



How can you see air move?

INTRODUCTION

Air is a form of matter. Air can move things around.

WHERE'S THE SCIENCE

Air and weather are connected. Weather is the condition of the atmosphere and the atmosphere is made of air. The weather we are concerned about happened in the lowest layer of the atmosphere, the troposphere. It has undergone many changes as the earth developed. It started with hot, poisonous gaseous, then cooled and water vapor started forming. It is believed that it rained for millions of years causing the oceans to form. As life began on earth, the atmosphere changed once again thanks to plants. They produced oxygen which helped to lessen the poisonous ammonia gases. The air we breathe today is made mostly of nitrogen, with oxygen, ammonia, methane, carbon dioxide, sulfur dioxide, helium, and hydrogen all mixed in. Weather is produced when these gases that form our air start to move. Changes in temperature cause the air molecules to move closer together (cold) or spread further apart (hot). If you are cold, you wrap your arms around yourself and huddle up to someone else. If you are hot, you hang your arms away from your side and spread away from others. In cooler places, or even at cooler times of the day, the air molecules move closer together causing them to be **denser**. Dense is a term that describes how many molecules there are in given space. A balloon half filled with air is not as dense as one ready to pop from overfilling. Denser air means heavier air that moves downward. This dense, "heavy", air pushes down and is thus called **a high-pressure area**. The opposite is true for warmer air. It spreads apart, causing less dense air that moves upward. We call this **a low-pressure area**. Land heats up faster than water, and near the equator heats up faster than near the poles. Uneven warming on the surface of the earth causes high and low pressure areas to exist at the same time. If you are crammed into a room with hundreds of people you start leaving and going to a room not so crowded. Air does the same thing. It moves from the high-pressure area crowded with molecules to the low-pressure area with more space. This causes wind. Wind can be a gentle breeze or a violent tornado depending on how much, and how fast, these pressure areas change. We use wind to push us in a sailboat, make energy from a spinning windmill, and lift us up in an airplane. Scientists are still studying new, creative ways to use wind to help us.

MATERIALS

- 1 Straw
- 1 Feather
- 1 Cotton ball
- 1 Sheet of paper about 4” square
- 1 Small Lightweight Hollow Plastic ball

PROCEDURES

1. Explore with the materials. Discuss what is similar about all of them and how are they all different. Which two are most like each other?
2. Try blowing the items around. You may want to set up a mini racetrack by laying a meter stick on a table or on the floor. Count how many puffs it takes to move each item the length of the stick. (You may need to explain and demonstrate what is meant by a “puff” so all students are using the same procedure.) Record the puffs in a chart by group or as a whole class.
3. Did they move? What made them move?
4. If you have the balloon pump from the last activity, try to see how many pumps it takes to go the same distance. If you do not have a balloon pump, try making air puffs by clapping with erasers, your hands, or books. Ask students for ideas on other ways to make wind.

ADDITIONAL RESOURCES

- *Janice VanCleave’s Earth Science for Every Kid book
- *FOSS Air and Weather Kit Investigation 1
- *<http://www.billnye.com/> (episode #22)
- *<http://www.weatherwizkids.com/>
- * <http://www.surfnetkids.com/wind.htm>

Nevada State Standard

P2A3 Students know matter can be categorized by observable properties such as color, size, shape, and weight. E/S