



## How to make a barometer

### Materials Needed:

- An empty glass jar
- A balloon
- A strong rubber band
- A drinking straw
- A piece of paper
- Scissors
- Sticky tape

### Directions for making the barometer:

1. Cut the neck off the balloon.
2. Stretch the balloon tightly over the mouth of the jar. Have a friend hold the jar so it does not fall and break.
3. Secure the balloon with a rubber band so it makes a flat, air tight seal on the jar.
4. Cut a small triangle from the piece of paper to form an arrow for the straw.
5. Snip one end of the straw crossways to make a 1cm slit on each side. Slide the paper arrow head into the slits.
6. Place the other end of the straw at the center of the covering of the jar. Attach the straw to the balloon with a piece of sticky tape so that one end is at the center and the other end extends over the edge.
7. Place your barometer outdoors in a sheltered spot.



## **Barometers and why we use them!**

1. What does a barometer measure?
2. Why would we need to know about changing weather patterns?
3. How does your barometer work? What happens to the balloon as the pressure changes? What does it mean?
4. What kind of weather does high pressure bring? What about low pressure?
5. Name three professions that would need to understand and use barometers.

## **Barometers and Weather**

### **Goals:**

- Understand the use and function of a barometer.
- Understand the relationship between weather and changing air pressure.
- Understand the concept behind the design of a basic barometer.
- Develop an appreciation of the complexity of weather and changing weather patterns.
- Develop an appreciation of how changing weather affects everyday life.

### **Objectives:**

- Students will build a basic barometer for measuring changes in air pressure.
- Students will follow directions for building barometer.
- Students will participate in a discussion about the materials used and why they were used for this particular design.
- Students will make predictions about how the pressure will affect their barometer.
- Students will participate in a discussion about how weather and changes in weather impact daily living.
- Students will create a chart to measure observations.
- Students will answer 5 questions to assess their knowledge after the lesson.

### **Skills:**

1. Following directions
2. Discussion
3. Prediction
4. Drawing Conclusions
5. Observation

### **Standards Covered:**

Earth and Space Science, Learning Standards 6 and 7

Technology Standards: Engineering 2.1-2.4, T/E 1.1

## **Introduction:**

Begin by accessing what students know about barometers and high and low pressure.

The key points are as follows:

1. Barometers measure the air pressure. Air pressure is a good indicator of changing weather patterns.
2. Low pressure means that bad weather is on the way: rain or storms or clouds.
3. High pressure means that good weather is on the way: sunshine and fair days.

The word barometer is derived from the Greek words for weight and measure.

## **Presentation:**

Give each student the instructions for making a barometer. Review the materials.

Engage the students in a discussion of why we are using the materials we are using to make the barometer.

The key points are as follows:

1. Balloons respond to air pressure and can directly indicate how much air pressure there is around them.
2. Get the students to think about why the seal would be air tight? What would happen if there was air in the jar (the balloon would not respond the pressure)?
3. Have the students make predictions about how the balloon will react to the pressure. Get them to discuss why they think this way. Have them give you a specific scientific reason. Then, write down some of their predictions.

## **Exploration:**

Make the barometer. Have the students work in groups so they can hold each other's glass jar.

## **Conclusion:**

1. Discuss the experiment and how easy or difficult it was to make the barometer.
2. Discuss with the students how the actual barometer will work:
  - Their barometers will measure changes in air pressure. It will often record not the present air pressure but the pressure that is coming.
  - High pressure pushes in on the balloon and the cover will be sucked inwards, forming a saucer shape. This should make the arrow point up.
  - Low pressure will cause the cover to puff out and the arrow will point down.
  - If the students record their observations over time, they will get good at predicting the weather patterns over time.
3. Discuss with the students who might use a barometer in their work: gardeners, pilots, coast guard, event planners, meteorologists, and many others.
4. Have students create chart for recording observations. See example.
5. Complete the post questionnaire.

## **Evaluation:**

1. Were the students able to follow the instructions?
  2. Did they understand the basic design? Did they reflect this in their discussion?
  3. Could they work in groups to complete the project or did it present challenges to the group?
  4. Did they have enough background knowledge about weather?
- Follow up: This project works really well if you get the balloon air tight. It is amazing to watch the balloon respond to the pressure. Really big storms like the one on December 1, 2006 pop the balloon way up! A simple and great tool to use with students.

## Making Barometers



Cutting balloon to fit jar.



The balloon needs to be air tight!



The finished product!!



Science is fun!!!