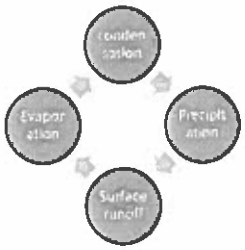
Understanding Weather

Part 3: Water in the Atmosphere

Water in the Atmosphere

Evaporation
- The process by which water molecules in liquid water escape into the air as water vapor

Water Cycle
- The movement of water between the atmosphere and Earth's surface



Humidity

- **Humidity:** the measure of the amount of water vapor in the air
  - Air's ability to hold water vapor depends on its temperature
- **Relative Humidity:** the percentage of water vapor actually in the air, compared to the maximum amount of water vapor the air can hold at a particular temperature
  - Ex: 10 degrees C, 1 cubic meter of air can hold at most 8 grams of water vapor. If the air actually help 8g of water, the relative humidity would be 100%
  - What about if there was 4g of water vapor in the air?
  - Air at 100% is called "saturated"

Measuring Relative Humidity

- The instrument used to measure relative humidity is called a **psychrometer**
  - Wet-bulb thermometer (has moist cloth) and dry-bulb thermometer
  - Spin the psychrometer by it's handle, and the air cools the thermometers
  - Wet-bulb thermometer is cooled by evaporation, and the reading drops below the dry bulb reading
  - If humidity is high, water on the wet-bulb evaporates slowly, and the wet-bulb thermometer reading doesn't change much (so much water in the air)
  - If humidity is low (little water in the air), water on the wet-bulb evaporates rapidly, and there is a larger change
  - The relative humidity is found by comparing the temperatures of the wet and dry bulbs.

How Clouds Form

- Clouds form when water vapor in the air condenses to form liquid water or ice crystals
  - **Condensation:** molecules of water vapor in the air become liquid water

Conditions for condensation:
1. Cooling of the air– cold air holds less water
2. Presence of particles– provide surface for water molecules to stick to to condense
   - salt crystals, dust from soil, smoke…or grass and windowpanes, but this is called dew.

- Dew point: the temperature at which condensation begins
- Dew: water that condenses from the air onto a cooler surface
- Frost: ice that has been deposited on a surface with a temperature that is below freezing

Types of Clouds

Classified by Shape:

cirrus

cumulus

stratus

Cirrus

- Wispy, feathery clouds
- Form at very high levels, where it is very cold
- Made of ice crystals

Cirrocumulus

- Look like rows of cotton balls
- "A storm is on the way"

Cumulus

- Fluffy, rounded piles of cotton
- Fair weather
- Common on sunny days

cumulonimbus

- Towering clouds with flat tops
- Often produce thunderstorms ("-nimbus" means "rain")

Stratus

- Flat layers ("strato-" means "spread out")
- "overcast"
- Cover all or most of the sky, uniform dull, gray color
- May produce drizzle, rain, or snow when they thicken (called nimbostratus when they are like this)