

Bell Ringer

1. What is humidity?
2. What kind of clouds are there outside right now?
3. What happens to air when it gets colder?

A bright blue sky with large, fluffy white cumulus clouds. The clouds are scattered across the frame, with a particularly large, prominent one in the upper center. The overall scene is clear and sunny.

Cloud Notes

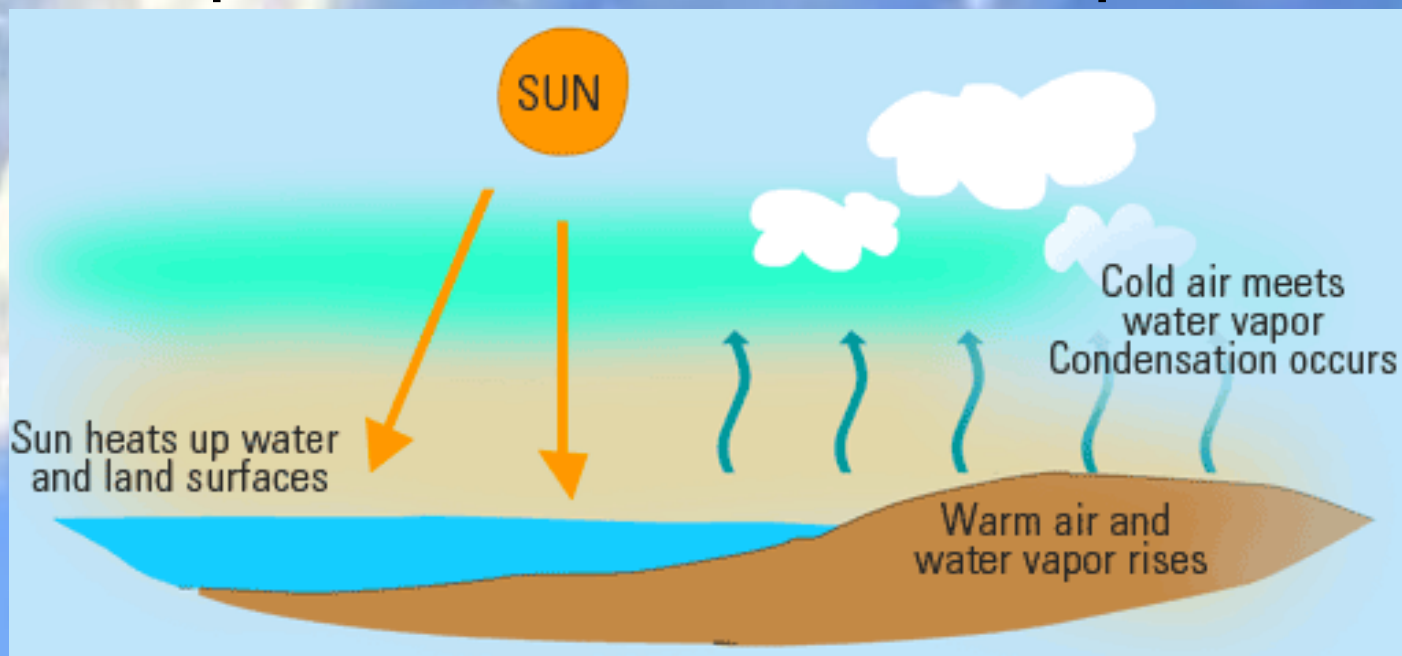
What are clouds?

- A cloud is made up of tiny water droplets and/or ice crystals, a snowflake is a collection of many ice crystals, and rain is just liquid water.

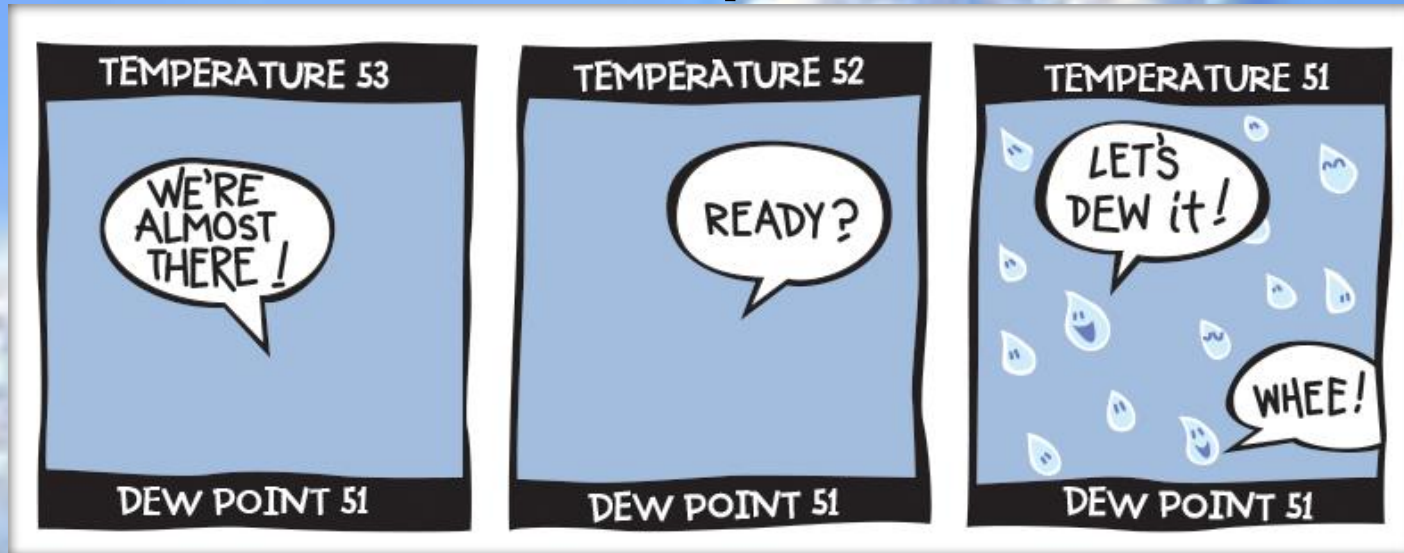
How do Clouds form?

To make a cloud, three ingredients are necessary:

1. Water vapor
2. A way to cool air to the dew point
3. A solid particle for the water vapor to stick to



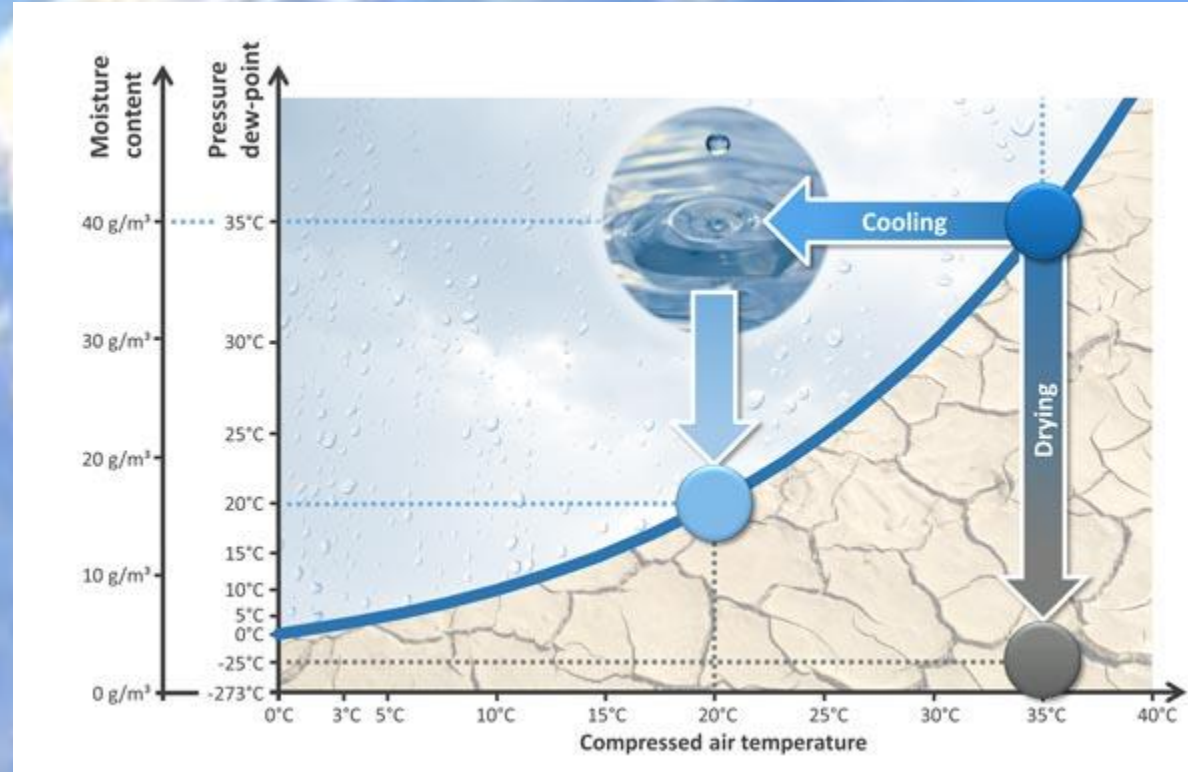
Dew point



- The temperature to which air must be cooled in order to be saturated with water (100% relative humidity). (Different size beakers)
- As air gets colder, it condenses and gets smaller, which means it can't hold as much water.

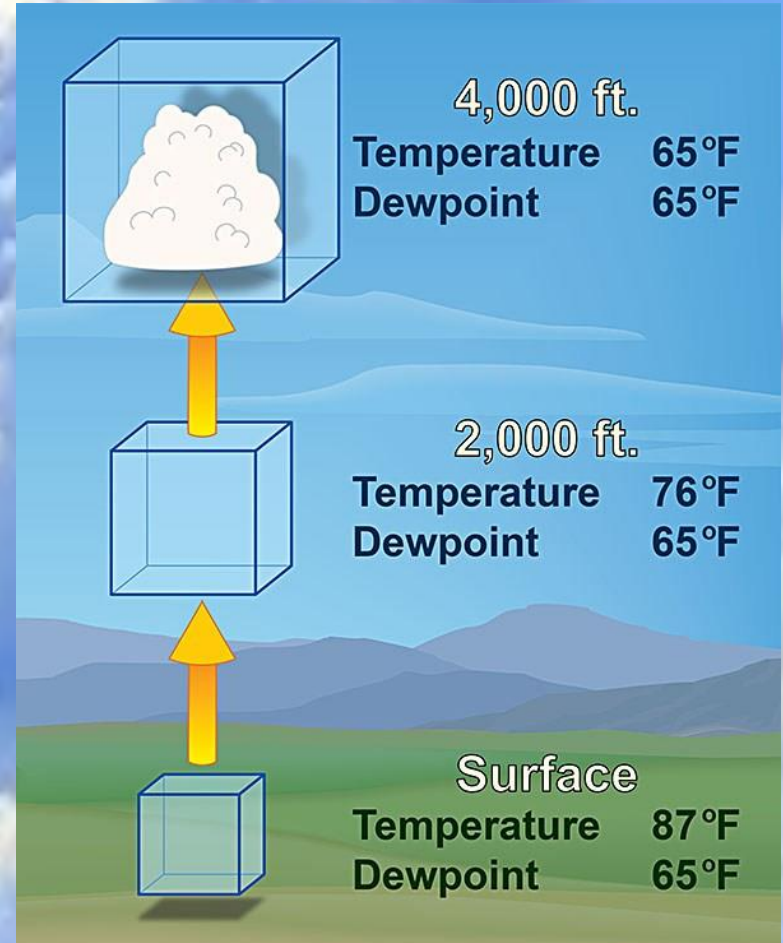
Dew Point

- Depends on two things:
 - Temperature
 - Relative humidity
 - (Also pressure, but don't worry about that for now)
- Frost point: Same thing, but it's cold enough to freeze...



Fog

- Normally the dew point is reached as altitude increases.
- Sometimes the dew point is right next to the surface, and there are enough particulates in the air, which makes fog.
- Fog = Cloud near the surface.



Cloud Names

- Names of specific types of clouds are created by combining the name of the cloud's shape with the name of the cloud's height.

Clouds - Shape

There are 3 main shapes of clouds:

- Cumulus or fluffy clouds – like cotton
- Stratus or layered clouds – like blanket
- Cirrus or thin feathery clouds



Cumulus



Stratus



Cirrus

Clouds - Height

There are 3 different zones clouds can form in:

- Low – These typically have the prefix ‘Stratus’ (I know, confusing).
- Medium – These typically have the prefix ‘Alto’ meaning ‘medium’.
- High – These typically have the prefix ‘Cirrus’ (Again, confusing, I know).

Mixing shape and height

- E.g. Stratocumulus = Strato (low) + Cumulus (Fluffy bunches)
- E.g. Altostratus = Alto (medium) + Stratus (Blanket like)



Low level clouds

- Stratus – Thick blanket
 - Stratocumulus – Puffy
 - Nimbostratus – Blanket, dark gray, produces rain
 - Fog
- If the clouds are at or below Mt. Timp,
= low level clouds.

Medium level clouds

- Altostratus – Thick blanket
- Alto cumulus – Puffy
- If cumulus clouds are about the size of your thumbnail when held out at arm length, it's medium level. Any bigger = low level. Smaller = High level.

High level clouds

- Cirrostratus – Thick layered
 - Cirrocumulus – Puffy
 - Contrails – Made by planes
 - Cirrus – Very thin wispy
- If it's about to rain, or has rained, stratus clouds are most likely at low level. If you can barely see the sun, like looking through a bottle = mid level. If you can still see the sun pretty much = high level.

Special Clouds



Stratus

The word *stratus* comes from the Latin word that means "to spread out." Stratus clouds are horizontal, layered clouds that stretch out across the sky like a blanket.



Stratus Clouds

Low clouds are made of water droplets. However, when temperatures are cold enough, these clouds may also contain ice particles and snow.

“Overcast”

These can often turn into rain producing nimbostratus clouds.

Stratus Clouds



-- Photograph by Ronald L. Holle --
-- U. of Illinois Cloud Catalog --

Stratus Clouds



Stratus Clouds

- **Stratus Clouds stretch across the sky in low, large flat layers. They resemble fog, but they do not reach the ground. They often produce mist or drizzle.**

Cumulus Clouds

- Fair weather cumulus have the appearance of floating cotton and have a lifetime of 5-40 minutes. The word *cumulus* comes from the Latin word for a heap or a pile. Cumulus clouds are puffy in appearance. They look like large cotton balls.

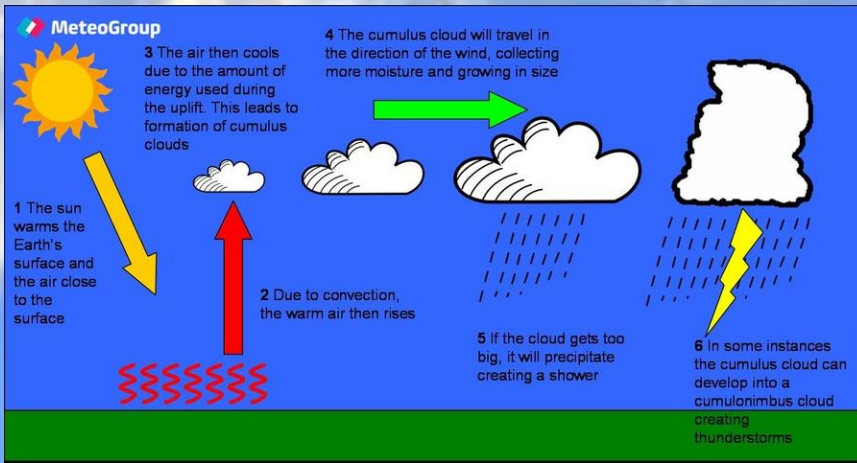


Cumulus Clouds

- Harmless fair weather cumulus clouds can later develop into towering cumulonimbus clouds associated with powerful thunderstorms.
- Spaced out because turbulent air creates pockets of upward and downward air currents.



-- Photograph by Ronald L. Holle --
-- U. of Illinois Cloud Catalog --

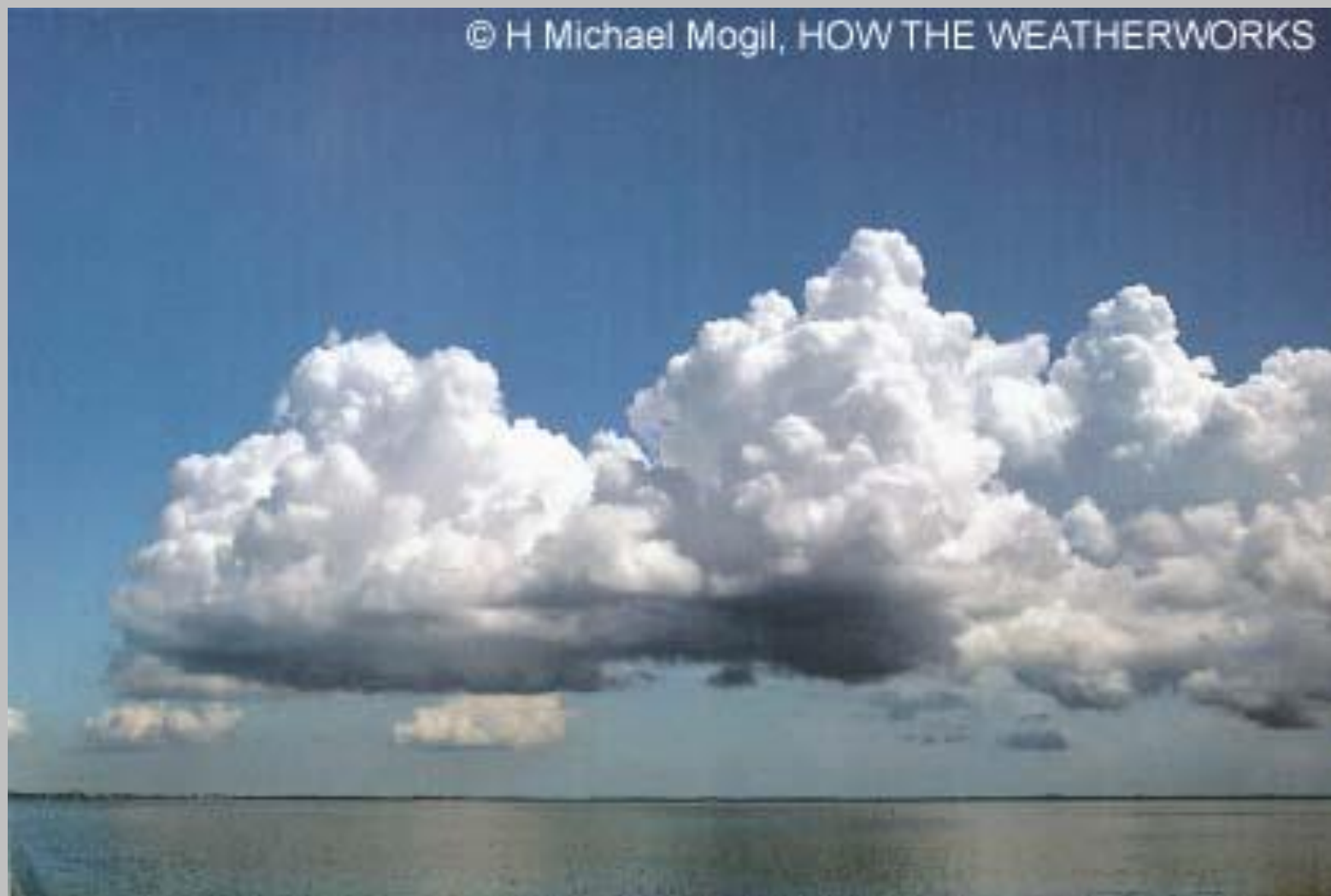


<https://www.youtube.com/watch?v=Qu7mcKZgqv0>

Fair Weather Cumulus



© H Michael Mogil, HOW THE WEATHERWORKS





Cumulonimbus










Cumulonimbus

- These clouds produce heavy thunderstorms in summer.
- Cumulonimbus clouds may extend upward for hundreds of meters.
- When they grow to the top of the troposphere they flatten into an anvil shape.
- <https://www.youtube.com/watch?v=0YatiDf9A8A>

Storm movement 


 Overshooting top


Lots of heat, lots of upward moving air.

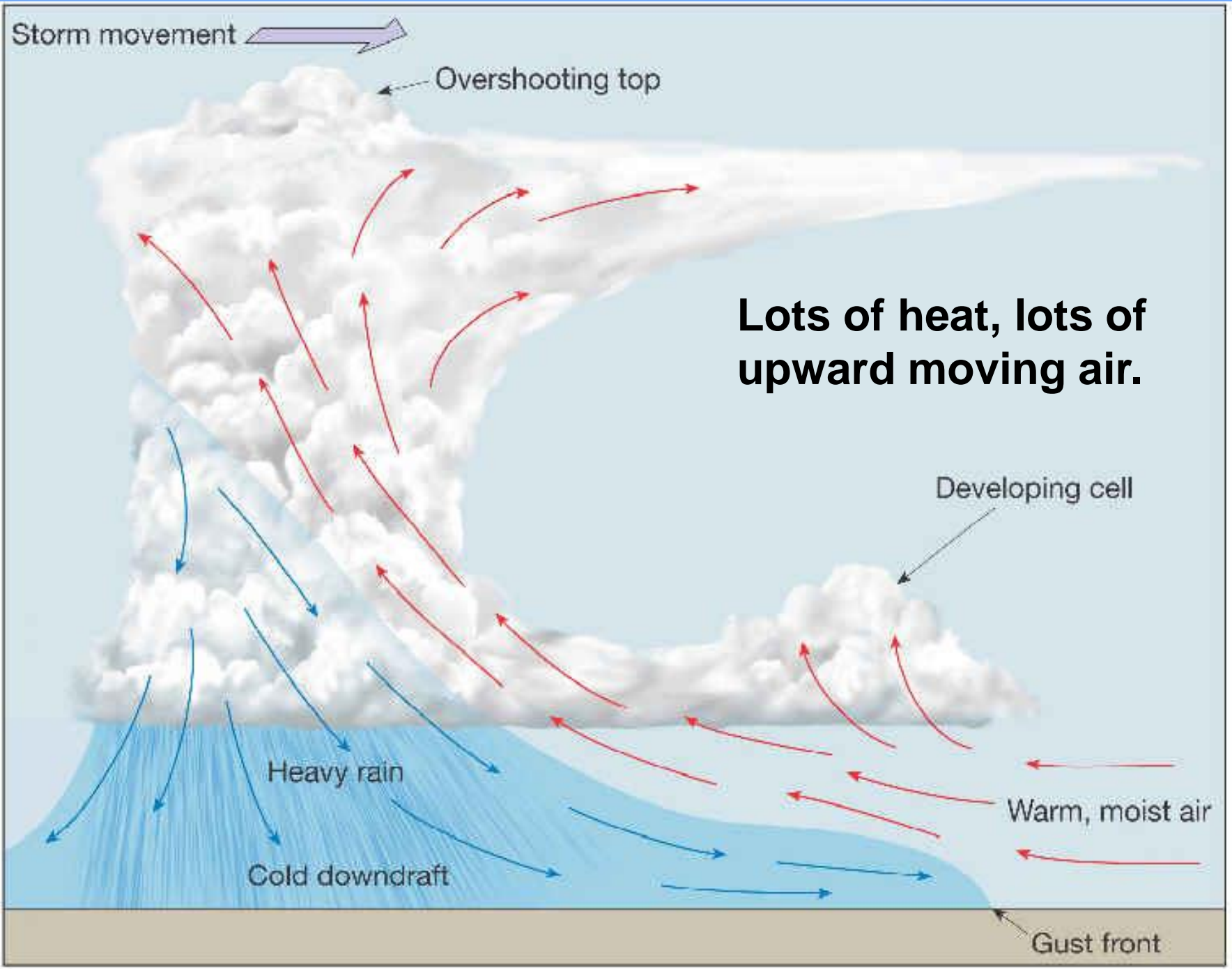
Developing cell 

Heavy rain 

Cold downdraft 

Warm, moist air 

Gust front 



Lenticular Clouds

Lenticular Clouds



Lenticular Clouds

