

Clouds & Precipitation



Essential Standard 2.5

Understand the structure of and processes within our atmosphere.

Learning Objective 2.5.4

Predict the weather using available weather maps and data including surface and upper atmospheric winds, and satellite imagery.

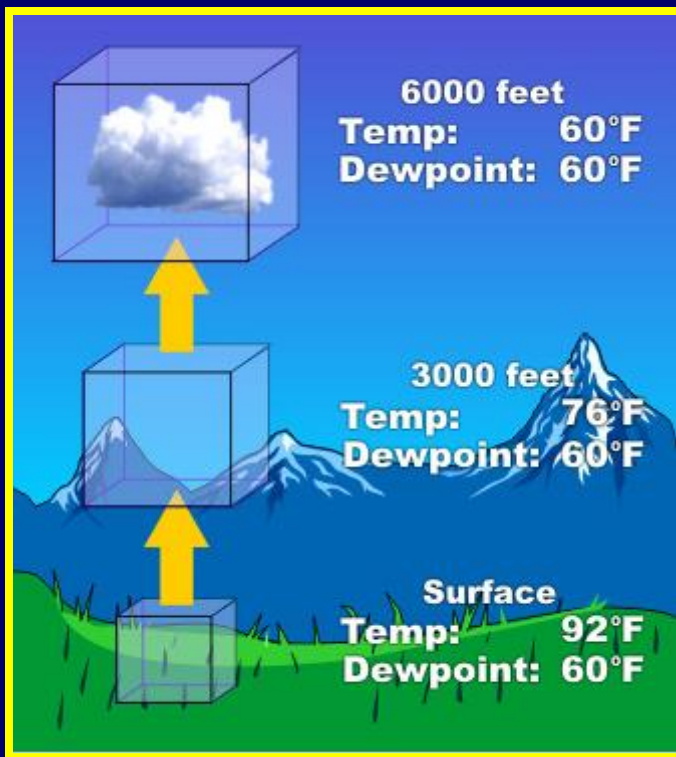
I Can Statements

At the end of this lesson, you should be able to say, with confidence:

- I can distinguish between humidity and relative humidity.
- I can explain the effects that temperature plays on relative humidity.
- I can explain when and why condensation occurs, in relation to relative humidity.

Cloud Formation

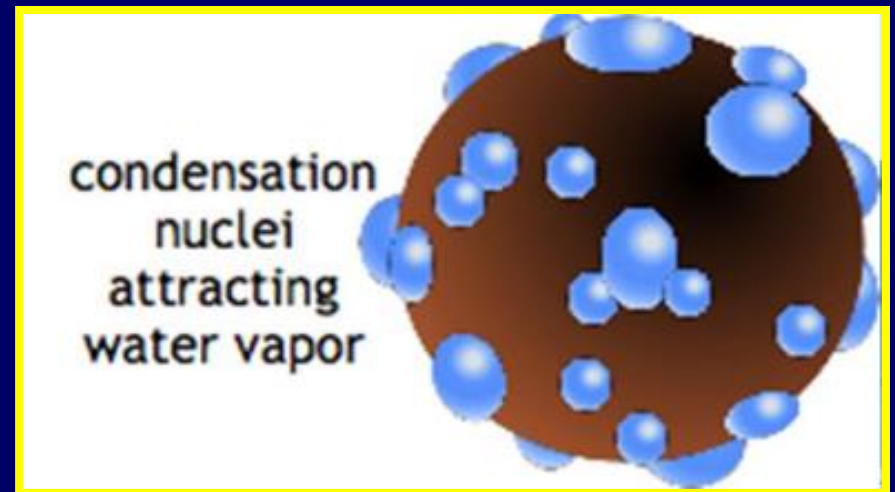
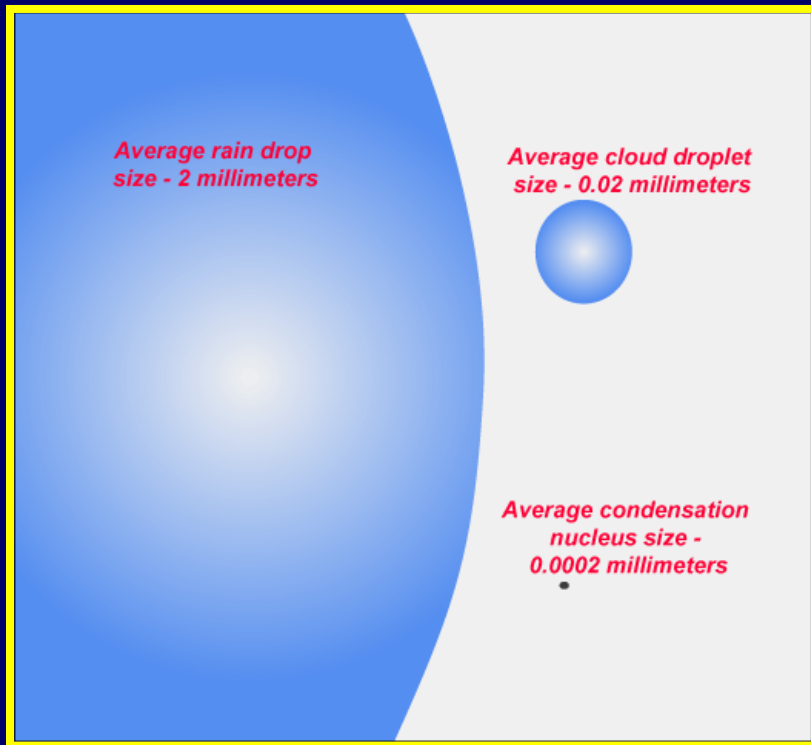
Clouds form when warm, moist air rises and cools to its dew point causing water vapor to condense into tiny water droplets.



Clouds form best on warm, sunny days and often result in afternoon showers.

Condensation Nuclei

Condensation is increased by the presence of condensation nuclei or particles of dust, sea salt, or smoke, that water particles can cling to while attracting more water molecules.



Types of Clouds

Clouds are classified according to the altitude in which they form and their shape.



Height	Shape
Cirro – High	Cirrus – Wispy
Alto – Middle	Cumulus – Puffy
Strato - Low	Stratus - Layered
Nimbus – Gray , Rain Clouds	

Low Clouds - Strato

Cumulus

Hot Days

Stratocumulus

As Hot Day Cools

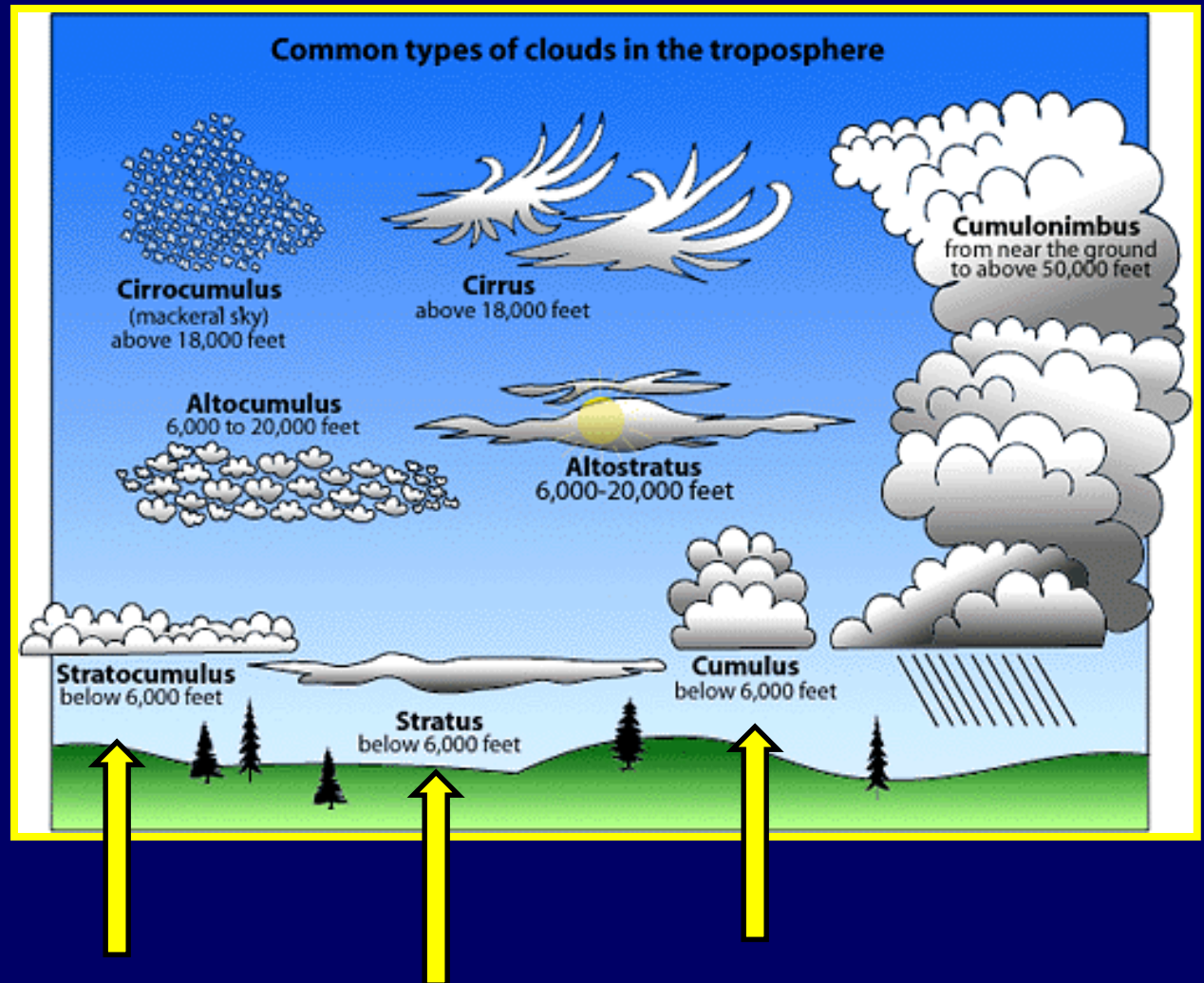
Stratus

Lifted Fog

Nimbostratus

Gray Rain

Clouds





Cumulus Clouds

Hot, Summer Days – Fair Weather



Stratocumulus Clouds

Cumulus clouds spread out as air cools



Stratus Clouds

Lifted Fog – Light Mist or Drizzle

Common in the mountains

Middle Clouds - Alto

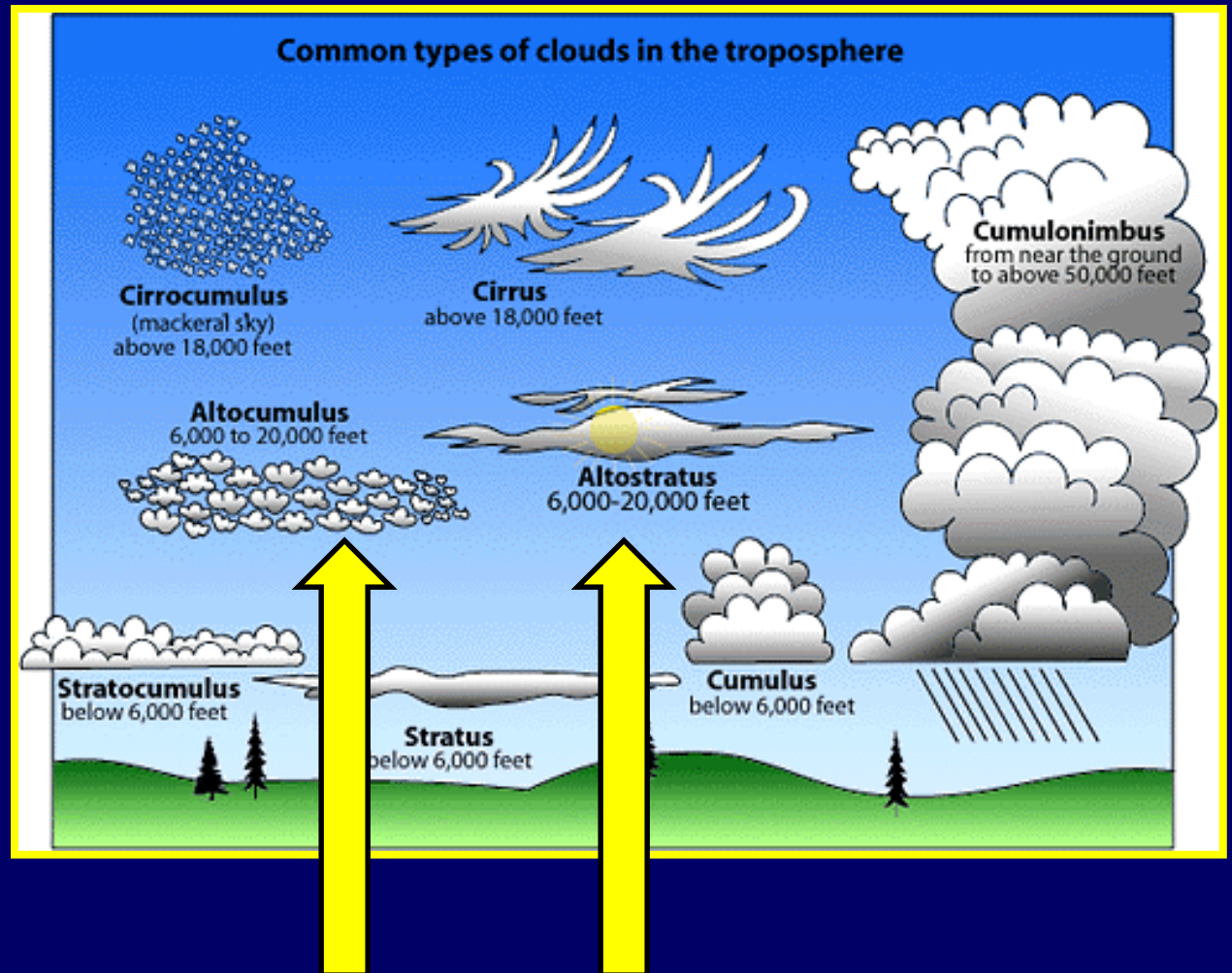
Contain Liquid and Ice Droplets

Altostratus

Hot Days

Altostratus

Hazy Days





Altocumulus Clouds

Grey-white with one part being darker than other – fair weather



Altostratus Clouds

Dark, thin veil of clouds that usually form before continuous rain or snow.



Nimbostratus Clouds

Rain or Snow

High Clouds - Cirro

Contain Ice Crystals

Cirrocumulus

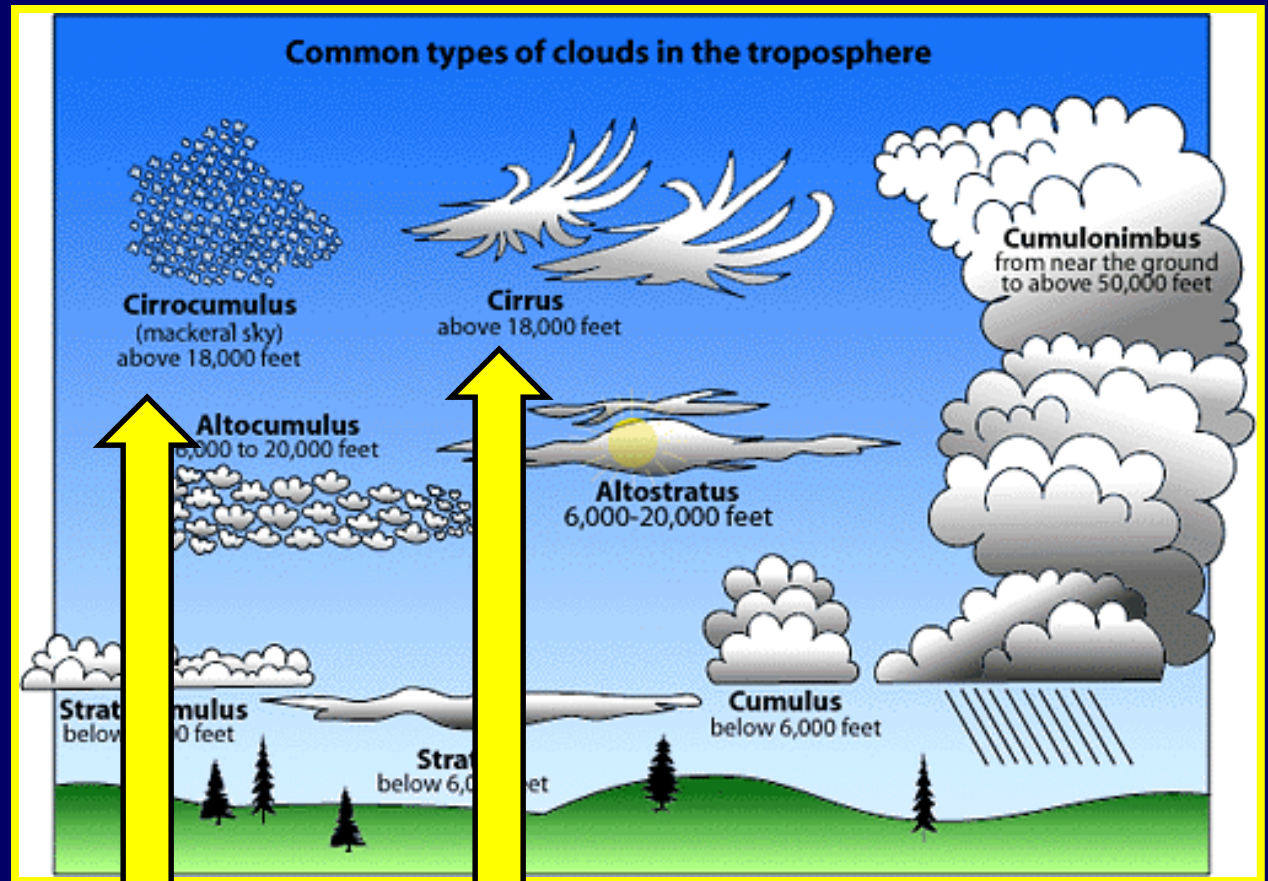
Fair but Cold

Cirrostratus

Hazy Days

Cirrus

Fair Weather





Cirrocumulus Clouds

Lines of small rounded puffs
Mackerel Sky
Winter – Fair but cold



Cirrus Clouds

Composed of ice and have long, wispy
streamers
A change in weather is on its way

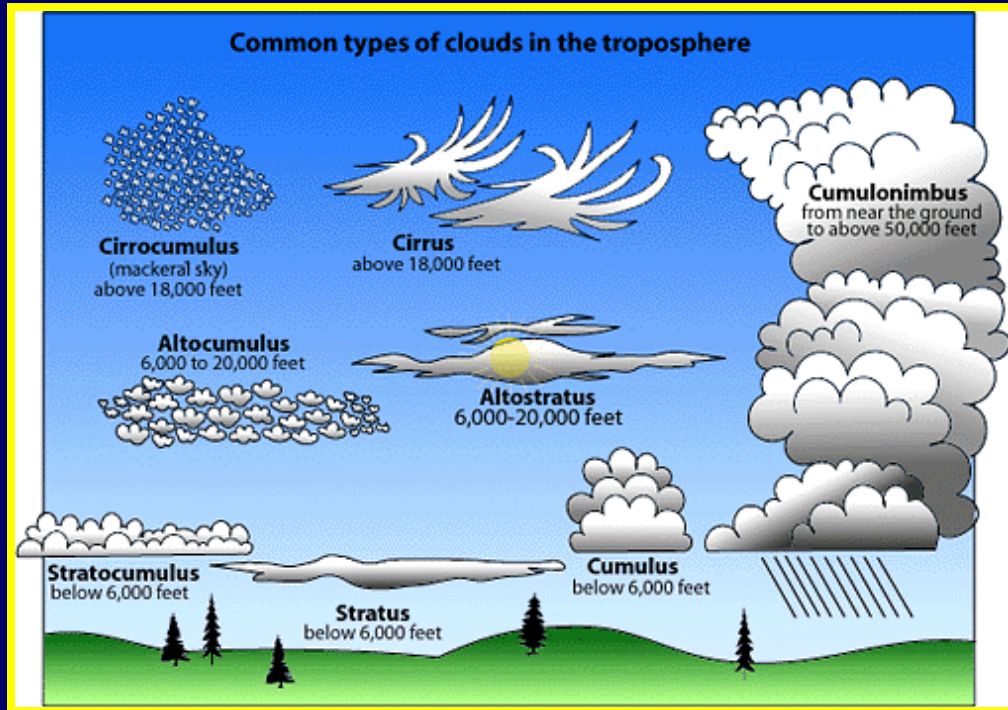


Cirrostratus Clouds

Sheet-like thin clouds that cover entire sky
Day or two before rain or snow storm

Cumulonimbus

Really tall clouds



Grow on hot days when moist air continues to rise.
Look out for rain, hail, and tornadoes.

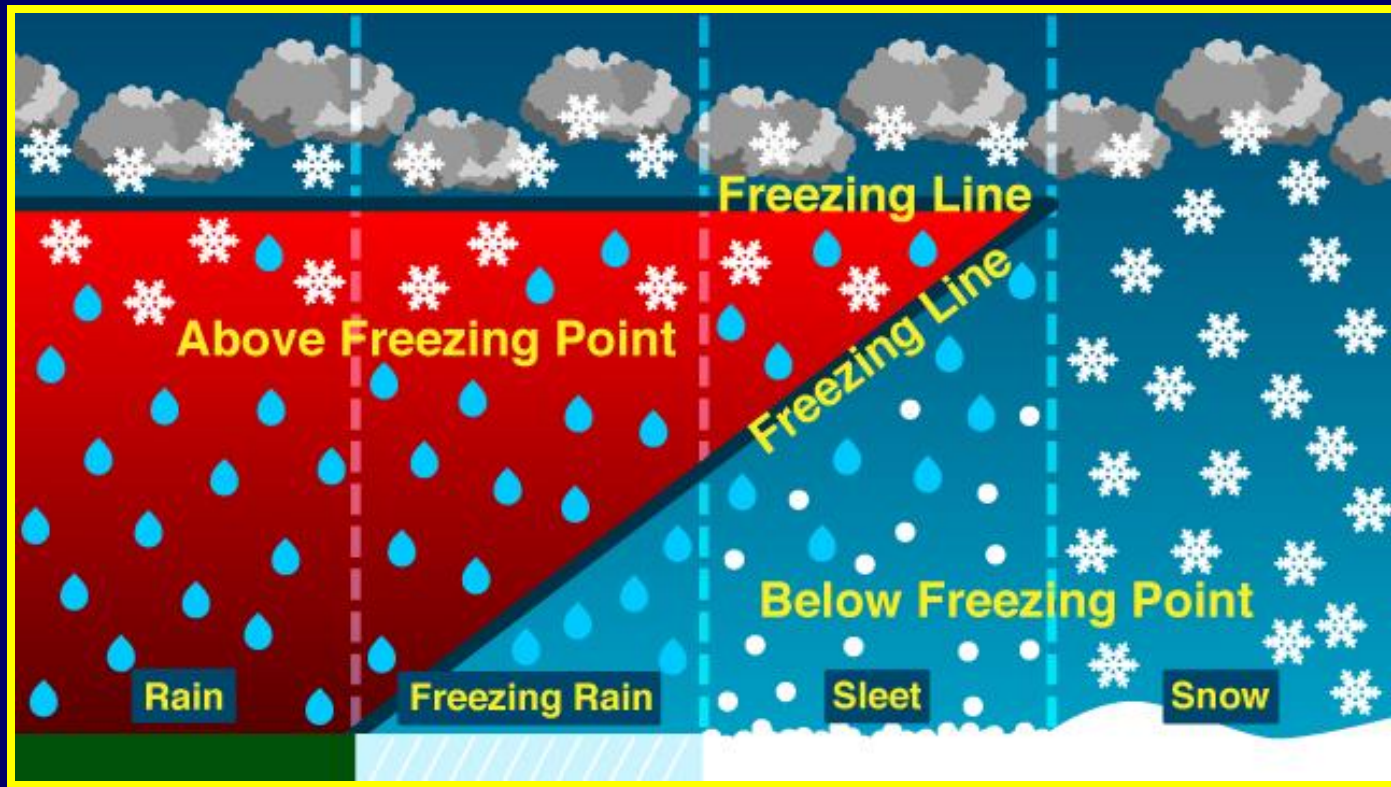
Contrails

Contrails are made by high-flying jet airplanes when the water vapor in the exhaust condenses into clouds.



Precipitation

When cloud droplets are too heavy to stay aloft, gravity pulls them downward and they fall to Earth as precipitation in the form or rain, sleet, or snow.



Precipitation

Rain will fall when the temperatures are above freezing.



Freezing Rain will fall like rain but will freeze as soon as it lands.

Precipitation

Sleet forms when a layer warm of air forms between two layers of cold air.



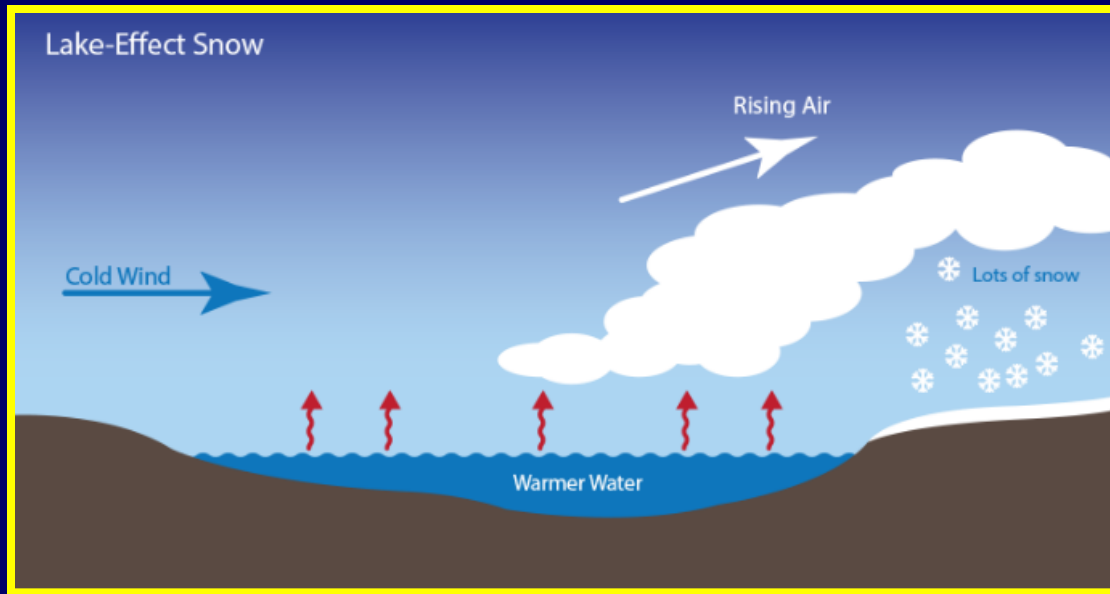
The sleet begins to fall as ice, melts, then turns back into wet ice.



Snow falls when all the air between the clouds and Earth's surface is below freezing.

Lake Effect Snow

When cold air moves over a lake in which the water is warmer than the air, the air will become warmer and water will evaporate into the air, increasing the moisture in the air.



When the moist, air moves back over cold land, it will rise, causing the water condense and fall to ground as snow.

Lake Effect Snow

This is a common phenomenon around the Great Lakes, especially in Buffalo New York that sits on the shores of Lake Erie. Buffalo has been known to get snow as deep as 27 feet before.



After the lake freezes, water can't evaporate into the air and lake effect snow decreases.

Lake Effect Snow

Due to a warmer than normal winter, Lake Erie didn't freeze.



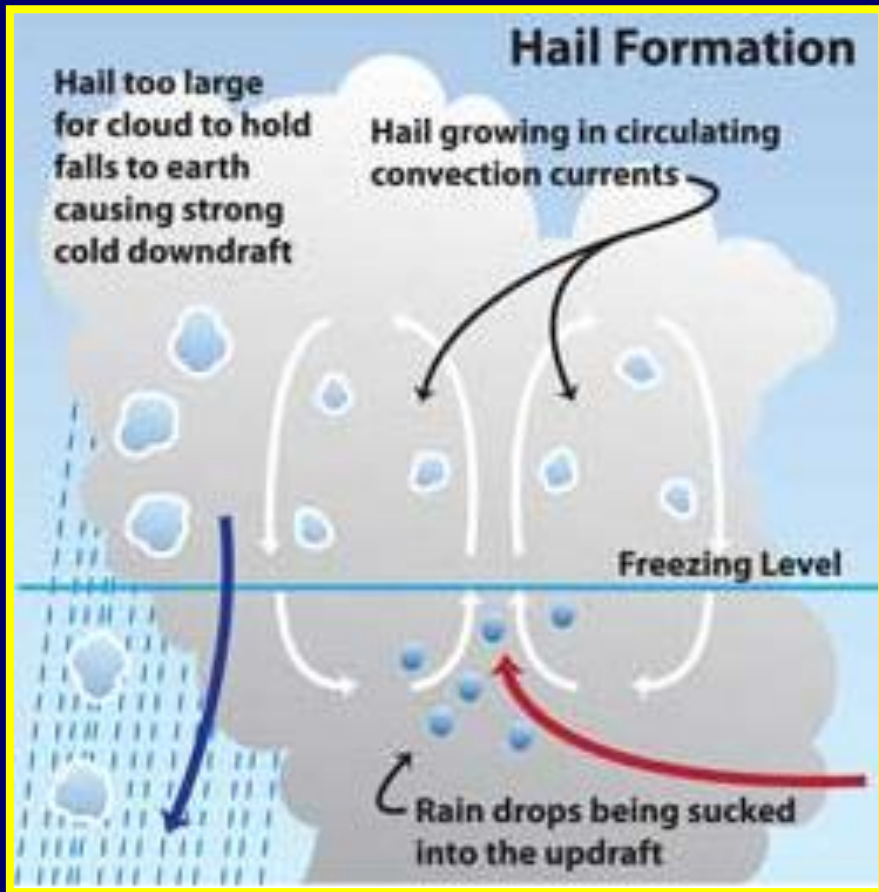
A winter storm with 50 mph gusts of wind sprayed lake water over the homes.



The water froze to create ice up to 3 feet thick.

Hail

Hail is formed when there are strong convection currents in a cloud.



Water will freeze in the upper part of the cloud, melt on the way down, and then refreeze and grow larger as it rises again.

Hail will fall to the ground when they become too heavy to stay aloft.

Hail

Hail is common with supercell thunderstorms and tornadoes, which usually occur during warmer months.



Largest piece of hail ever recorded fell in South Dakota on July 23, 2020.

The End

