

Controlled Experiments: A Fair Test

Name _____

Date _____ Hour _____

Define the Variables

Variables are factors in an experiment that are capable of changing.

There are three categories of variables in every experiment- the dependent, independent 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?)

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?

Controlled Experiment Practice

Name _____

Date _____ Hour _____

Question: Does chewing gum cause cavities?

Hypothesis: Chewing gum causes cavities.

Experiment: A group of 40 people are involved in the experiment. 20 chew gum each day and 20 do not. Their teeth are checked before the experiment and 6 months after.

1. What is the **Independent Variable**? _____
2. What is the **Dependent Variable**? _____
3. What would be some **Controlled Variables** for this experiment?

4. Which Group is the **Test Group**? _____
5. Which Group is the **Control Group**? _____
6. Is this a **Fair Test**? Why or why not?

Question: Does eating candy cause children to become hyperactive?

Hypothesis: Eating candy causes children to become more active than without candy.

Experiment: 100 3rd grade children are observed daily for 10 days. 50 children are given 25 grams of candy each day at 3:00 p.m. 50 children are not given the candy. Scientists observed all children's behavior from 3-5 p.m. daily and recorded changes in activity level. The children were all approximately the same size and weight, and had the similar activity levels before testing.

1. What is the **Independent Variable**? _____
2. What is the **Dependent Variable**? _____
3. What would be some **Controlled Variables** for this experiment?

4. Which Group is the **Test Group**? _____
5. Which Group is the **Control Group**? _____
6. Is this a **Fair Test**? Why or why not?
