

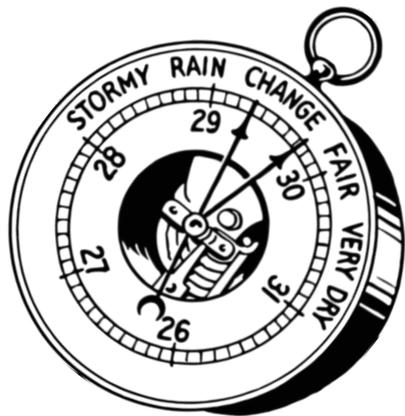
DIY Air Force Activities:

Basic Barometer



Materials:

- empty jar (plastic or glass)
- balloon
- scissors
- paper clip
- coffee stirrer
- tape
- rubber band
- pen and paper to record your findings



We are constantly under pressure from the atmosphere! The air around us is like an invisible ocean. These layers of gas (air) create a shell between the earth and space. That air has mass, and exerts pressure on us. The amount of pressure can change depending on the temperature of the air and your altitude (how high in the sky you are). Weather changes accompany those changes in temperature and pressure (see our Wild Weather DIY). A tool called a barometer can measure pressure changes and help you make predictions about the weather!

Directions (images are provided on the back):

1. (a) Cut off the top of the balloon (about 1-2 inches depending on the size of your jar, this part needs to fit snugly over the top of the jar), (b) followed by the bottom ring.
2. (a) Stretch the top part of the balloon over the mouth of your jar and (b) seal it by wrapping a rubber band around the rim over the balloon, (c) as well as the bottom ring of the balloon.
3. Use your ruler to estimate the center of the top of the jar.
4. Glue your straw to the top of the balloon slightly off of center. Hold it until glue dries.
5. Straighten your paper clip and insert it into the straw so that a small amount is left out.
6. Set up your barometer somewhere that you can leave it for a couple weeks without it being disturbed. Do not place it in direct sunlight. Place your ruler against a wall, secure it with tape, and place your barometer jar in front of this so the needle/wire lines up with the marks on the ruler. This is how you will take your readings! Leave the barometer for 24 hours before recording your first value.

Over the next couple weeks record the position of the needle and make observations about the top of your jar at the same time every day. You can create your own table or use the one on the back of this page to get started. What sort of changes do you observe? What weather conditions correlate with that change? How does your data compare to the local weather report? Don't be discouraged if the needle doesn't move much for a few days! If there is little change in the weather (therefore the temperature and pressure) you will not see a great change in your reading! Check in the morning and evening, you may notice as the atmosphere warms you will see some variation during the day! This is why you must make your comparisons at the same time each day!

Air Force Associations:

These days the Air Force has replaced manual devices such as barometers with automated systems which provide instant data to forecasters. The 45th Weather Squadron out of Patrick Air Force Base in Florida performs weather assessments for air and space operations. They are responsible for assessing the weather and deciding if it is safe for space shuttles to launch! <https://www.patrick.af.mil/>

Step 1:



Step 2:



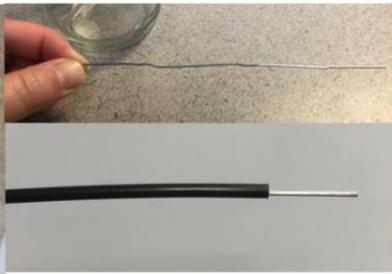
Step 3:



Step 4:



Step 5:



Step 6:



Gravity pulls the air towards the Earth causing it to exert pressure on the surface. The temperature, as well as the number of molecules in a volume of space (how dense), affect the amount of atmospheric pressure an area experiences. Low-pressure systems allow warm air to rise, cool, and condense. Therefore, these systems are normally associated with wind, clouds and precipitation.

When a high-pressure system rolls in, the warm air settles, humidity increases (making the air more dense), and temperatures rise! That is why highs tend to be associated with clear skies and calm weather! For more on this topic see our Condensing into Clouds DIY!

Date	Ruler Mark	Pressure Change	Weather
9/27	14.1 cm	-	63° partly cloudy
9/28	13 cm	-1.1 cm	56° rain showers
9/29	16.1 cm	+2.1 cm	68° sunny

