

## APPLY WHAT YOU LEARNED

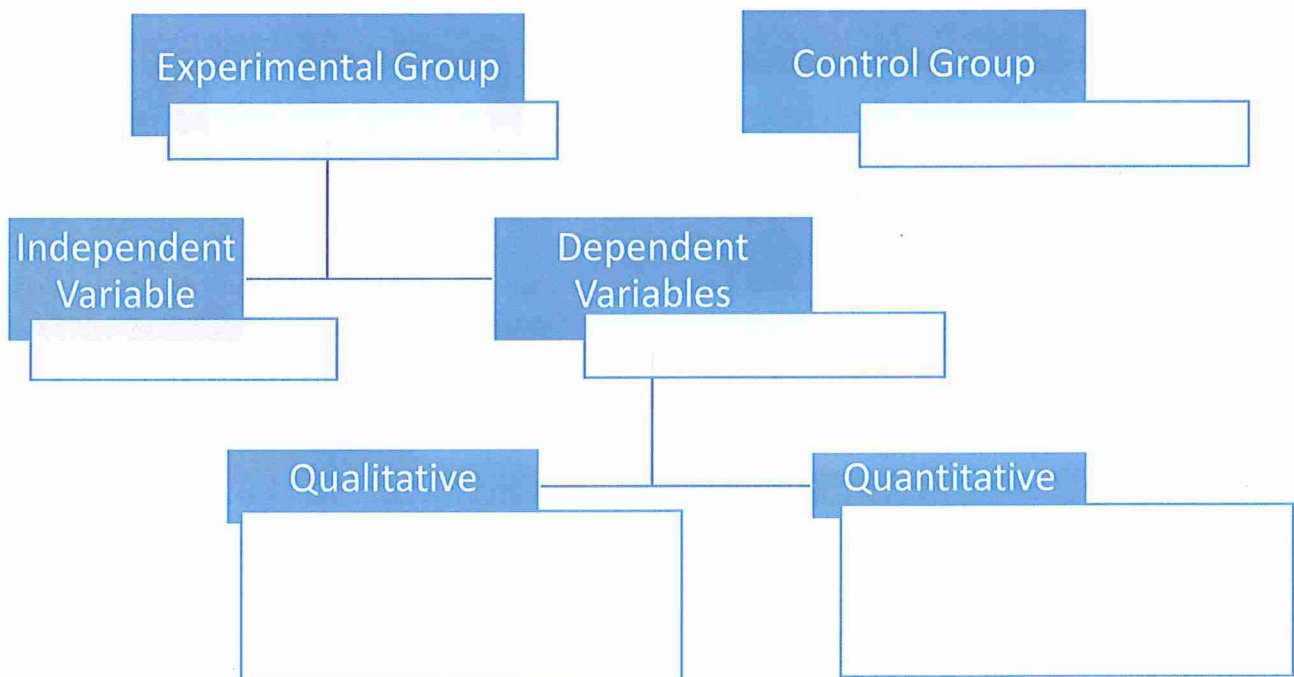
With a partner, think of an example of an experiment. Write out the steps and different variables.

OBSERVATION/QUESTION: \_\_\_\_\_  
\_\_\_\_\_

WHAT YOU WOULD RESEARCH: \_\_\_\_\_  
\_\_\_\_\_

YOUR HYPOTHESIS: \_\_\_\_\_  
\_\_\_\_\_

THE EXPERIMENT



## Identifying Parts of the Scientific Method

Each sentence describes a part of a scientific experiment. Match them with the step of the scientific method listed below.

- A. Make an observation.
- B. Form a hypothesis.
- C. Test the hypothesis with an experiment.
- D. Draw a conclusion.

- \_\_\_\_\_ 1. George saw bats flying around his head and asked himself how they caught insects in the dark.
- \_\_\_\_\_ 2. Maria gave each tree a different amount of fertilizer to see which grew the fastest.
- \_\_\_\_\_ 3. Angela thought that the ants would avoid the piles of salt in her kitchen.
- \_\_\_\_\_ 4. Josephine surveyed the class to determine which students were left-handed and which were right-handed.
- \_\_\_\_\_ 5. Guillermo's data showed that chocolate was the most popular candy in the class.
- \_\_\_\_\_ 6. Catherine wondered where the water in the creek came from.
- \_\_\_\_\_ 7. Alex said, "If I feed this rat junk food, it will be less healthy than my other rat."
- \_\_\_\_\_ 8. Ed's data showed that household cockroaches moved away from raw cucumber slices.
- \_\_\_\_\_ 9. Cameron's experiment showed that animals avoided areas impacted by acid rain.
- \_\_\_\_\_ 10. Elizabeth predicted that bleach would kill 50% of the germs on the kitchen table.

Rosa is growing a tomato garden. She wants to know how to make her plants grow better. She looks on the internet and thinks that if she uses fertilizer, her plants will grow taller. She decides to test it out. On three plants, she puts no fertilizer. On three more plants, she puts 1 oz. of fertilizer on each plant. On the final three plants, she puts 5 oz. of fertilizer on each plant. For three weeks, she fertilizes the plants once a week. During the three weeks, she waters each plant with 16 oz. of water a day. All nine plants are in her front yard with the same amount of sunlight. After three weeks, she measures how tall her plants are, and finds that the plants with 5 oz. of fertilizer are the tallest.

**Fill in the parts of the experiment:**

Observation: \_\_\_\_\_

\_\_\_\_\_

Hypothesis: \_\_\_\_\_

\_\_\_\_\_

Experiment: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

\_\_\_\_\_

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

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

Control variable(s): \_\_\_\_\_

\_\_\_\_\_

Qualitative data: \_\_\_\_\_

Quantitative data: \_\_\_\_\_

## IDENTIFYING CONTROLS AND VARIABLES

### Experimental Design

Scientists conduct experiments to test their hypotheses and to help answer questions. The **independent variable** in an experiment is a condition that is changed by the scientist. The **dependent variables** change in response to changes in the independent variable. They are observed and measured during an experiment. Conditions that do not change during an experiment are called **constants**. Scientists use **control groups** to make certain that the changes they observe are the result of the independent variable, and are not due to other factors. A control group is treated exactly like the experimental group except for the independent variable being studied.

**The paragraphs below describe an observation, a question, and an experiment. Select a color for each of the parts of an experiment below. For each of the experiments, identify the following by highlighting the section in the appropriate color.**

- a. control group..... ☐
- b. independent variable ..... ☐
- c. dependent variable..... ☐
- d. conclusion(s)..... ☐

**1.**

Iker is concerned about global warming. He believes that much of the problem is caused by the intense heat arising from surfaces such as streets and the roofs of buildings. Iker convinces the principal of his school to run an experiment. With the help of other students, Iker raises money for a rooftop garden to be put in on one half of his school building. For one semester, Iker keeps track of the air temperature on the half of the building with the rooftop garden and the half of the building without the garden. He finds that the average temperature near the rooftop garden is 73°F. The average temperature away from the garden is 84°F.

**2.**

Caroline decides to save money by switching to a generic brand of dog food for Schnookum and Schnozzer, her mastiffs. After several days of eating the new food, however, the dogs stop sleeping through the night. They whine and tug at Caroline's blankets until she gets up to play with them. Caroline wants to know if this behavior is caused by their new food. For one week, she gives the generic food to Schnookum, and she gives the original brand of food to Schnozzer. Schnookum continues to wake her up every night, but Schnozzer sleeps all night.

**3.**

Gabby loves long-distance running, but her feet develop terrible blisters. Some of her track teammates suggest that the blisters are caused by her cotton socks, which absorb moisture. Gabby borrows a pair of double-layer running socks made of a synthetic blend. For two weeks she wears the synthetic socks when running, and for the following two weeks she switches back to the cotton socks when running. During this month, Gabby counts the number of blisters she develops. She finds that she develops only one blister while wearing the synthetic socks, but five blisters while wearing the cotton socks.

**4.**

One of Tatsu's weekly chores is cleaning the bathrooms. He notices that the shower in his bathroom develops a gray layer of scum more quickly than does the shower in his parents' bathroom. Wanting to minimize his scrubbing time, Tatsu tries to find out what is responsible for this difference. He notices that his parents use a gel body wash, whereas he uses bar soap. Tatsu switches to using a gel body wash for two weeks and finds that the scum layer does not develop.