Hover Cup

Primary Audience: 6th – 8th

Note: This activity is from the Ohio Statewide Science Workshop (OSSW) Cup O'S*cience*

Description: Participants will explore how air pressure can move an object, create a model hovercraft, and investigate design changes and their results

Keywords: Friction, Air pressure

Concepts: Air pressure can eliminate friction between two surfaces

Materials (per group)

Paper cup
Lightweight cardboard (a file folder)
Glue
Balloon
Masking tape
Thick marker or pen

Procedures:

1. Cut a 4-inch square out of the cardboard. Cut the 4 corners to make an octagon.
2. Draw a ¼-½" diameter circle in the center of the cardboard. Use a pen to score the edge of the circle and punch it out. (A Crayola® marker has a perfect diameter.)
3. Glue the octagonal cardboard piece to the open end of the cup. Glue it securely to form an airtight seal between the cardboard and the cup. Let the glue dry.
4. Make a cardboard tube: cut another cardboard piece into a rectangle (approx. 3½" x 2"). Roll this piece to form a 3½"x¼" diameter tube. Use masking tape to tightly seal the entire length of the seam.
5. Punch a hole in the bottom of the cup large enough for the cardboard tube to fit snuggly (as air tight as possible).
6. Insert the tube into the opening of the balloon. Tape the balloon 1" from the end of the tube. Make sure the seal made with the tape is airtight.
7. Blow up the balloon (through the tube) and twist or pinch off the end to keep the air from escaping. Place the open end of the tube into the hole in the cup's bottom.
9. Set the hovercraft on a level, smooth surface. Release the air from the balloon so that it flows into the tube.
10. Blow the balloon up again, release and this time gently push your hovercraft.

What's Going On?

A Hovercraft or Air Cushion Vehicle (ACV) is a craft that travels on a layer of compressed air just above any kind of surface--land or water. The compressed air serves as a cushion that eliminates almost all friction between the vehicle and the surface. With your hovercraft, the air flowing from the balloon through the holes forms that layer of air between the hovercraft and the table, reducing friction. With less friction, your hovercraft glides smoothly across the table.

Further Exploration:
Can you modify the base (cardboard octagon piece) so that it “steers” the hovercraft in a specific direction? What are some uses for hovercrafts? Are there other types of machines that use compressed air to do work?