

Determine the Variables

There are three kinds of variables that you must account for in an experiment

The **INDEPENDANT** Variable

- AKA the experimental variable
- The **independent variable** is what you, the experimenter, directly change in the experiment.
- It is important that you have only one independent variable in your experiment. You would not be able to draw reliable conclusions from the experiment if you altered more than one experimental condition.

The **DEPENDANT** Variable

- The **dependent variable** is most often what you measure as an outcome of an experiment.
- If we think of the independent variable as a cause, the **dependent variable** could be the effect.
- Unlike the independent variable, an experiment can have several dependent variables because variations in the independent variable can have many different effects. For example, you might measure length of leaves and weight of roots to assess the growth of radish plants.

The **CONTROLLED** Variables

- Any other conditions in the experiment are called **controlled variables**.
- You must keep these conditions constant for all treatments in the experiment.
- Controlled variables might include light exposure, humidity, pH of solution, ambient noise, etc.
- If you allow these “variables” to vary from treatment to treatment, they become independent variables, and remember that you cannot have more than one independent variable in a scientific experiment.

Design a Procedure

- The procedure is the exact steps you take to carry out your experiment.
- Replication is the number of times you repeat a specific procedure. This is important to ensure that your experimental data is reliable and less subject to chance variation.
- The control group is the treatment or set up in which the independent variable is held at a "normal" level. It provides data to compare the experimental results with to show if the independent variable is really responsible for your observations.
- **Be careful not to confuse the control group with the controlled variables.** Remember, the control group is the group in which the independent variable isn't changed, and the controlled variables are the factors that are set up the same in each treatment.