

Variables

What are variables?

A **variable** is anything that can change in an experiment. It is important to keep all the variables in an experiment the same except the one you are testing—the **independent variable**. Controlling variables helps you know that results are due to the variable you tested.

Suppose you test how saltwater affects bean plant growth. All the bean plants are

grown in similar containers and soil, get the same number of hours of sunlight each day, and the same amounts of water. However, some plants are given freshwater, while others get saltwater. In this experiment, the independent variable is the type of water given to each plant.

Recall these investigations:

1. McKenna had 10 identical iron nails. She painted five of the nails and left the others unpainted. She put all the nails in a plastic tray and placed the tray outdoors. She observed the nails each day. After 3 days, all the unpainted nails had rust on them, but no painted nails showed signs of rusting. On day 30, rust began to show through the paint on two of the painted nails. Five days later, all of the painted nails showed signs of rusting.

2. Hector had four identical cans. He painted two cans black and two cans white. He filled each can with 200 mL of water. He then recorded the temperature of the water in each can before putting the cans in a sunny place. The water temperature in each can was measured and recorded every 20 minutes for 2 hours. For each measurement, the temperature of the water in the black cans was always a few degrees higher than the temperature of the water in the white cans.

3. Brianna filled three 50-mL beakers with 10 mL of water. She then cut a 5-cm square from three brands of paper towels with different thicknesses. She put one square into each beaker. After 10 minutes, Brianna poured the water from the first beaker into a graduated cylinder and recorded its volume. She repeated this step for the remaining two beakers. Her measurements showed that the smallest volume of water was collected from the beaker that contained the thickest sheet of paper towel.

Show What You Know

Identify the independent variable for each investigation above.

1. _____ 3. _____

2. _____