

# Identify and Control Variables

**Variables** make science exciting. What is a variable? The root word of variable is *vary*. When you vary something, you change it. So, variables are things that can change. In science, there are three main types of variables: independent, dependent, and controlled. Think about variables for a question such as, “Does a bean plant grow best in sun or shade?”

First, identify the variable that will be changed. In this case, the amount of light that the plant receives is changed. This is the **independent variable**.

Next, figure out what will be measured. For this question, the amount that the plants grow is what is being measured, so this is the **dependent variable**. The dependent variable *depends on* the independent variable. The amount that the plants grow *depends on* the amount of sun they get. The independent variable is what you change, and the dependent variable is what happens because of the change.

## Do You Know?

Every experiment should have only one independent variable. If the question were “How much sun and water does a plant need?” two things would be being studied at once—sun and water, which would be confusing. It’s important to change only one variable at a time.

© Stockphoto.com/Tang Wei

The only way to get reliable results from this experiment is to make sure that all the other variables stay the same, or are **controlled**. There are many variables that would need to be controlled in this experiment. Examples include: how much water each plant gets, what kind of soil the plants are in, and the temperature of the air. If any of these variables were to change during the experiment, you could not be certain that the results occurred solely due to the amount of sunlight each plant got.

Understanding the differences between independent, dependent, and controlled variables will help make all your science experiments more successful.

## ✓ Brain Check

- What is an independent variable?
- What type of measurement tool would you use if your dependent variable were the temperature of water?
- Why is it important that all variables in an experiment, except for the independent variable, are controlled?



Illustration by Cende Hill

Circle the parts of the picture that show the independent variable.