

IDENTIFYING VARIABLES

Main Idea:

- Variables are factors that **could change** in a scientific experiment.
- A **good experiment** is designed so that only one variable is changed, one variable is measured, and all other variables remain constant throughout the investigation.
- The **independent variable** is the variable you intentionally change to see how it affects another variable.
- The **dependent variable** the variable that you measure.
- **Constants** are variables that must be identical throughout the experiment. Examples include temperatures, room conditions, measurement tools and types of materials.

Identify the independent variable and the dependent variable in each hypothesis.

1. Problem: What is the effect of a golf ball's height above ground and the force when it hits the ground?

Hypothesis: If you increase the height from which a golf ball is dropped onto a tray of sand then the crater it makes will have a larger diameter because the golf ball will fall with more speed.

Independent variable: _____

Dependent variable: _____

2. Problem: What is the effect of surface area of wet sponges and their drying time?

Hypothesis: If you increase the number of pieces you cut a wet sponge into, then those cut into smaller pieces will have a faster drying time than those cut into bigger pieces, because the smaller pieces have more surface area exposed to the air.

Independent variable: _____

Dependent variable: _____

3. Problem: What is the effect of increased text messaging at home on students' grades?

Hypothesis: If students spend more times per week text messaging, then they will have lower average grades than students who spend less time text messaging, because the time spent messaging will reduce the amount of time performing school work and studying.

Independent variable: _____

Dependent variable: _____

4. Problem: What is the effect of increasing sunblock SPF (sun protection factor) on sunburn time?

Hypothesis: If the SPF of a sunblock is higher, then it takes longer to get sunburned because the sunblock filters out more UV rays.

Independent variable: _____

Dependent variable: _____

5. Problem: What is the effect of increasing the frequency of brushing and the number of cavities?

Hypothesis: If students brush their teeth more times per day, then they will have fewer cavities, because they will have less plaque buildup and less tooth decay.

Independent variable: _____

Dependent variable: _____

6. Problem: What is the effect of a surface's color and its temperature?

Hypothesis: The darker the color of the surface, then the warmer the surface will become in sunlight because darker colors absorb more light than lighter colors.

Independent variable: _____

Dependent variable: _____

7. Problem: What is the effect on higher water temperature and the amount of sugar that can dissolve?

Hypothesis: If the temperature of the water is higher then more spoonfuls of sugar can be dissolved because the water particles are moving at faster speeds and are more spread out at higher temperatures, making it easier to dissolve the sugar particles.

Independent variable: _____

Dependent variable: _____

8. Problem: What is the relationship between atmospheric pressure and the amount of rain?

Hypothesis: If there is lower atmospheric pressure, than the amount of rain is higher because more low clouds form when the pressure decreases and low clouds form rain.

Independent variable: _____

Dependent variable: _____

Challenge:

Identify the independent variable and the dependent variable in the following experiment.

A group of students chose to study acceleration. The students used small toy cars and made a ramp from a wooden board. They held one end of the ramp on the floor at different angles, which they measured using a protractor. Then they used a meter stick to measure how far the cars ran off the ramp from the different angles.

Independent variable: _____

Dependent variable: _____