

Project FOCUS  
Best Lessons  
MIDDLE SCHOOL

**Title of Lesson:** Hot Air Balloons

**Theme:** Earth/Space Science

**Unit Number:** [Click here to enter text.](#)

**Unit Title:** Weather

**Performance Standard(s) Covered (enter code):**

S6CS1: Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.

S6E3: Students will recognize the significant role of water in Earth processes.

**Enduring Standards (objectives of activity):**

**Habits of Mind**

- Asks questions
- Uses numbers to quantify
- Works in a group
- Uses tools to measure and view
- Looks at how parts of things are needed
- Describes and compares using physical attributes
- Observes using senses
- Draws and describes observations

**Content (key terms and topics covered):**

High Pressure

Low Pressure

Air Temperature

Density

**Learning Activity (description in steps)**

**Abstract (limit 100 characters):** Students relate different properties of air, such as temperature and density, in order to understand high pressure and low pressure systems.

**Details:** Before class cover an open empty water bottle with a regular sized balloon. Set up a hot plate with a pot about 1/4 filled with water and also set up a bowl filled with ice water. Turn on the hot plate to warm up the water. It doesn't need to be boiling, just hotter than comfortable to touch. Start by reminding the students about the water cycle and density. I used a video of a lava lamp to help transition from what they know about density to how heat affects density. Put sentences on the board with blanks in them that when answered say "warm air rises and expands" and "cold air sinks and condenses". Have the students try to fill in the blanks from the discussion and volunteers will write their answers in the blanks. Once the students sit down begin the demonstration asking students to write down what they think will happen. Place the water bottle in the hot water and watch the balloon inflate. Then move the bottle to the ice water and watch as the balloon deflates. Ask students to write down their observations then discuss with their partners what they think just happened. Come back together as a class and discuss. Then draw a high pressure system and a low pressure system on the board and ask them what kind of air relates to each. High pressure is cold air because it sinks and condenses towards the earth. Low pressure is hot air because it rises and expands towards the atmosphere.

**Materials Needed (type and quantity):**

Empty plastic water bottle

Balloon

Hot plate

Pot (or heat resistant bowl)

Ice

Water

**Notes and Tips (general changes, alternative methods, cautions):**

If you let the students do the experiment themselves, be sure to watch them and make sure they don't burn themselves.

It would be more fun for the students to have individual hot plates as a group rather than have to watch a demonstration as a class.

Bring an extra bottle bigger than the water bottle so the students can see if more air heating up blows the balloon up more.

**Sources/References:**

1) <http://www.weatherwizkids.com/experiments-balloon-bottle.htm>