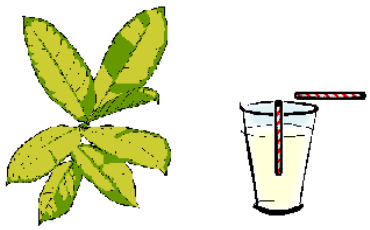
Bernoulli Sprayer

Activity Summary

Participants observe the Bernoulli Principle at work on a cup of water. As air is blown over the top of a partially submerged straw, the water rises inside the straw. Colored water makes the water movement easier to observe. Participants who are able to blow a strong enough breath can make a horizontal spray of water with which they can try to hit a target.

Class time: 15 minutes

Grade Level: 1st-5th



Learning Objective

- Air exerts pressure
- The amount of pressure exerted by air changes under certain circumstances

Materials Needed

- Plastic straw
- Scissors
- Cup of water
- Food coloring
- Target (for older participants)

Activity

1. Add a few drops of food coloring to the water.
2. Cut the straw in half.
3. Stand one of the straws upright in the water. It should be a little taller than the glass.
4. Hold the second straw at a right angle to the first one, as shown in the diagram.
5. Blow through the second straw and watch the level of water in the first straw.

Explanation

The moving air blowing across the top of the straw has *less pushing power* than still air. The air pressing down on the water in the glass is able to push harder than the moving air over the straw and forces water up the straw.

In 1738, Swiss physicist Daniel Bernoulli discovered that as the speed of a fluid increases its pressure decreases. What does that mean? When air is still it pushes equally in all directions. For example, air pressure pushes down on a table, but also up on the underside. But when air moves along the surface of an object the pressure is reduced. A fan blowing across the surface of the table reduces the downward pressure of air. A light wind has little effect on a heavy object like a table, but a cup of water and straw illustrates the principle well as in this simple activity.

This activity was adapted from:
175 Science Experiments to Amuse and Amaze Your Friends, by Brenda Walpole