

**Title:** Aha! How Things Work

**Overview:** Aha! “scientists” will be introduced to how compasses, barometers and boomerangs work, with emphasis being placed on magnetism, air pressure and lift.  
Vocabulary: air pressure, magnetic north pole, magnetic south pole, lift and force

**Objectives:**

1. Scientist will learn about Earth’s magnetism, the definition of magnetic north and magnetic south poles, and explore how a compass works with Earth’s magnetism to determine direction.
2. Scientists will construct their own compasses and use them successfully in the science lab.
3. Scientist will discover how air pressure is used to predict the weather through the use of a barometer.
4. Scientists will build a working barometer and learn how to interpret the data.
5. Scientists will explore the physics of flight and discover how the design of a boomerang works with the mechanics of flight.
6. Scientists will assemble their own boomerangs and test how the boomerang design works with lift and force to create the circular orbit of the boomerang.

**Materials and Resources:** Materials for experiments [see experiments]  
Compass Experiment: <http://science.howstuffworks.com/compass2.htm>  
Barometer Experiment: [http://mathinscience.info/teach/k5\\_science/earth\\_sciences/weather\\_watchers/ka\\_make\\_baromtr.pdf](http://mathinscience.info/teach/k5_science/earth_sciences/weather_watchers/ka_make_baromtr.pdf)  
Barometer High/Low Scale Pattern handout (found on above website).  
Air Pressure Observation handout (found on above website).  
Boomerang Experiment: <http://www.nationalgeographic.com/ngkids/trythis/try11.html>

**Procedures :**

Before class starts: Hang directional signs that indicate North, South, East and West.

1. Start a dialogue how things work and introduce How Stuff Works website: <http://www.howstuffworks.com>. Ask scientists for examples and demonstrate how to use website to find answers.
2. Introduce magnetism and define magnetic north pole and magnetic south pole. Explain how a compass works with the magnetic poles to find direction.
3. Scientists will build compasses and test them for accuracy using directional signs.
4. Discuss how air pressure is used to predict weather changes and the importance of a barometer in this process.
5. Scientists will construct their own barometers and learn how to interpret the data correctly to predict weather patterns.
6. Review the physics of flight and lift. An excellent resource for this can be found at the following website: <http://www.lpi.usra.edu/education/explore/rockets>. Another resource is the NASA Educator’s Guide entitled: 3-2-1 Liftoff! This can be downloaded from their website at [www.nasa.gov](http://www.nasa.gov). Click on the link “For Educators” and select your grade level.
7. Using the Boomerang Experiment pattern, scientists will create their own boomerangs and practice how to throw them properly so that the boomerang returns.

**Conclusion :** The Air Pressure Observation Handout will be given to scientists so that they can use their barometers at home. Scientists will also take home their compasses with the suggestion that they find out which direction their front door faces. Scientists can continue to experiment with flight and their boomerangs at home as well.