



Chapter 15. Bringing More Meaning to Weather Predicting: the Weather Station and “Reading” the Sky Help Put It All Together: A Guided or Open-Inquiry Activity

Background

This publication uses the building of weather instruments as a means of developing a better knowledge of the basic elements of meteorology related to understanding and ultimately predicting weather. In addition, much effort was expended to produce these activities that vary in level of inquiry. In this section, there is an emphasis on other important attributes of learning.

Some of the instruments needed for a weather station are described simply and directly. The approach does not abandon the important learning involved in building and applying various types of weather instruments. However, there are challenges given for developing or securing more accurate and sophisticated instruments. Because of the importance of technology and the wealth of information available from the Internet, guidance is given for searching the Internet and enhancing the classroom activities by using this important learning medium (Appendix V). Emphasis in this section focuses on the necessary skills of keen observation, the ability to collect important data and using this data in projecting outcomes. Finally, the important and basic information about air movements should coalesce as this information relates to the formation of clouds and their movements in bringing our future weather.

The following information focuses on the tools, procedures, and the necessary understanding to build a backyard weather station. Most immediately, the instructions, as they relate to the elements of a weather station, are more directed and of low-level inquiry. The approach becomes much less directed and moves toward guided and open inquiry as it stresses proper ways of collecting data, compiling

and synthesizing data from the weather station, and ultimately relating this data to changes in sky condition.

The learners might choose to use some of the instruments they have constructed and to purchase others as needed, such as (1) an anemometer, (2) a wind vane, (3) a rain gauge and (4) a thermometer from a local hardware store or scientific supply house. Also, instructions are given to construct these needed instruments if desired. It might be interesting to compare the accuracy of the data collected from the student-constructed instruments with the data from the more sophisticated purchased ones and to check the results.

Building a Simple Weather Station

A weather station, as shown in Figure 15-1, consists of a series of instruments that can be used to collect information about weather factors such as temperature, air pressure, rainfall, relative humidity, wind direction and wind speed. Ideally, these instruments should be grouped as closely together as possible. The instruments of an official weather station are often sheltered in an enclosure, except for the anemometer and rain gauge.

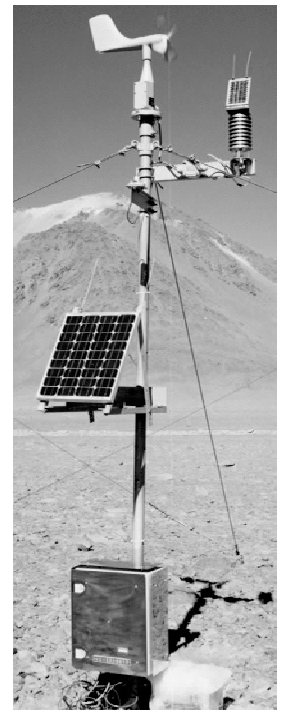
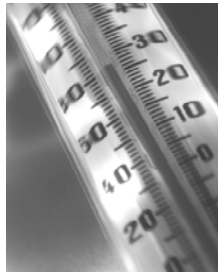


Figure 15-1.
A weather station.

Instruments Needed

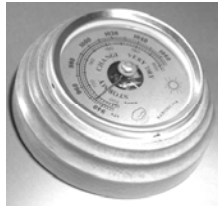
A **thermometer** is needed to measure the air temperature. It is important to make sure that the bulb of the thermometer is shielded from the direct sunlight.



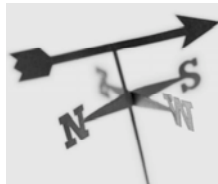
A **rain gauge** is needed to measure the amount of precipitation. A rain gauge should be placed in an area where it is well exposed to an open sky and not sheltered by trees or other overhanging obstructions.



A **barometer** is needed to measure the air pressure.



A **wind/weather vane** is used to determine wind direction. The wind vane should be placed in an open area where it can rotate freely as the wind direction changes.



An **anemometer** is used to measure wind speed. An anemometer should be placed in an open area where it can rotate freely as the wind changes direction and speed.



A **psychrometer/hygrometer** is used to measure relative humidity. If a hygrometer is used, make sure that it is shielded from exposure to direct sun.



It is important to decide which weather events and data you want to record and how often you want to take measurements, such as once a day, twice a day and so forth. The more detailed and accurate your measurements and recordings are, the more specific your picture of the patterns will become.

Extensions for This Activity

Many kinds of open-inquiry activities can be established using the weather station:

Listening to and recording the seven-day TV weather forecast can be used to compare your predictions based upon your weather station output.

Long-range comparisons can be made by keeping an accurate record of your data over a long span of time.

Comparisons with the almanac readings (simply averages over long spans of time) can be compared with your long-range recordings to determine how they correlate.

Compare the percent accuracy of your weather station data predictions with that of the TV weather predictions to see how they correlate.

The following are directed instructions for ways to construct weather instruments not addressed in the previous sections of this publication.

The following activities or directions assist the learners in devising the additional weather instruments they will need but have not yet developed.

Weather Vane or Wind Vane

A weather vane (also called a wind vane) spins on a rod and points in the direction *from* which the wind comes and is used for determining wind direction. It is probably one of the oldest weather tools and is usually shaped like an arrow. One end is shaped like an arrowhead and turns into the wind, and the opposite end is wide so that it is affected by the slightest breeze.

