

Collecting Weather Data

By Cindy Grigg

¹ The conditions of the atmosphere at a certain time and place are called weather. Is weather important in your life? It affects what clothes you wear and your choices of activities. It may even affect your mood. The weather of an area is due to four factors. They are heat energy, air pressure, winds, and moisture. Changes in these factors determine the kind of weather an area will have. We base decisions on what to wear, where to go, and what to do on the weather forecast.



² To make weather maps and forecast weather, weather data must be collected from Earth's surface and atmosphere. Scientists analyze the weather maps and the data in them to forecast the weather. These data are collected in many ways. Data comes from a Latin word meaning "something given." It is the plural form of the word "datum." Today, we often use it as both singular (meaning information) and plural (meaning facts or pieces of information).

³ Data are collected at weather stations on the ground. More than four hundred national weather stations in the United States measure weather conditions many times every day. Each station measures weather conditions such as temperature, atmospheric pressure, wind speed and direction, amount of cloud cover, and precipitation. The National Weather Service uses the data to make weather maps.

⁴ Radar is another tool meteorologists use to gather data. Radar, which stands for radio detecting and ranging, sends out radio signals that are reflected from objects such as clouds and rain. Computers turn the reflections into images. Radar on ground level is used to identify areas of heavy, medium, or low precipitation. You have probably seen radar images on television. They usually appear in different colors to show different amounts of precipitation.

⁵ One of the most valuable sources of global weather information is weather satellites. A satellite is a body in orbit around another larger body. The moon is a natural satellite of Earth. But Earth has many man-made satellites in orbit around it. The satellite's speed and momentum keep it from falling, and Earth's gravity keeps the satellite from flying off into space.

⁶ Weather satellites orbiting high above Earth's surface take images of cloud patterns and storm systems and can track their movements. You often see such pictures on television weather broadcasts. Weather satellites also record data about winds, temperature, rainfall, water vapor, wave height, soil moisture, and snow cover.

⁷ Most satellites are either polar-orbiting or geostationary. Polar-orbiting satellites circle

the globe in a north-south orbit crossing over the poles and the equator. They are called "low Earth orbit" satellites because they orbit only about five hundred miles above Earth's surface. Because of Earth's rotation, polar-orbiting satellites cover different parts of Earth from one orbit to the next. They have heat sensors that measure the temperatures of the oceans, the land, the air, and the clouds. The National Weather Service uses this information to forecast weather for days and even weeks ahead. This information also helps scientists study how the climate is changing over long periods of time.

° Geostationary satellites complete one orbit, traveling east to west, in the same time it takes Earth to rotate once. They must be at high altitudes to be able to do this. They are called "high Earth-orbit" satellites because they orbit more than 22,000 miles above Earth. Because geostationary satellites rotate with Earth, they're always above the same spot on Earth's surface. This means that they monitor weather conditions over the same area. They can take pictures continuously of storms forming over land and oceans. The newest geostationary satellites can collect information from inside hurricanes, recording wave heights, surface winds, and rainfall. Some now carry microwave sensors that can gather information through cloud cover.

° As technology improves, weather forecasters will have better knowledge to allow them to predict weather with more accuracy. This will help save lives and decrease property damage in cases of severe weather such as hurricanes and typhoons.

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<p>1. The weather of an area is due to what four factors?</p> <p><input type="radio"/> A Heat, gravity, magnetism, and winds</p> <p><input type="radio"/> B Volcanoes, humidity, the sun, and the wind</p> <p><input type="radio"/> C Heat energy, air pressure, winds, and moisture</p>	<p>2. Name three ways weather data are collected.</p> <p><input type="radio"/> A Ground weather stations, radar, and weather satellites</p> <p><input type="radio"/> B Rain gauges, thermometers, and wind socks</p> <p><input type="radio"/> C People, computers, and radar</p>
<p>3. Name three things weather stations on the ground measure.</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>4. The National Weather Service uses the data collected to:</p> <p><input type="radio"/> A Launch weather satellites</p> <p><input type="radio"/> B Make weather maps</p> <p><input type="radio"/> C Name hurricanes</p>
<p>5. In weather forecasting, radar is used to:</p> <p><input type="radio"/> A Identify wind speeds</p> <p><input type="radio"/> B Identify areas of high and low temperatures</p> <p><input type="radio"/> C Identify areas of heavy, medium, or low precipitation</p>	<p>6. Polar-orbiting satellites:</p> <p><input type="radio"/> A Cover different parts of Earth from one orbit to the next</p> <p><input type="radio"/> B Monitor weather conditions at the north and south poles</p> <p><input type="radio"/> C Monitor weather conditions in the same area</p>
<p>7. Geostationary satellites:</p> <p><input type="radio"/> A Cover different parts of Earth from one orbit to the next</p> <p><input type="radio"/> B Aren't really moving</p> <p><input type="radio"/> C Monitor weather conditions in the same area</p>	<p>8. Which type of satellite orbits at a higher altitude?</p> <p><input type="radio"/> A Geostationary</p> <p><input type="radio"/> B Polar-orbiting</p>