Pop Up Science - Weather!
Activity 1: Make Your Own Barometer

What you need
- Glass jar or a clean tin can
- Balloon (uninflated)
- Scissors
- Clear tape
- Strong rubber band
- A plastic or paper straw
- An 8.5x11 piece of cardstock paper
- Markers or crayons

Follow the steps below to make a barometer for measuring air pressure. By tracking the movement of the barometer, you can predict short-term changes in weather for your area!

Preparation
1. Gather your materials.
2. Using the scissors, cut the neck of the balloon off and discard.
3. Using the scissors, cut one end of the straw at an angle to create a pointer.
4. Fold the cardstock paper into a triangular column so that it can stand up on its own. You can tape the corners together to give it more stability.

What to do
1. Stretch the remaining portion of the balloon over the top of the jar or can. Pull it as tight as possible so that there is no bump in the center.
2. Place the rubber band so that it secures the balloon in place over the jar or can. The purpose of this is to create a sealed vacuum.
3. Tape the uncut end of the straw to the balloon, such that the end of the straw sits in the center.
4. Place the cardstock column beside your barometer. Using the markers or crayons, mark where the straw currently rests. A little way up above that mark, draw a sun and the letter “H” (for high pressure). A little way below the mark, draw rain and clouds and the letter “L” (for low pressure).
5. Place your barometer outside for several weeks and record the position of the straw pointer daily.

What do you observe? How does the position of the straw pointer relate to the weather?

What is happening?
Your barometer an instrument that measures air (or atmospheric) pressure, which is also sometimes called barometric pressure. Air pressure is essentially the “weight” of the gas molecules in the Earth’s atmosphere. Air pressure changes with altitude and with temperature. Warm air, which is less dense, rises and results in lower air pressure. When it rises it cools down and turns into water vapor, which then condenses into liquid. This leads to cloud formation and rain. Low pressure is generally associated with cloudy and rainy weather. Alternatively, high-density cold air results in increased air pressure. As cold air sinks it dries, causing warm and dry weather conditions in high pressure zones. Therefore, if the air outside has a higher pressure, it will push into the lower pressure zone inside your barometer and push down on the balloon, causing the straw to point upwards. If the air pressure outside is lower, the trapped air inside the barometer pushes up into the lower pressure air and pushes the balloon up, causing the straw to point downwards.

Modified from https://www.scientificamerican.com/article/measure-the-pressure/