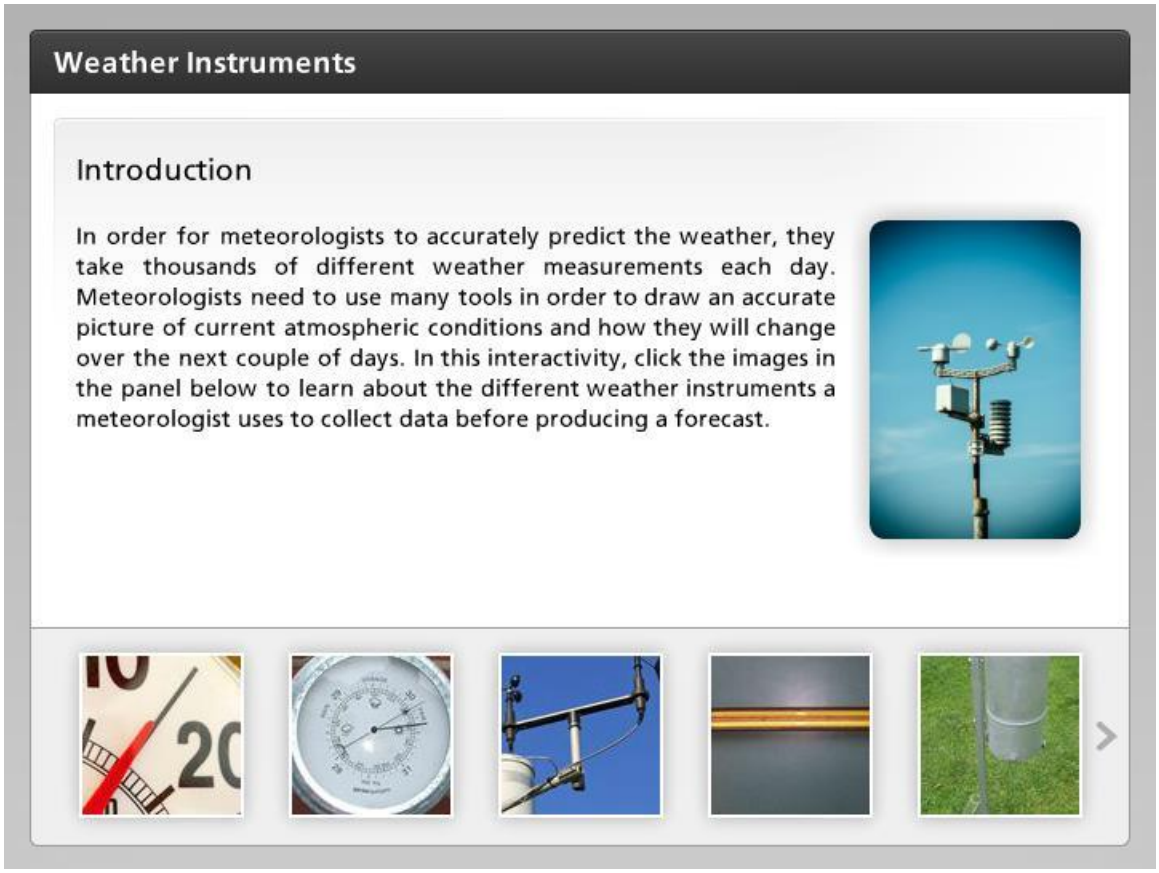
Module 11: Meteorology
Topic 4 Content: Weather Instruments Notes

Introduction



In order for meteorologists to accurately predict the weather, they take thousands of different weather measurements each day. Meteorologists need to use many tools in order to draw an accurate picture of current atmospheric conditions and how they will change over the next couple of days. In this interactivity, click the images in the panel below to learn about the different weather instruments a meteorologist uses to collect data before producing a forecast.

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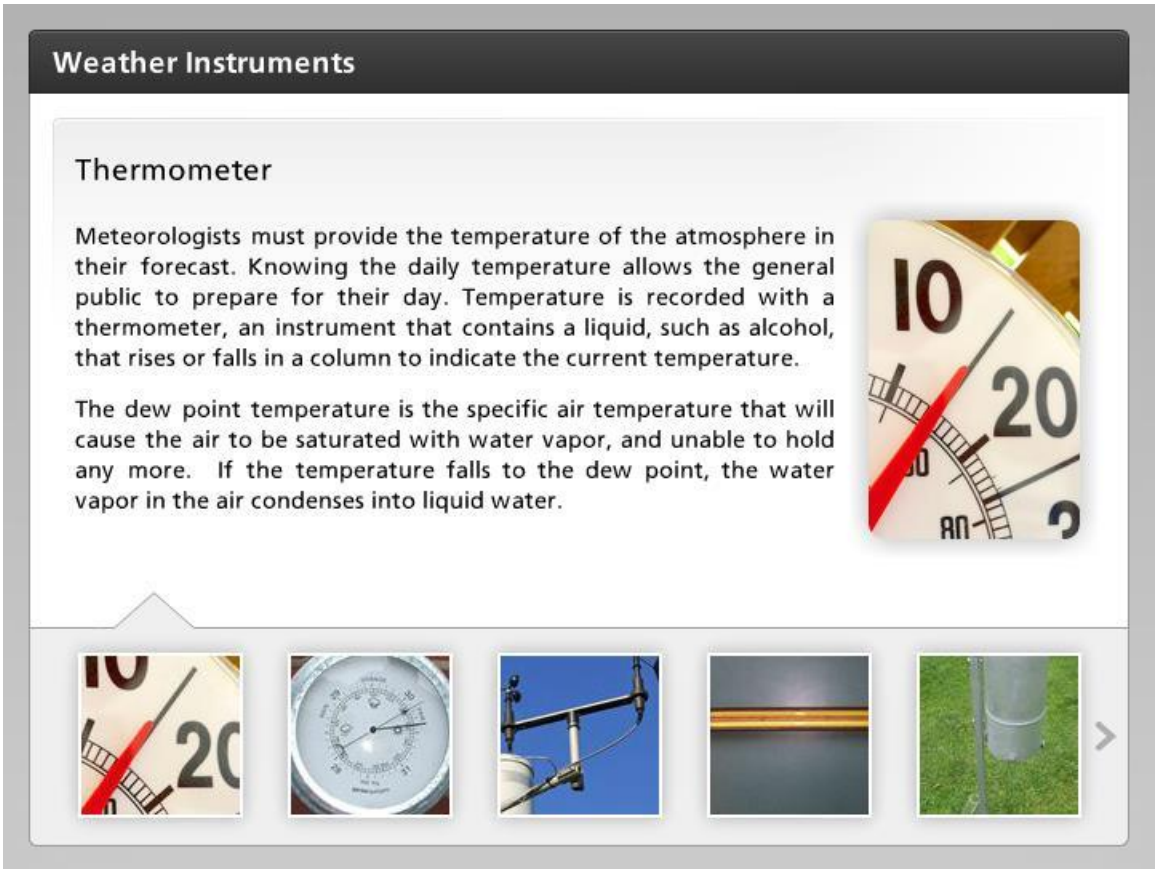
Thermometer



Meteorologists must provide the temperature of the atmosphere in their forecast. Knowing the daily temperature allows the general public to prepare for their day. Temperature is recorded with a thermometer, an instrument that contains a liquid, such as alcohol, that rises or falls in a column to indicate the current temperature.

The dew point temperature is the specific air temperature that will cause the air to be saturated with water vapor, and unable to hold any more. If the temperature falls to the dew point, the water vapor in the air condenses into liquid water.

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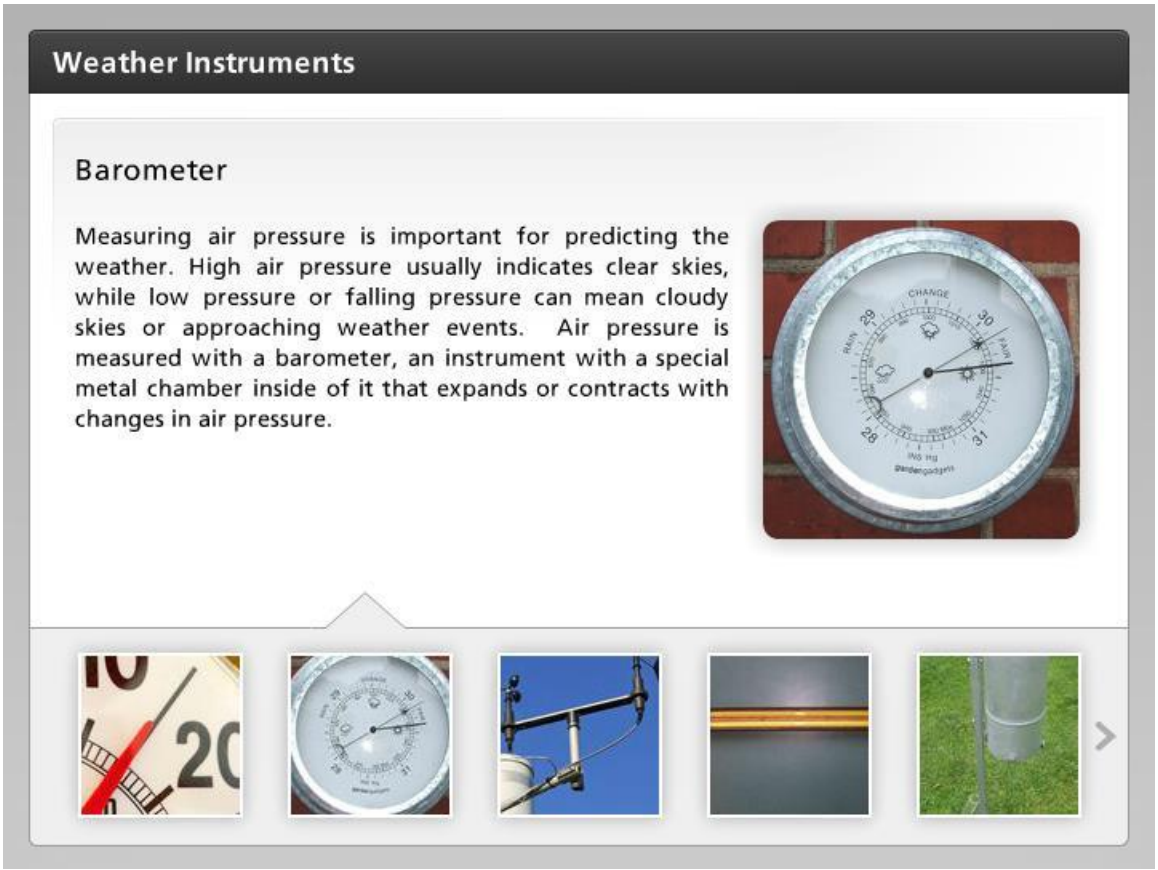
Barometer



Measuring air pressure is important for predicting the weather. High air pressure usually indicates clear skies, while low pressure or falling pressure can mean cloudy skies or approaching weather events. Air pressure is measured with a barometer, an instrument with a special metal chamber inside of it that expands or contracts with changes in air pressure.

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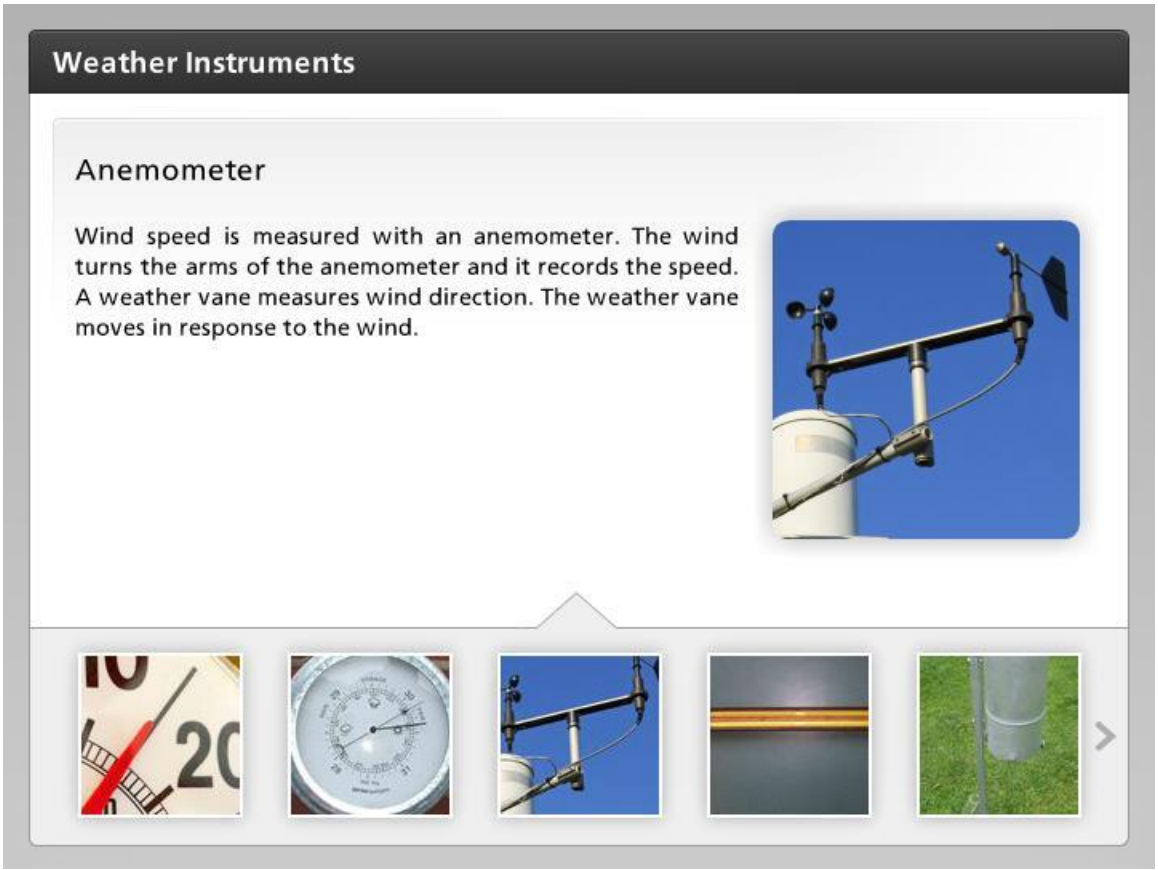
Anemometer



Wind speed is measured with an anemometer. The wind turns the arms of the anemometer and it records the speed. A weather vane measures wind direction. The weather vane moves in response to the wind.

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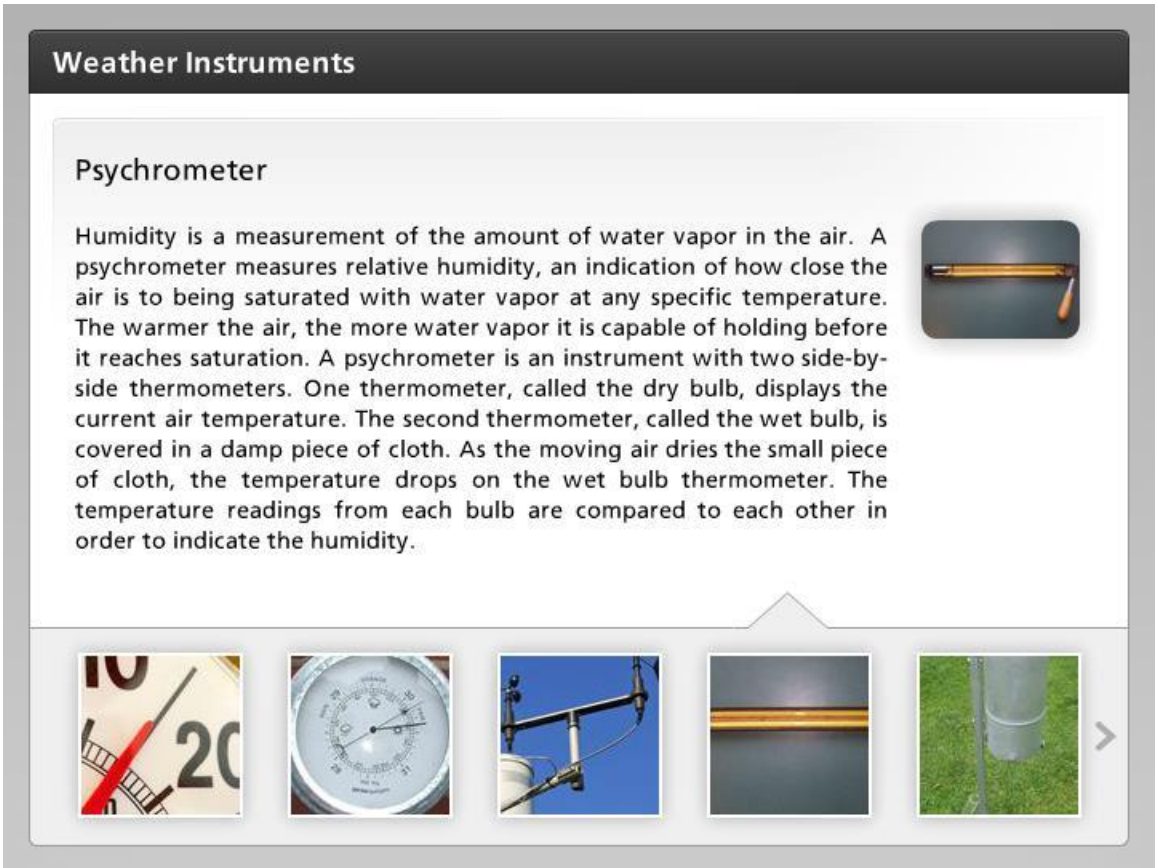
Psychrometer



Humidity is a measurement of the amount of water vapor in the air. A psychrometer measures relative humidity, an indication of how close the air is to being saturated with water vapor at any specific temperature. The warmer the air, the more water vapor it is capable of holding before it reaches saturation. A psychrometer is an instrument with two side-by-side thermometers. One thermometer, called the dry bulb, displays the current air temperature. The second thermometer, called the wet bulb, is covered in a damp piece of cloth. As the moving air dries the small piece of cloth, the temperature drops on the wet bulb thermometer. The temperature readings from each bulb are compared to each other in order to indicate the humidity.

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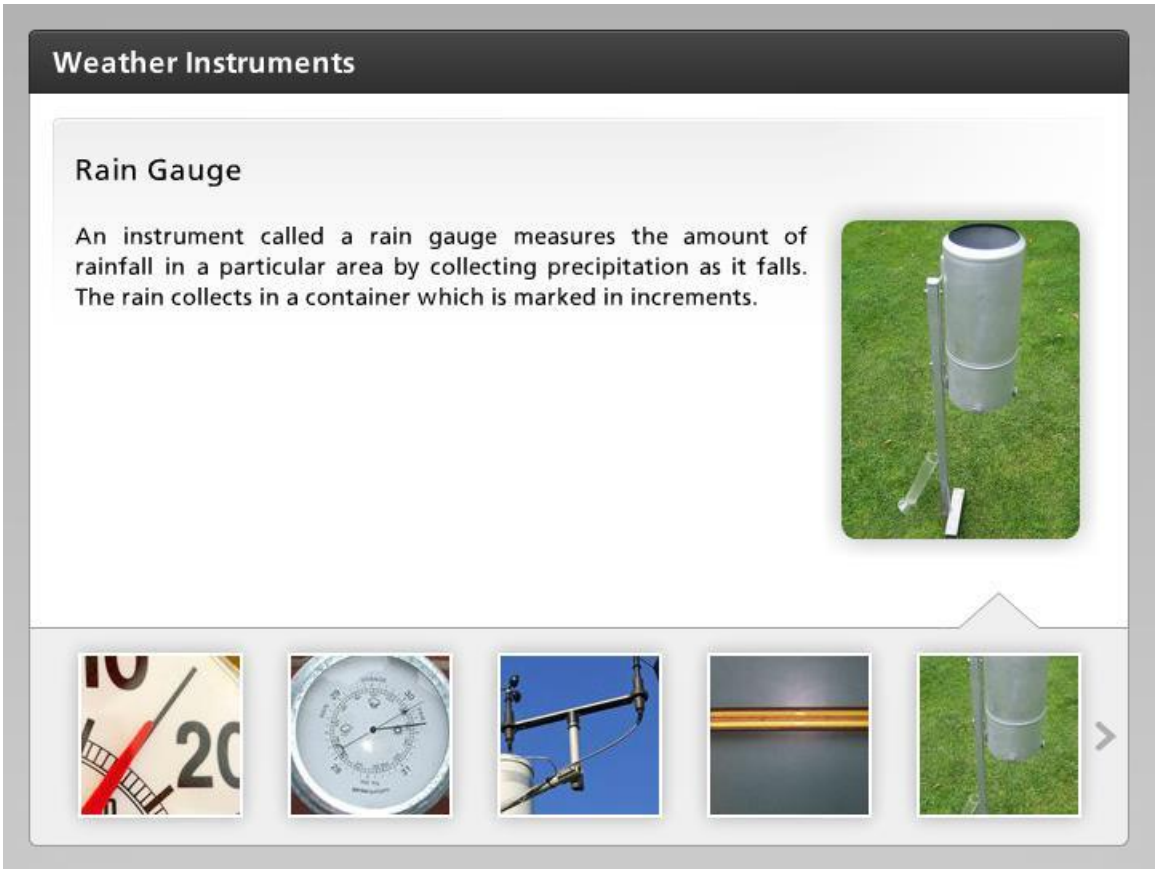
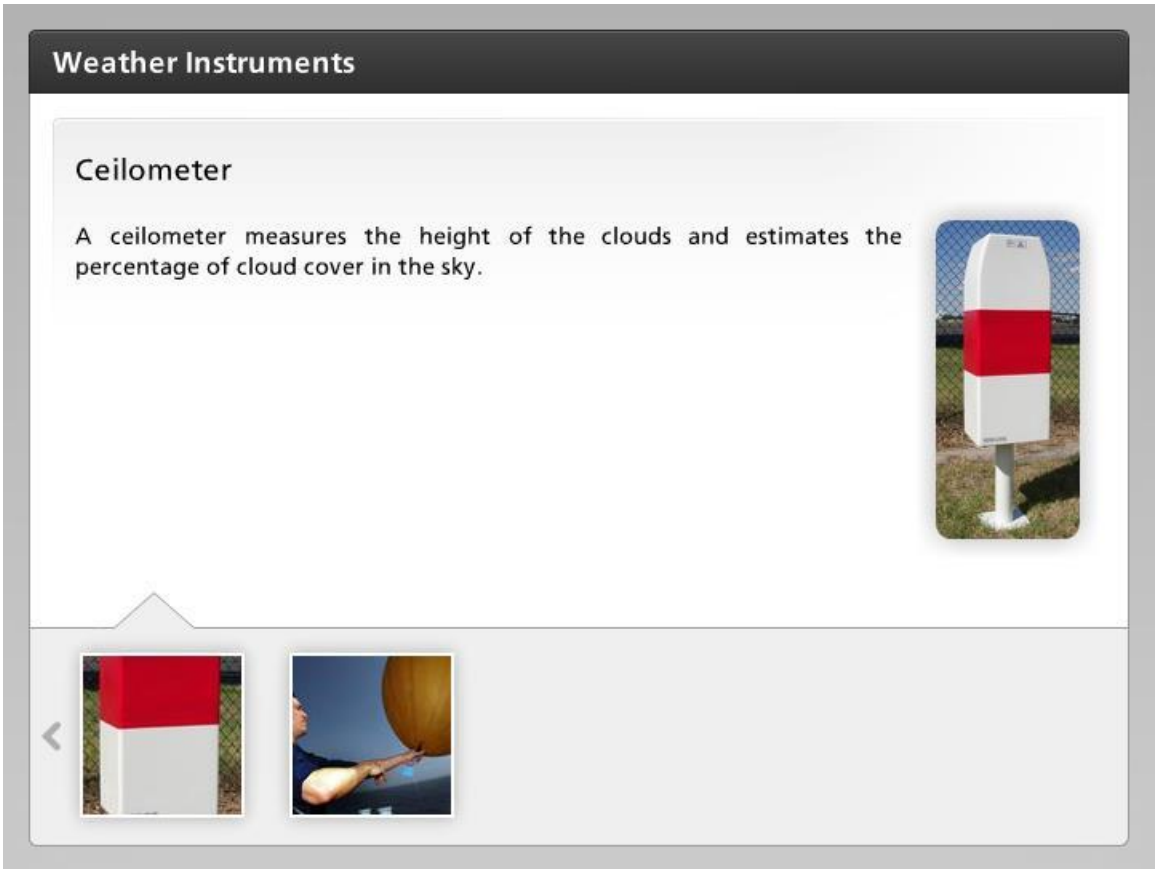
Rain Gauge



An instrument called a rain gauge measures the amount of rainfall in a particular area by collecting precipitation as it falls. The rain collects in a container which is marked in increments.

Ceilometer



A ceilometer measures the height of the clouds and estimates the percentage of cloud cover in the sky.

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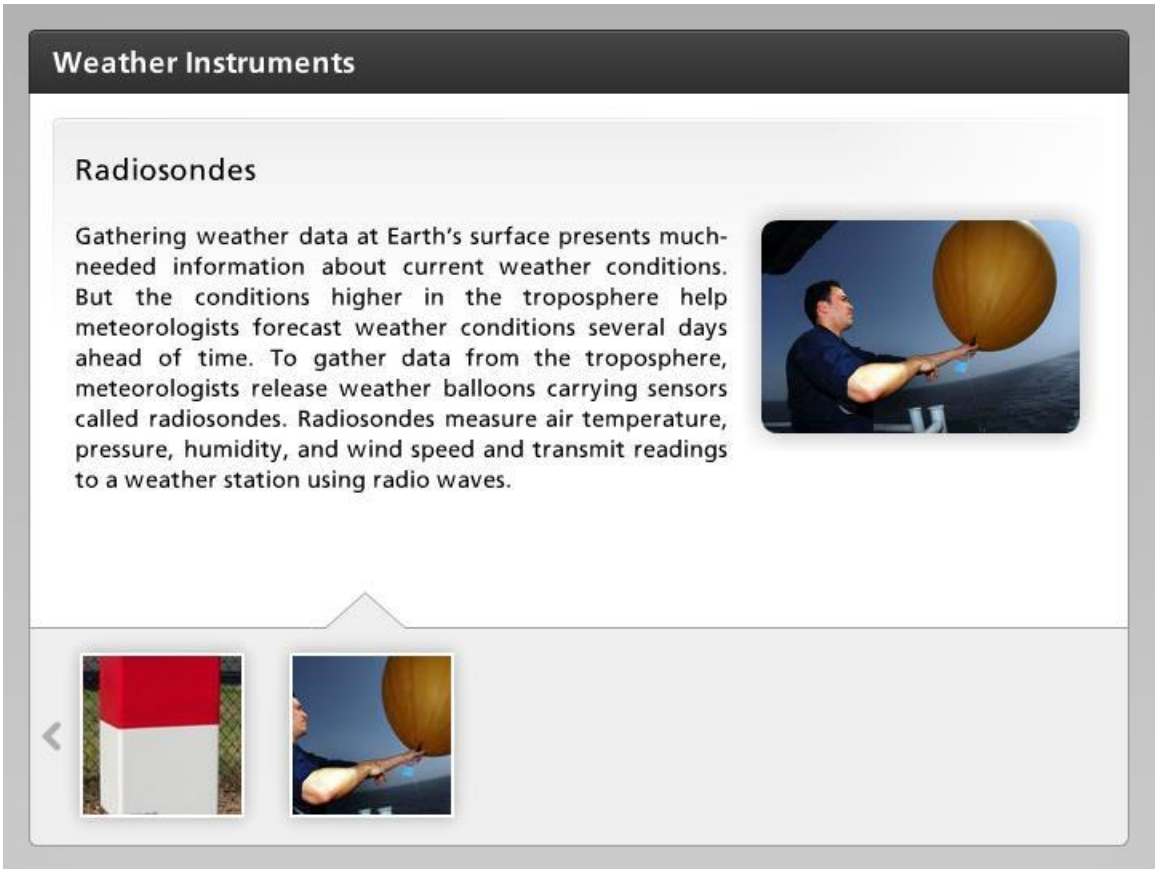
Radiosondes



Gathering weather data at Earth's surface presents much-needed information about current weather conditions. But the conditions higher in the troposphere help meteorologists forecast weather conditions several days ahead of time. To gather data from the troposphere, meteorologists release weather balloons carrying sensors called radiosondes. Radiosondes measure air temperature, pressure, humidity, and wind speed and transmit readings to a weather station using radio waves.