

# Hot-Air Henry

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**Program Description:** LeVar experiences a colorful and exciting expedition in a hot-air balloon, takes a look at some comical flying machines of the past that never made it off the ground, and visits the National Space Camp where kids find out what it takes to become an astronaut.

## Mini-Tornado

**Key Words:** air currents, tornadoes, vortex

**Concept:** Rapid movement of air or water can create a vortex.

Hot-air balloons drift along on air currents caused by the movements of warm and cold air. Most air currents are gentle but they can be very forceful, as in the case of a tornado. A tornado is the result of a large amount of moving air coming together in one place. The air develops a spinning motion called a vortex. You may have seen a small vortex in your bathtub at home as you watched spinning water go down the drain.

**Materials:** Wide plastic jars with lids such as a peanut butter jars, water, uncooked grains of rice, liquid dish soap, paper towels.

1. Have each small group of students fill a plastic jar with water to an inch from the top, then add a few grains of rice, and 2 or 3 drops of liquid soap before securing the lid tightly.
2. Have them dry the jar with paper towels, and hold the jar tightly as they shake it vigorously in a circular motion.
3. After shaking the jar have them quickly place it on a table and observe the motion of the water and air. The movement in the jar will form a mini-tornado, which is made more visible by the soap and rice. This spinning water is called a vortex and it is similar to a tornado, which is rapidly spinning air. Before repeating the activity, students may need to scoop some of the soapsuds out of the water.

# On The Rise

**Key Words:** air, gases, temperature

**Concept:** Warmer air rises.

As Hot-Air Henry learned, pulling on the burner cord made the hot-air balloon rise, and opening the top of the balloon made it descend. This is because the burner fire warmed the air inside the balloon and, since warm air rises, the balloon rose. Releasing the warm air and allowing the outside cooler air to enter the balloon caused it to descend.



**Materials:** 8" construction paper circles with centers marked, scissors, tape, 12" pieces of thread, 100-watt light bulb, lamp without a shade, electrical source.

1. Discuss what Hot-Air Henry did to make the balloon rise and descend. Explain that warmer air rises and that cooler air sinks. Ask students to explain why the balloon rose and fell. (The burner warmed the air, causing the balloon to rise. Opening the hole in the top of the balloon released the warm air causing the balloon to descend.)

In this activity students won't be able to see the warm air rising but they will be able to tell that it is by seeing its effects.

2. Have each student cut a spiral shape from construction paper, and tape the end of a piece of thread to the center of it.

3. Discuss the changes in the temperature of a light bulb when it's on compared to when it's off. Ask them to predict what will happen to the temperature of the light you'll be using when it's turned on. (The temperature around the light bulb will become warmer.)

4. One at a time, have students hold their spiral several inches above a cool light bulb. Then turn on the light (reminding them not to touch the bulb) and have them try it again. After a moment the spiral will start to spin slowly. Ask them why this happened. (Warm air rising above the light pushes up on the spiral causing it to spin.) Have them try it away from the light and again over the lighted bulb, reminding them to steady the spiral after each move. Ask them why the spiral does not spin when it is away from the light. (There is no warm rising air to push it.)

**Extension:** Ask students to think of other places where warm air might be rising, such as above a radiator or above a sunlit, dark-colored, countertop. (Forced-air heaters are not good examples since air movement is caused by a fan.) Have them use their spiral to test if their predictions are correct.