



Smithsonian

Tracking a

STORM



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Beyond Guesswork

Have you ever been caught in a storm that you did not know was coming? Have you ever dressed in the morning only to have the weather change by lunch? Without a doubt, weather has a huge effect on our lives. We cannot change weather. We can only prepare for it. The more we know about weather before it happens, the better we can plan around it. But weather can be hard to predict and can change quickly.

When you see a weather **forecast**, it is more than just a guess. Modern **meteorologists** (mee-tee-uh-RAH-loh-jihsts) put science to work to predict what the future holds. They can help people plan their day. They can help people decide whether to pack an umbrella. But that's not all they do. They also track tornadoes, hurricanes, and other major storms. They help people plan for disasters—before they strike. Weather forecasts can actually save lives!

The first forecast that predicted a tornado was issued on March 25, 1948. The tornado was headed for Tinker Air Force Base in Oklahoma.



tornado damage at
Tinker Air Force Base



damage caused by a tornado

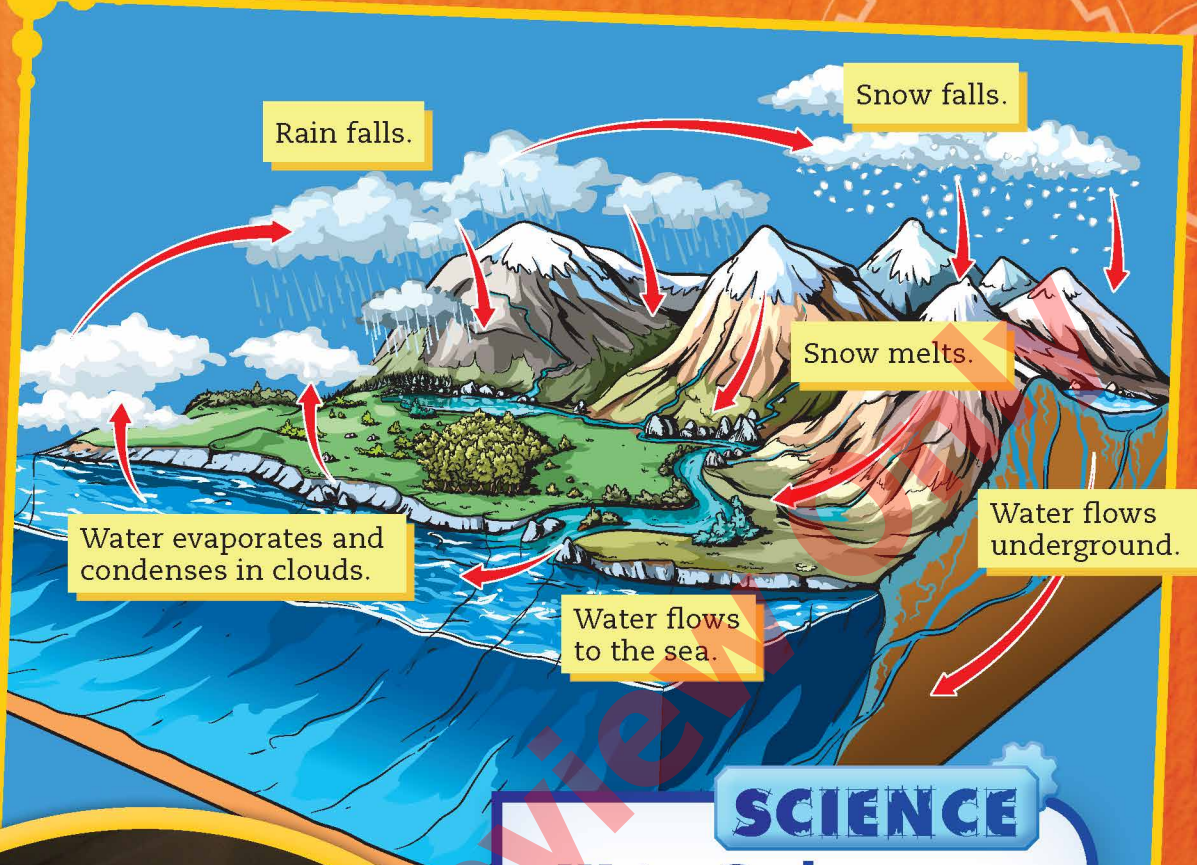
What Is Weather?

When scientists talk about weather, they are describing the state of air at a certain place and time. Many things can affect weather. Air **temperature** is one. Wind speed and **humidity** (hyoo-MIH-dih-tee) can also change the weather.

Air temperature is the most common measurement. People read thermometers to find out the temperature. They help people know how hot or cold it is.

You may have felt humidity before. It can make it hard to breathe. This is due to the **water vapor** in the air. The more water vapor there is, the more humid it is. On a hot day, high humidity makes it feel even hotter. If it is too hot and too humid outside, it can be dangerous.





SCIENCE

Water Cycle

In the water cycle, water moves from Earth's surface to the sky and back again. When the sun heats oceans and lakes, some of that water **evaporates**. It becomes a gas, also called water vapor. Later in the cycle, the same water becomes **precipitation**. It falls back to the ground. This pattern has recycled Earth's water for billions of years.

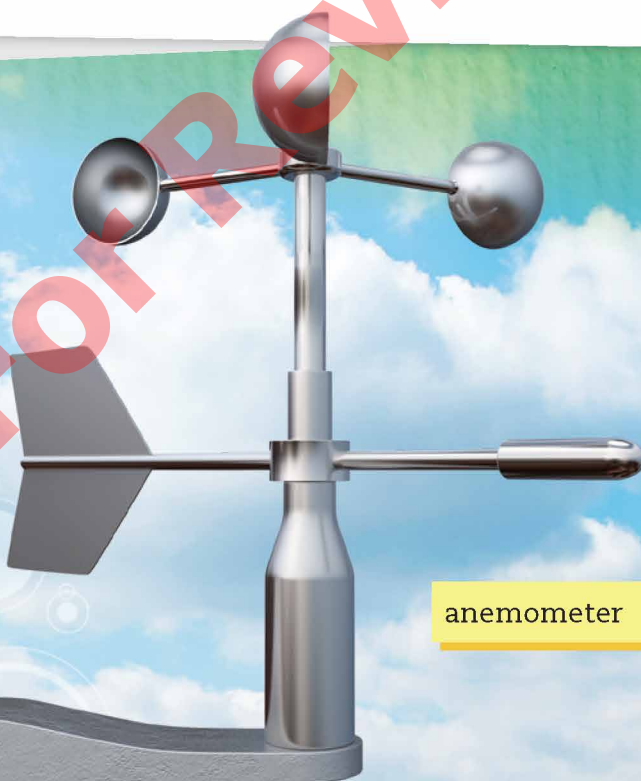
Meteorologists track the weather.

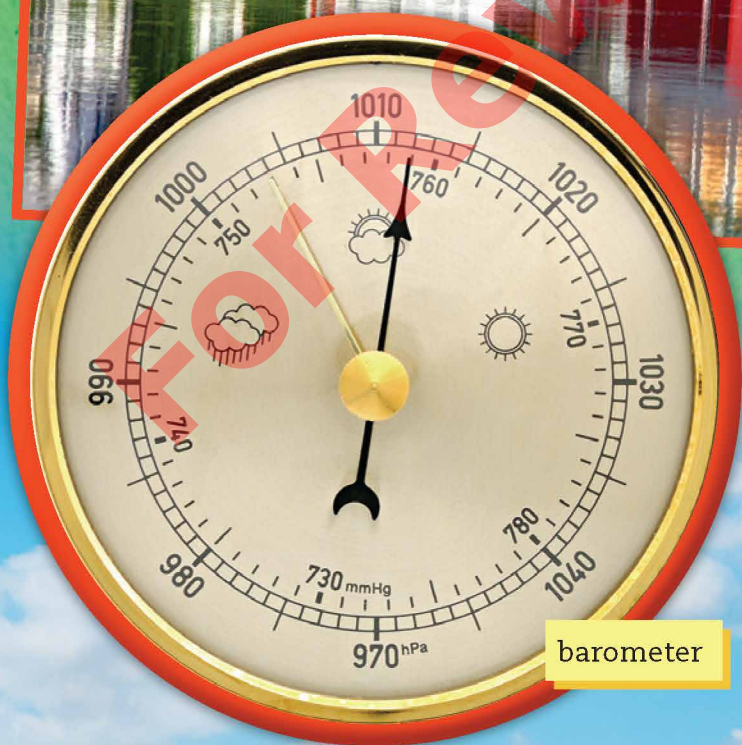
Easy Breezy

You know when it is windy. You can't see the wind, but you can see the effects of it. Leaves fly through the air and blow along the ground. Trees and branches sway in the breeze. But seeing what wind can do does not always give you enough information. Scientists use tools to learn a lot more about wind than they can see with their eyes.

Scientists use anemometers (a-neh-MAH-meh-tuhrz) to measure wind speed. An anemometer is made of a rod with cups attached to it. The cups spin when they catch the wind. Scientists count the number of times an anemometer spins to find the speed of the wind.

A barometer (bah-RAH-meh-tehr) measures the pressure of the **atmosphere**. That is the weight of the air as it is pulled down to Earth by gravity. Atmospheric pressure can help predict the weather. High pressure usually brings clear skies, while low pressure creates clouds and storms.





Air pressure is higher the closer you are to sea level.

STEAM CHALLENGE

Define the Problem

Imagine your class is creating and installing a set of weather tools to be used at school. Your group has been challenged to design a tool that represents the school and measures wind strength and direction.



Constraints: Your tool must be made out of recycled materials.



Criteria: Your tool must have colors, artwork, and/or symbols that represent the school and clearly show wind speed and direction.





Research and Brainstorm

How is wind strength measured? How does your tool work? Where will it be placed? What materials are used to make your tool? What colors, symbols, or themes represent your school?



Design and Build

Sketch a design for your tool, including any artwork. Build your tool.



Test and Improve

Use a multispeed fan to create different wind strengths. Does your tool clearly show the strength and direction of the wind? Ask teachers and students at your school about how well your artwork represents the school. Modify your design and try again.



Reflect and Share

Does placement of your tool matter? How will your tool be useful to students at your school? Would your tool survive all weather conditions?

