

Cumberland Island National Seashore

Weather Activity



Make your own Barometer:

What is a Barometer?

A **Barometer** is an instrument that measures atmospheric pressure. It is used in forecasting the weather and determining altitude. Low pressure systems usually mean stormy weather, and high pressure systems mean clear weather.

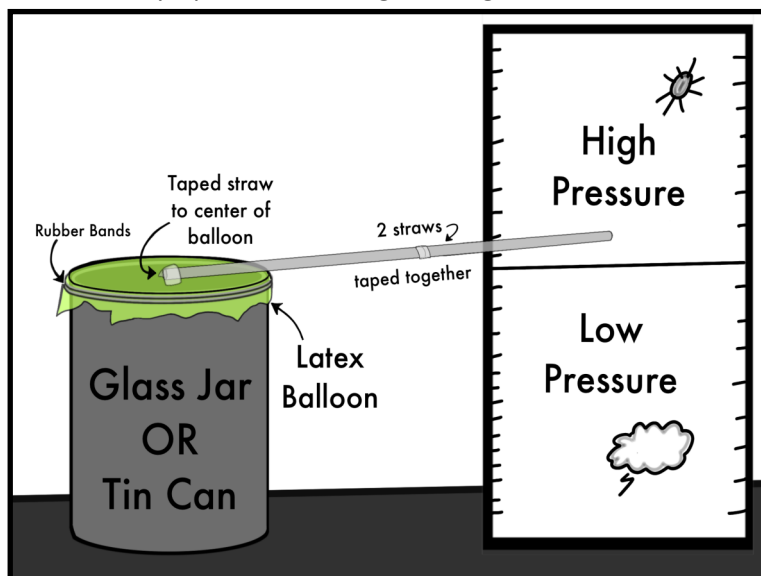
Atmospheric Pressure is the weight of the atmosphere pressing down on Earth. It has an average value of one atmosphere (1 atmosphere = 1 atm) at sea level but decreases with increasing altitude. It is also called **barometric pressure**.

Directions:

1. Set the glass jar (or tin can if concerned about breakage) on a flat surface.
2. Cut the tail of the balloon off so that you have a nice round part left, without the long end.
3. Stretch the balloon so it fits over the mouth of the jar. Make sure it is snug! The jar must be sealed.
4. Use the rubber bands to keep the balloon firmly in place over the mouth of the jar and to keep the jar sealed, so no air comes in or leaks out.
5. A longer straw makes the homemade barometer reading more accurate. Put the first drinking straw into the empty end of the second straw. Do this by gently squeezing the tip of the straw and then pushing it in just a little bit, so they become a single, long straw. Use tape to secure them in the middle.
6. Place one end of the long plastic drinking straw on the center of the balloon. Gently secure it in place with light pressure and then tape it down.
7. Keep your barometer indoors. Place it near a wall. Use some adhesive tape to attach the ruler to the wall. Alternatively, mark a piece of paper with evenly spaced markings, using the ruler. Where the straw sits is "zero". Above this line, write the words "high pressure" or draw a sun. Below this line, write the words "low pressure" or draw a storm cloud.
8. Once your homemade barometer is ready, it should look similar to the diagram (right).
9. Watch your straw over several days and record what you see in a weather journal. Take a few readings each day at same time each day. Make these recordings over the course of a week, so you can compare changes more accurately.

Materials Needed:

- An empty glass jar or a tin can
- A latex balloon (new, not used!)
- A few rubber bands
- Adhesive tape
- 2 plastic drinking straws
- 2 pieces of Cardstock paper
- Ruler



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The science behind the 'Make your own Barometer' Activity

Why did this happen? How does this work?

At the time you sealed off the glass jar (or tin can), you captured air inside it. The air pressure inside your jar was exactly the same as the air pressure outside of the jar. However, as the weather changes, so does the air pressure in the atmosphere (the outside air).

Since your jar is nicely sealed, the air pressure inside it does not change. However, the air pressure outside changes with the weather. This causes pressure on the balloon cover to increase or decrease.

As the air pressure goes up (increases), the chances for sunny, clear weather goes up (increases) as well. Higher air pressure means that outside air is going to press on the balloon cover, since it is heavier than the air inside the jar. When the air presses upon the balloon cover, it makes it cave in a little. This is almost like the air in the jar is sucking in its breath! Since we have taped the straw on the balloon, it will sink down where it is attached to the balloon, therefore the other tip of the straw will rise! Think of a see-saw.

As a storm approaches your location, the air pressure may drop (decrease). This will cause the pressure inside the jar to be higher than the surrounding *atmosphere*, or air, and your balloon cover will bulge out. When this occurs, the end of the straw taped to the balloon goes up, while the end pointing to your ruler will go down!

What else influences Barometric Air Pressure Changes?

Decreasing atmospheric pressure can predict stormy weather, since air pressure changes are usually associated with storms. However, the air pressure you measure is influenced by a few other things too. The daily heating and cooling of the air can increase or decrease the pressure by small amounts. The barometric pressure also changes depending on the *altitude* you live at. **Altitude** is the height of an object or point in relation to sea level or ground level (**elevation**). For example, if you lived at the beach, your altitude would be close to zero, and the typical atmospheric pressure would usually be around **1 atmosphere**.

What are the units for measuring Barometric Air Pressure?

Barometric Pressure can be measured in many units: atmospheres (atm), Pascals (Pa), millibars (mb), or millimeters of mercury (mmHg: which is measured by a mercury barometer).

These activities are intended as a supplemental activity for students taking Cumberland Island National Seashore's distance learning Weather class. This program was made possible by a grant from the National Park Foundation through generous support of partners including Union Pacific Railroad and donors across the country. Revised February 2021.

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Supplemental Journal Entry to Record Barometric Changes in the Atmosphere

Weather Conditions							
Cumberland Island's Barometric Pressure							
Your Location's Barometric Pressure							
Change in Air Pressure (Higher, Lower, Same?)							
Marking on Ruler (Metric)							
Date							

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