

Additional Information

Weather patterns occur primarily because of differences in temperature and moisture between one location and another. These differences are related to the angle of the sun, which varies according to latitude. The farther a location is from the tropics, the lower the angle of the sun relative to the surface of the Earth and the cooler the temperature.

The sun and the oceans also affect the weather of land masses. Evaporated water allows moisture to spread to nearby land masses which hydrates and cools them. Wind circulates air and water from one location to another; thus, storms, clouds, precipitation and currents are carried between different regions.

The atmosphere is a chaotic system, meaning that small changes to one part of the system can have significant effects on the system as a whole. This chaotic nature makes it difficult to accurately predict the weather more than a few days in advance.

Somewhere Over the Rainbow

Look closely at the CD and notice that it has many tiny lines, side by side. All the lines on the CD form what is known as a diffraction grating. The diffraction grating separates light into the colours of the rainbow (red, orange, yellow, green, blue and violet), which become visible on the bristol board.

Blue Cloud

This activity illustrates how humidity, temperature and air pressure influence the formation of clouds. The water produces high humidity in the bottle, while the smoke particles from the match act as a condensation site for water molecules. Squeezing the bottle raises the pressure and temperature inside the bottle, causing more water vapour to evaporate. Quickly releasing the bottle causes the air pressure and temperature to drop. Cooling causes some of the water vapor to condense back into a liquid and to form a cloud. Notice that when the bottle is squeezed again, the cloud vanishes.

The Stormy Day

The cold, blue water sinks while the warm, red water rises because of convection. The blue water represents a cold, stable air mass and the red water represents a warm, unstable air mass. A thunderstorm is caused when a body of warm air is forced to rise by an approaching cold front. The boiling water represents the water on the surface of the earth. As the sun heats the water, it turns to steam and rises into the atmosphere. The steam cools as it rises and forms clouds. When enough water collects in the clouds, the droplets become big enough to fall back to earth as rain.