OBJECTIVE	Show that air has weight.
OVERVIEW	After balancing two inflated balloons, the air is removed from one balloon throwing the balance off.
TOTAL TIME	5 minutes.
SUPPLIES	Yard/meter stick Two large balloons String Scotch tape
PRINTED/AV MATERIAL	None
TEACHER PREPARATION	You can have someone hold the string or you may want to have a piece of string hanging from the ceiling before class.

Background

Air is all around us. This air is composed of atoms and molecules. Despite their small size, the quantity of atoms and molecules exert weight on us known as pressure. Since our bodies are designed to live in this environment, we do not notice the pressure.

Procedure

1. Blow up both balloons so they are the same size.
2. Tape one balloon to each end of the yard/meter stick.
3. Tie a string to the center of the stick and adjust it so the stick balances when held by the string. Tape the sting in place to prevent it from slipping.
4. Ask the students, "If one end were heavier, would the heavier end move up or down?"
5. Supporting one balloon, have someone carefully deflate the other balloon. Try poking the balloon with a pin in its neck to prevent the balloon from tearing apart as it pops.
6. Release the remaining balloon and ask the students to explain what happens.

Discussion

Since the inflated balloon weighs more than the deflated one, the side of the inflated balloon will drop. Imagine the weight of air if that balloon were now 15 miles (24 km) tall. That is actually what is occurring at this moment in your classroom. When we measure air pressure, we are measuring the weight of a column of air 15 miles (24 km) high directly over us.

Fast Facts

Baseballs travel farther in moist air than in dry air. For any given volume of air, moist air (at the same temperature and pressure) has exactly the same number of molecules as dry air.

Dry air is composed of mostly of heavy oxygen (O_2) and nitrogen (N_2) molecules. However in moist air, some molecules are the lighter weight water molecules (H_2O), rather than heavier O_2 or N_2 molecules.

Therefore, the air is less dense in moist air and this decrease in density equates to less resistance to the ball's motion through air. So, for two baseballs hit with equal force, the one in the moist air would travel farther than the one hit in dry air.

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