**Water in the Atmosphere Notes:**

**Unit 3: Interactions of the Atmosphere and Hydrosphere**

**Mini-Unit:** Water in the Atmosphere

**Goal 3: The student will demonstrate the ability to explain how the transfer of energy affects the water cycle.**

Objectives – The student will be able to:

* + Analyze energy transfer systems that influence phase changes (condensation, melting, deposition, freezing, sublimation, and evaporation) and the latent heat in the atmosphere

**Textbook:** Unit 7, Chapter 23, pg. 574

**Atmospheric Moisture:**

3 States of Water in Atmosphere:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – solid
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – liquid
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – gas

Humidity –

Key Points:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – measure of how close the air is to reaching the dew point

* What we call “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”
* Measured as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* At 75% relative humidity, the air has ¾ of the water vapor it can hold
* As relative humidity goes up, the difference between temperature and the dew point decreases

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – the temperature where the condensation point equals the evaporation point, under this temperature and water droplets form

* The greater the temperature/dew point spread, the less amount of water in the air compared to how much it could hold
* Measured in degrees
* Dew Point: 50 degrees – comfortable
* Dew Point: 60 degrees – humid
* Dew Point: 70 degrees – very uncomfortable

Dew –

Frost –

If the dew point = current temperature = 100% relative humidity = water vapor condenses forming dew

Absolute Humidity –

**Clouds and Fog:**

Clouds –

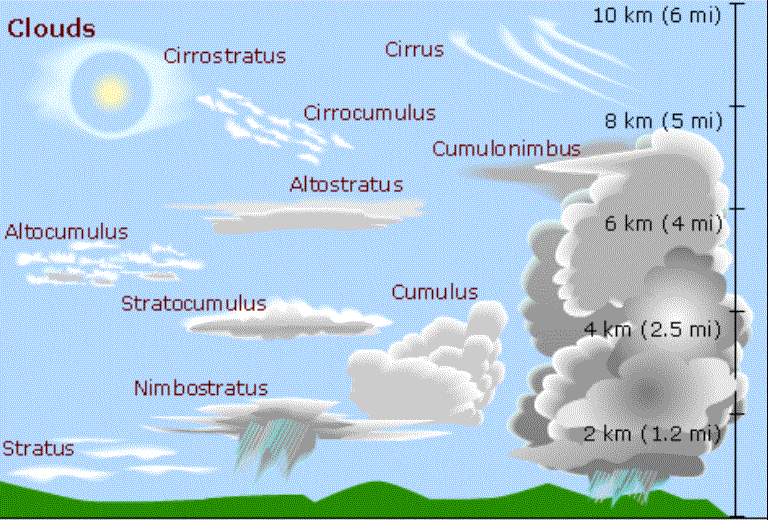
Cloud Formation:

1. Condensation Nuclei-
2. Evaporation rate must be in equilibrium with condensation, “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”
3. As temperature of the saturated air drops, condensation occurs more than evaporation, and clouds form

Cooling Processes for Cloud Formation:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – The process by which the temperature of an air mass decreases as an air mass rises and expands due to a decrease in air pressure, thus a decrease in particle collisions, thus lower temperatures
2. Mixing –
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – The forced upward movement of air either by a mountain range or another air mass going underneath it and lifting it (storms)
4. Advective Cooling –

Classification of Clouds:



Stratus Clouds:

Cumulus Clouds:

Cirrus Clouds:

Fog:

**Precipitation:**

Precipitation –

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – liquid precipitation

Snow –

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – rain that freezes on the way down to Earth

Freezing Rain -

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_– solid precipitation that is a ball of ice that cycles in the clouds, the more cycling the bigger the hail