

Controlled Experiments: A Fair Test

Name _____

Date _____ Hour _____

Define the Variables

Variables are parts of an experiment that can be changed.

There are three types of variables in every experiment- the independent, dependent and controlled.

Independent: What is changed during the experiment; what you think will affect the dependent variable. [CAUSE]

Dependent: What will be measured; what will be affected by the independent variable during the experiment. [EFFECT]

Controlled: Variables held constant (meaning unchanged; kept the same). Eliminates the chance that the outcome is affected by factors other than the independent variable.

A **fair test** occurs when you change only one variable and keep all other conditions the same.

The **Test Group** is the experiment that has the Independent Variable being tested.

The **Control Group** is an experiment without the Independent Variable. All of the controlled (or constant) variables are exactly the same as the Test Group.

The control group is used for comparison with the _____.

(How do you know the effect test if you don't compare it to a group that hasn't been tested?)

Multiple Trials- A good investigation includes many trials of the test group. This is because any number of errors could occur during testing, which could make your data inaccurate. Repeating the experiment many times, OR running the experiment on many identical test subjects makes your overall data more reliable.

Example 1

Question: Will Fertilizer X cause Petunias to grow taller?

Hypothesis: Fertilizer X will make petunias grow taller than plants without the fertilizer.

Experiment: 40 plants are tested. Group A has 20 plants that are given Fertilizer X.

Group B has 20 plants that are not given any fertilizer. Both groups are given the same amount of soil, water and sunlight, and are kept at the same temperature.

Independent Variable: _____

Dependent Variable: _____

Controlled Variables:

Test Group: _____

Control Group: _____

Is this a **Fair Test**? Why or why not?

Example 2

Question: Can insulation cause an ice cube to melt at a slower rate?

Hypothesis: Insulation causes an ice cube to melt 2x as slow as an ice cube alone.

Experiment: 10 ice cubes are taken out of a freezer at the same time. Five are immediately placed inside an insulated container. The other five are left out of the container. All of the ice cubes are the same size and are placed into rooms at the same temperature.

Independent Variable: _____

Dependent Variable: _____

Controlled Variables:

Test Group: _____

Control Group: _____

Is this a **Fair Test**? Why or why not?
