

STEM CHALLENGE

The Sun Will Come Out Tomorrow...Maybe? Building a Weather Station



OVERVIEW

Scientists observe and record natural events in our world using tools to make precise measurements. You can build your own weather station and create instruments you can use to record the weather events in your neighborhood.

In this activity, you will design and construct three scientific instruments: a rain gauge to track the amount of rainfall, an anemometer to calculate wind speed and a barometer to measure atmospheric pressure. Then you can collect and compare your data to make your own forecasts to predict the weather.

ANEMOMETER MATERIALS

Table tennis ball
String
Protractor template (On Following Page)
Scissors*
Tape*

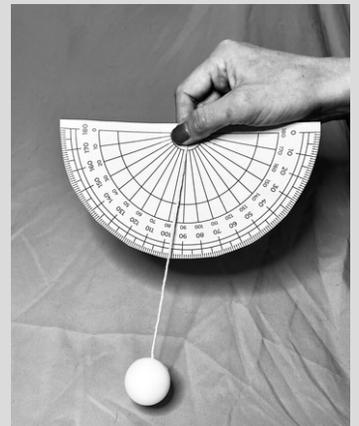
* This item not provided in the kit

LET'S DO IT: ANEMOMETER

1. To build your anemometer, start by cutting out the protractor from the attached template.
2. Tape one end of a piece of string to a table tennis ball and the other to the center of the straight edge of your protractor.
3. Hold your anemometer with the straight edge on top and parallel to the ground.
4. Observe the angle of the string when the wind blows the ball. Determine the wind speed by comparing the angle you measured with the chart.

| ANGLE (degrees) | WIND SPEED (KM/HR) |
|-----------------|--------------------|
| 90 | 0 |
| 95 | 9 |
| 100 | 13 |
| 105 | 16 |
| 110 | 19 |
| 115 | 21 |
| 120 | 24 |
| 125 | 26 |
| 130 | 29 |
| 135 | 31 |
| 140 | 34 |
| 145 | 37 |
| 150 | 41 |
| 155 | 46 |
| 160 | 52 |

An ANEMOMETER is used to measure wind speed!



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RAIN GAUGE MATERIALS

Plastic two-liter soda bottle*
Gravel or fish rocks*
Ruler template
Scissors*
Tape*
Marker*



* This item not provided in the kit

BAROMETER MATERIALS

Small Jar or Cup* (Such as a Mason Jar or Yogurt Cup)
Balloon
Rubber Band
Drinking Straw
Tape*
Scissors*
Two index cards
Sheet of paper*
Marker*

* This item not provided in the kit

LET'S DO IT: RAIN GAUGE

1. To make your rain gauge, carefully cut off the top fourth of a two-liter bottle (just below the "shoulder"). Be careful inserting the point of the scissors to get it started.
2. Cut out the ruler from the attached template. Measure 2 inches from the bottom of the bottle and use a marker to mark the level.
3. Fill the bottom of the bottle with about 2 inches of gravel or fish rocks.
4. Tape the paper ruler to the outside of the bottle so that the "zero" of the ruler lines up with the top of the rocks.
5. Add water to the bottle until it reaches the top of the gravel.
6. Turn over the top of the bottle you cut off and insert it into the bottle to form a funnel. Cover the edges with tape.
7. Place your rain gauge outside and measure the amount of rainfall on the ruler.

LET'S DO IT: BAROMETER

1. Start by cutting off the neck of a balloon.
2. Stretch the balloon over the mouth of a small cup or jar and secure it in place by stretching a rubber band over the balloon and around the cup.
3. Cut a drinking straw in half, and cut one end on an angle to make a point. Align the straight end of the straw with the middle of the cup opening. Tape the straw to the balloon.
4. Tape the short ends of two index cards together, fold at the joint, and tape the structure to a sheet of paper to keep it stable and maintain the same height and angle.
5. Place the cup next to the structure with the straw pointing at one of the cards. Mark on the card where the straw points each day.
6. When the straw points down, your barometer is detecting falling air pressure, indicating a storm may be approaching. When the straw points up, your barometer is detecting rising air pressure, indicating clear skies.



A BAROMETER is used to measure air pressure



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By assembling your weather instruments on the base of a box or a tray, you now have built a weather station. Make observations each day and be sure to collect and record your data on the attached sheet. Can you find any patterns? What is your forecast for tomorrow's weather?

PUTTING
IT ALL
TOGETHER

WHAT'S THE
SCIENCE?

Weather forecasts rely on measurements to detect and predict changes over time. Weather describes the temperature, humidity, pressure, wind, rainfall, and other meteorological characteristics of the atmosphere in a specific place and at a specific point in time.

A weather station includes instruments that help measure the weather. An anemometer measures the speed of the wind. A rain gauge measures how much rain has fallen. A barometer measures atmospheric pressure. By gathering information about the weather, you can predict if you should plan for storms or sunny skies.

CAREER
PATHWAYS

If you like studying the weather, you could be a

- Meteorologist
- Atmospheric Scientist
- Climatologist
- Storm Chaser
- Pilot

READING
CONNECTIONS



You can extend your learning by scanning this QR code to explore books at your local library!

VIDEO
TUTORIALS



Watch tutorials for this activity and additional STEM Challenges by scanning this QR code.



STEM CHALLENGE

DATA TABLE

| DATE | TIME | WIND SPEED <i>anemometer</i> | PRECIPITATION <i>rain gauge</i> | PRESSURE <i>barometer</i> | OBSERVATIONS |
|------|------|---------------------------------|------------------------------------|------------------------------|--------------|
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