Air Pressure Lesson Plan

Learning Objectives: Student will understand the properties of air (weight, volume) and that these properties create air pressure.

Idaho State Standards Met: K.S.3.1.1**,** 1.S.3.2.1, 2.S.3.2.2, 3.S.3.1.1, 4.S.3.1.1, 5.S.3.3.2, 6.S.3.3.3, 7.S.3.1.1**,** 9-10.B.3.1.2

Background: It's hard to imagine that air is matter. After all, matter is something that has volume (takes up space) and has mass (*can be weighed), and because air is invisible, it seems to have neither. In fact, for many thousands of years, people didn't even know that air existed. But air does take up space, even if we can't see it, and air has weight, even if we can't feel it -- and both of these properties can be observed and measured.

Standing before the students, hold an empty bottle and ask, "What do I have in this bottle?" (air) Ask the students if they can name some of the properties of air. Write them on the board. In addition to being invisible and odorless, see how many of the properties of air they can come up with. If they don't suggest weight and volume, ask... "Does air have weight? Does air take up space?"

Activity: Air takes up space

Materials: Cup and Paper Towel

Procedure: Place a balled up paper towel at the bottom of a clear cup (tape it to secure it to the cup) and ask what will happen to the paper towel when you submerge it in the clear bowl or aquarium filled with water? Submerge the cup and have students notice that the paper towel stays dry.

Ask: Why is the paper towel able to stay dry? Because the air trapped in the cup takes up space, and does not allow the water to soak the paper towel.

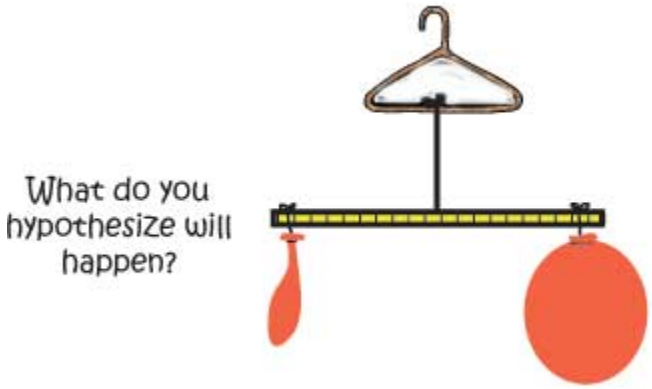
Activity: Air has weight

Materials: Yardstick, two balloons, a hanger, tape and string or thread for each team of students

Procedure: Air has weight. You can prove this by the conducting the following experiment.

1. You will need a yardstick, two balloons, a hanger, tape, and string or thread.
2. Suspend the yardstick from a hanger by attaching a string to the middle of it. Make sure to find the exact middle of the yardstick.
3. Tape or tie each balloon to the ends of the yardstick. Make sure your yardstick is balanced.
4. Remove one of the balloons and blow it up. Tie a knot to keep it closed. Replace it to the exact same spot on the yardstick.

5. Is the yardstick still balanced? Why?



Activity: What is air pressure?

Background: Although we are not aware of it, we live at the bottom of an ocean of air. The atmosphere of our planet is pressing down on us all the time. Air pressure is greater near the ground than it is higher in the sky. To illustrate this principle, imagine a pile of books stacked one on top of the other. The weight or pressure on the bottom book would be much greater than the pressure on the top one. It's the same with air molecules; those molecules on the bottom have greater pressure on them than those above. You can feel this change in air pressure as you go up a mountain. Your ears will pop in order to balance the pressure between the outside and inside of your ear.

The higher the air pressure, generally the warmer the temperature. The molecules nearer sea level are compressed together and when the molecules compress together, the air gets warmer. Try pumping up a tire with a bicycle pump. When you push the plunger down, you compress the air inside. After pumping awhile, you can feel the pump get warmer as the compressed air inside heats up.

Can you predict which city would generally have the warmer temperatures, Boise or Idaho Falls?