

Building Weather Stations

OBJECTIVES

Students construct weather stations on which they will post data that they collect and examine in later activities. The different types of data used to forecast the weather are also discussed in this activity.

The students

- ▶ are introduced to the role of weather stations
- ▶ construct weather stations
- ▶ create sections for recording data on local and national weather

SCHEDULE

About 40 minutes

VOCABULARY

atmosphere
climate
meteorologist
meteorology
weather
weather forecasting
weather station

MATERIALS

For each student

- 1 Activity Sheet 1

For each team of two

- 1 box, flat†
- 1 map, U.S. outline
- 1 marker*
- 4 paper fasteners
- 1 pair scissors*

For the class

- 1 stapler*
- 16 weather reports, newspaper*

*provided by the teacher

†in separate box

PREPARATION

- 1 Make a copy of Activity Sheet 1 for each student.
- 2 Select an area in the classroom where the weather stations can be displayed. Each team of two will have one station.
- 3 **Weather Reports:** Before beginning the activity, collect sixteen reports of national weather and sixteen reports of local weather from today's local newspaper. (National and local weather reports can usually be found on the same page of the newspaper.)
 - The reports should also contain a forecast for local and national weather.
 - Preview the reports and become familiar with the information contained in them in order to answer students' questions.
- 4 Each team of two will also need a U.S. outline map, four paper fasteners, a marker, a pair of scissors, and a flat box.

BACKGROUND INFORMATION

The **atmosphere** is the layer of air that surrounds the earth. **Meteorology** is the study of the entire atmosphere, including its weather. **Weather** is the condition or state of the atmosphere at a given time and place, and predicting what future weather will be like is known as **weather forecasting**.

Even though many technological advances have allowed us to forecast the weather more accurately, there are still so many variables (volcanic dust, pollution, and so on) that affect our weather that often the day's weather surprises us.

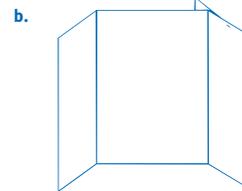
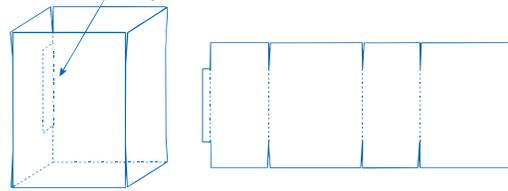
A **weather station** is a place where weather data is recorded for display. In this activity, students build their own weather stations. Later, they will organize, chart, and record national and local weather data, and use the data to make daily forecasts.

▼ Activity Sheet 1

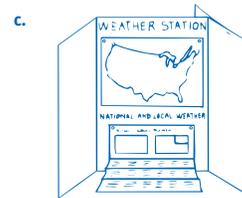
Building the Weather Station

Follow these instructions to make your weather station:

a. Pull apart seam.



Fold back the side without the tab. Staple it in place. Fold back the tab. Staple it in place.



Use paper fasteners to attach the map and the newspaper report.

Guiding the Activity

- 1 Write *atmosphere*, *weather*, *weather forecasting*, *meteorology*, and *meteorologist* on the board. Ask, **What do you think these terms mean?**

Explain that the condition or state of the atmosphere at a given time and place is known as **weather**, and predicting future weather conditions is known as **weather forecasting**. Explain that **meteorology** is the study of the atmosphere and its weather. Those who study meteorology are called **meteorologists**.

Write the word *climate* on the board. Tell students that **climate** is the average weather over a long period of time.

Write *weather station* on the board and ask, **What do you think a weather station is?**

Additional Information

*Students may know that the **atmosphere** is the air surrounding the surface of the earth.*

*A **weather station** is a place for recording and displaying weather data that has been collected.*

Guiding the Activity

Tell students that in this activity each team will build a weather station, and that in later activities they will collect weather data and record these data in particular areas on their weather station.

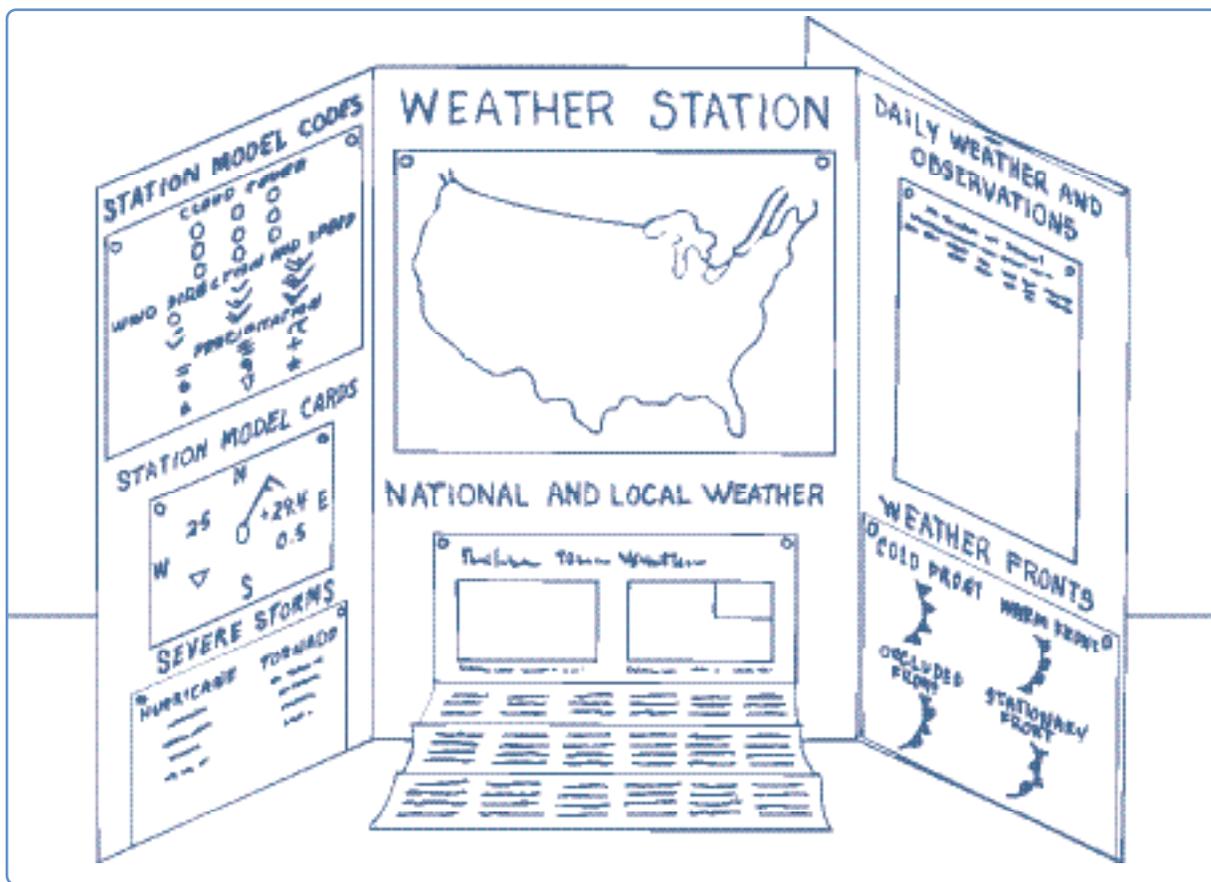
- 2 Make a drawing on the board of what the weather stations will look like, using Figure 1-1 as a guide.

Tell students that they will add more sections to the weather stations in later activities.

Additional Information

By observing the weather conditions every day, the students will be able to predict (forecast) the weather.

Label only the center panel of the weather station for this activity.



▲ Figure 1-1. The weather station.

- 3 Distribute a copy of **Activity Sheet 1** to each student, and distribute one box and one marker to each team. Tell teams to follow the pattern on the activity sheet to construct their weather stations.

Make sure that teams are pulling apart the seam correctly so that every station will look like the one shown in Figure 1-1.

Guiding the Activity

Additional Information

4 After the seam of each box is opened, one side is folded back, and the box is positioned as shown in Figure 1-1, students should staple the right-hand-most flap to the back of the adjacent flap. Then have teams use their markers to write *Weather Station* on the top of the center panel (see Figure 1-1).

5 Distribute the U.S. outline maps, the paper fasteners, the scissors, and the national and local weather reports from a newspaper. Have each team use two paper fasteners to hang the outline map on the center panel, directly under the *Weather Station* heading.

Tell teams to use the marker to write the heading *National and Local Weather* under the outline map. Then teams should cut the weather report out of the newspaper. They can use the remaining two paper fasteners to secure it under this heading on their station (see Figure 1-1).

6 Call the students' attention to the newspaper weather report. Tell them that they will get the national and some of the local and regional weather data from the newspaper but that much of the local data they will collect themselves.

Tell the students that in upcoming activities they will learn how to use weather instruments to gather data that they will display in specific areas on their weather stations. Explain that they will keep track of weather conditions such as temperature, amount of rainfall, wind speed and direction, air pressure, cloud types, and more.

Note: You may wish to assist students as they make holes in the cardboard for the paper fasteners.

Explain to the students that the weather reports contain symbols that meteorologists use to indicate the current state of the weather. These symbols will be explained in detail later.

Remind students that they will learn how to use all of this data to forecast the weather.

Guiding the Activity

- 7 Remind each team that they must collect and bring to class a weather report from a newspaper for the next 8–10 activities. Let students know on what days you plan to conduct the activities so that they will know when to collect and bring in a weather report.

Collect extra weather reports and forecasts yourself, as well, so that any team without a report can use one that you provide.

Additional Information

Team members could take turns collecting the daily newspaper report so that one student does not assume all responsibility for the team.

REINFORCEMENT

Encourage students to think of a television or radio weather report that they have heard recently. Ask whether the broadcast included a weather forecast. Recall what types of weather information were given in the report. Compare the information in the broadcast report with what the students read in the newspaper report.

SCIENCE JOURNALS

Have students place their completed activity sheets in their science journals.

CLEANUP

Put the weather stations in the designated areas.

SCIENCE AT HOME

Have students watch a television weather broadcast. Tell them to pay special attention to the weather station that the meteorologist uses and what types of data are present.

Connections

Science Challenge

Ask interested students to research how Earth's atmosphere was formed and to create a bulletin-board display showing the sequence of stages from the formation of the first atmospheric gases about 4.6 billion years ago through today's atmosphere. One good source of this information is *How the Weather Works* published by Readers Digest, 1999.

Science Extension

- ▶ Ask each student to write a brief explanation of the difference between *weather* and *climate*. Let students share their definitions and then check a resource to verify and, if necessary, correct them. (Definitions may vary somewhat. In general, weather refers to the condition of the lower atmosphere at a particular time and place, whereas climate refers to the average weather at a particular place over a long period of time.) Students also could investigate the various climate zones on earth.
- ▶ Explain that weather is the result of the interaction between the sun's energy and Earth's surface and atmosphere. Solar energy powers the water cycle. Have students recall or research the steps in the water cycle: the evaporation of water from oceans, lakes, rivers, and other bodies of water on Earth's surface; the rising of water vapor into the air, where it cools and condenses to form clouds; and the falling of precipitation (any liquid or solid form of water) from clouds to Earth's surface, where it can evaporate again. If you have a terrarium in the classroom, cover the top with a sheet of plastic wrap for a day or two so students can observe the water cycle. (*Note:* If you have animals in the terrarium, make sure that temperatures do not become too hot for them.) Students also could observe the cycle by putting plastic wrap over the top of a small bowl half-filled

with damp soil and then placing the bowl in sunlight.

Science and Language Arts

Students might enjoy reading old myths that attempt to explain weather conditions in terms of gods and goddesses or other supernatural beings. For example, the ancient Greeks believed that different winds were caused by different gods—including Boreas, Notus, Eurus, and Zephyrus—all controlled by the god Aeolus. In ancient China, dragons were believed to cause rain.

Science and Social Studies

Ask interested students to research and report on the development of the science of meteorology from ancient times to the present. Students could begin by studying Aristotle's work and continue with Galileo's and Descartes' observations with instruments, Sir Isaac Newton's and Edmond Halley's experiments, Benjamin Franklin's studies of weather patterns in the United States, the federal government's establishment of a weather service to collect data and forecast weather, and the types of weather collection and reporting methods used today. Make sure students include in their research the use of computers to model and predict weather conditions. (Also see the Science, Technology, and Society connection.)

Science, Technology, and Society

Suggest that teams of students research and report on the different types of technological devices that are commonly used today to collect weather data and transmit it to weather centers and stations. Examples include weather satellites (both geostationary and polar-orbiting), radar, weather buoys, and radiosondes (weather balloons).