurately measures what it is supposed to so that the results are correct and so that the experiment can be repeated by someone else.

Basic experiments are based upon a hypothesis that tries to predict the outcome of the experiment. Many experiments do not show that their hypothesis is true. These experiments are still valuable because they help to guide further research into an area that scientists are interested in.

Experiments test the influence of one thing over another. A proper experiment compares two or more things but changes only one variable or factor in the experiment. One example that is often used is an experiment that tests the influence of fertilizer on the growth of plants. The hypothesis states that plants that get fertilizer grow taller than plants that get no fertilizer.

For any particular plant in the experiment, the amount of fertilizer it will get during the experiment is determined in advance by the experimenter. Some plants will get no fertilizer while others will get a measured amount. In this example, the *independent variable* is the amount of fertilizer.

The other term used in experiments is dependent variable. The *dependent variable* is what is measured in the experiment. In this example, the dependent variable is how tall the plants are. The dependent variable (how tall the plants are) depends on the independent variable (the amount of fertilizer).

Example:

Stress increases the heart rate of a person.

Dependent variable (what is measured in the experiment):

heart rate

Independent variable (what is controlled in the experiment):

the amount of stress

Exercise:

Lifting weights increases the breathing rate of a person.

Dependent variable: \_\_\_\_\_

Independent variable: \_\_\_\_\_

