Weather Instruments

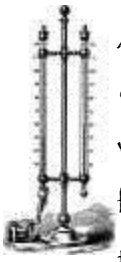
The weather forecast that helped you plan activities for this week was probably made by a ***meteorologist***. A meteorologist is a person who studies the weather. Meteorologists need many kinds of data before the weather can be predicted.

The ability to make accurate weather forecasts is directly related to the speed at which large amounts of data can be analyzed. This is where the greatest advances have been made during the past few decades. By contrast, the accuracy of measuring instruments has not changed greatly.

When you step outdoors, the air temperature may be the first weather condition you notice. In fact, you probably dressed a certain way to be comfortable at that temperature. If the air temperature is around 15°C you might wear a sweater.

Thermometers measure air temperature. Thermometers work because matter expands when heated. Most thermometers are closed glass tubes containing liquids such as alcohol. When air around the tube heats the liquid, the liquid expands and moves up the tube. A scale that shows the temperature is on, or attached to, the tube.

A *barometer* measures air pressure. An Italian scientist named Torricelli built the first barometer in 1643. People still use mercury barometers based on Torricelli's design to measure air pressure.



A ***psychrometer*** measures *relative humidity*, using the cooling effect of *evaporation*. Two thermometers are used in a psychrometer. Notice that a wet cloth covers the end of one of the thermometers. Water evaporates from this cloth, causing the temperature on that thermometer to be lower than the other.

An ***anemometer***, like the one shown in the picture, measures wind speed. The cups catch the wind, turning a dial attached to the instrument. The dial shows the wind speed. Wind speed can be estimated without special tools however. The faster the wind blows, the faster the cups spin. Every time a certain colored cup passes by, it counts as one revolution.

Nephoscope is used to observe the direction and speed of cloud movement. It indicates the direction of the wind high above the Earth.

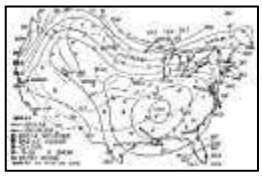
Rain Gauge is a weather instrument used to measure rainfall. Rainfall is measured in millimeters. The way the rain gauge works is, water droplets fall into the rain gauge and then the amount of rainfall is measured with a type of measuring instrument, such as a ruler. You have to make sure that you look straight at eye level, when you look at the water line inside of the container. The rain gauge works better when it's NOT hidden under trees or houses, because you don't want anything getting in the way of the falling rain.

Hygrometer measures the amount of moisture in the air which causes humidity.

A *Wind vane* indicates the direction from which the wind is blowing. The weather vane works by pointing in the direction that the wind is blowing. If the head of the arrow is pointing to the northeast, then the wind is coming from the northeast.

A *Wind sock* hangs outdoors on a pole or tree. When the weather is windy, the wind fills the sock and lifts it up, indicating wind direction.

Meteorologist place all of their data that they collect on to a ***weather map***. By means of certain symbols, a single weather map can indicate atmospheric conditions above a large portion of the earth's surface.



Weather satellites are able to photograph and track large - scale air movements. Then meteorologist compile and analyze the data with the help of computers.

http://schoolscience.rice.edu/duker/winstruments.html