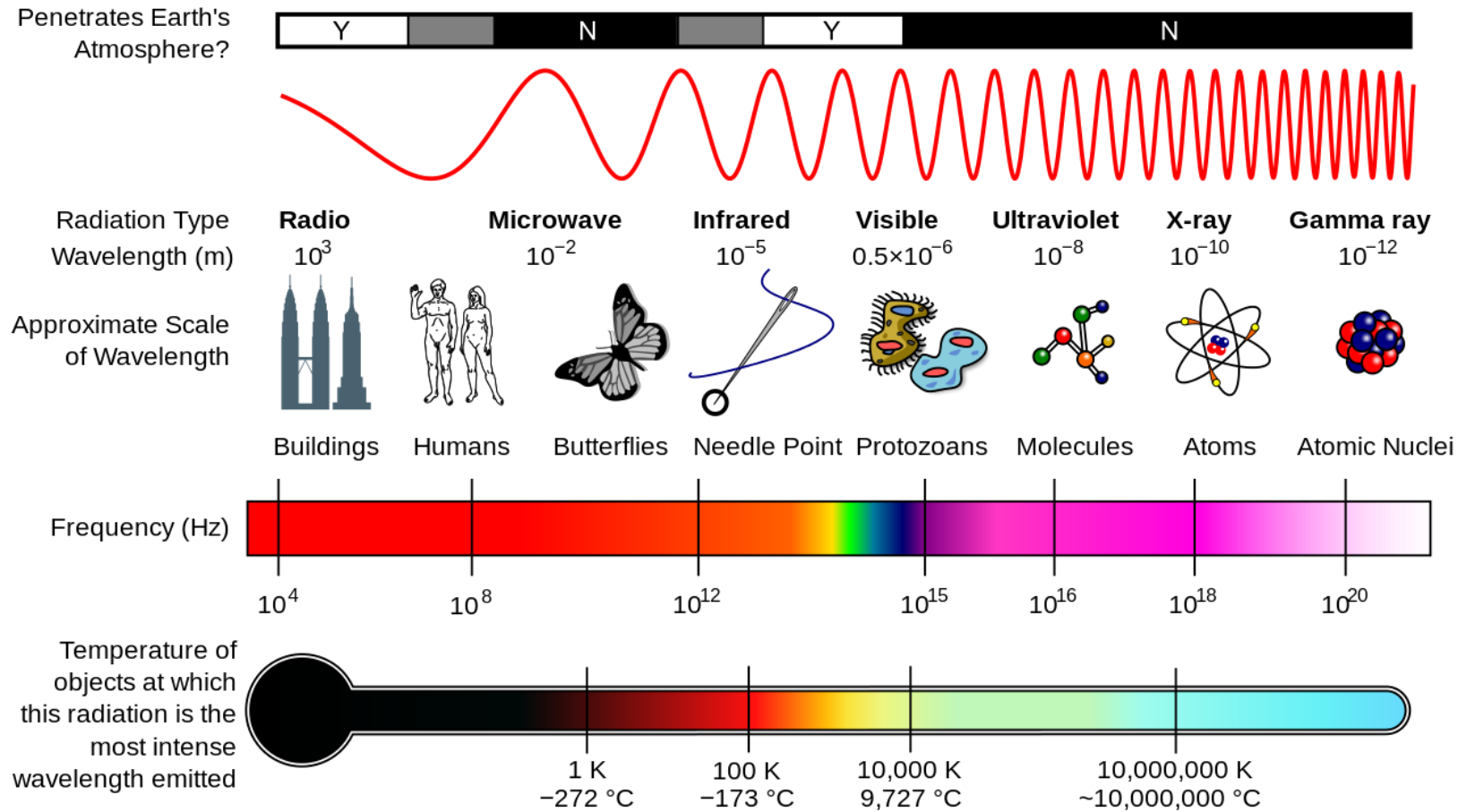


Weather Lab Review

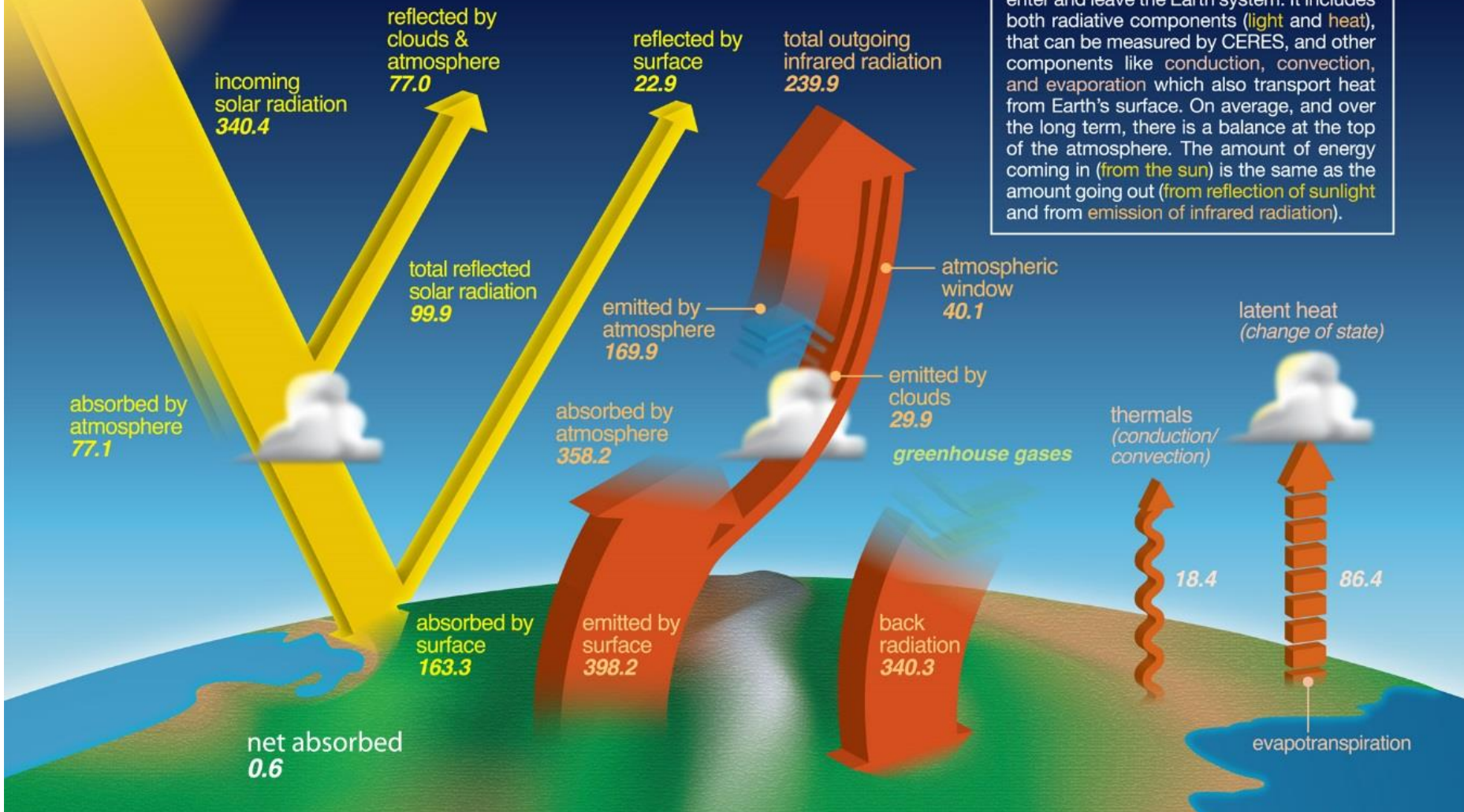
How does solar energy reach Earth?





earth's energy *budget*

The Earth's energy budget describes the various kinds and amounts of energy that enter and leave the Earth system. It includes both radiative components (*light* and *heat*), that can be measured by CERES, and other components like conduction, convection, and evaporation which also transport heat from Earth's surface. On average, and over the long term, there is a balance at the top of the atmosphere. The amount of energy coming in (*from the sun*) is the same as the amount going out (*from reflection of sunlight* and from *emission of infrared radiation*).



All values are fluxes in Wm²
and are average values based on ten years of data

Loeb et al., J. Clim. 2009
Trenberth et al., BAMS, 2009

Key Weather Principles

1. Energy reaches Earth as solar radiation



Because the earth is round, sunlight near the poles is spread out over a large area creating cold air temperatures

As you move farther from the equator, sunlight becomes more spread out and weaker creating slightly cooler air temperatures

Locations near the Earth's equator receive direct high angle sunlight creating warm air temperatures

As you move farther from the equator, sunlight becomes more spread out and weaker creating slightly cooler air temperatures

Because the earth is round, sunlight near the poles is spread out over a large area creating cold air temperatures

Key Weather Principles

1. Energy reaches Earth as solar radiation
2. The Earth experiences differential heating

Why did this happen?



Key Weather Principles

1. Energy reaches Earth as solar radiation
2. The Earth experiences differential heating
3. Cold air is denser than warm air

Why did this happen?



Key Weather Principles

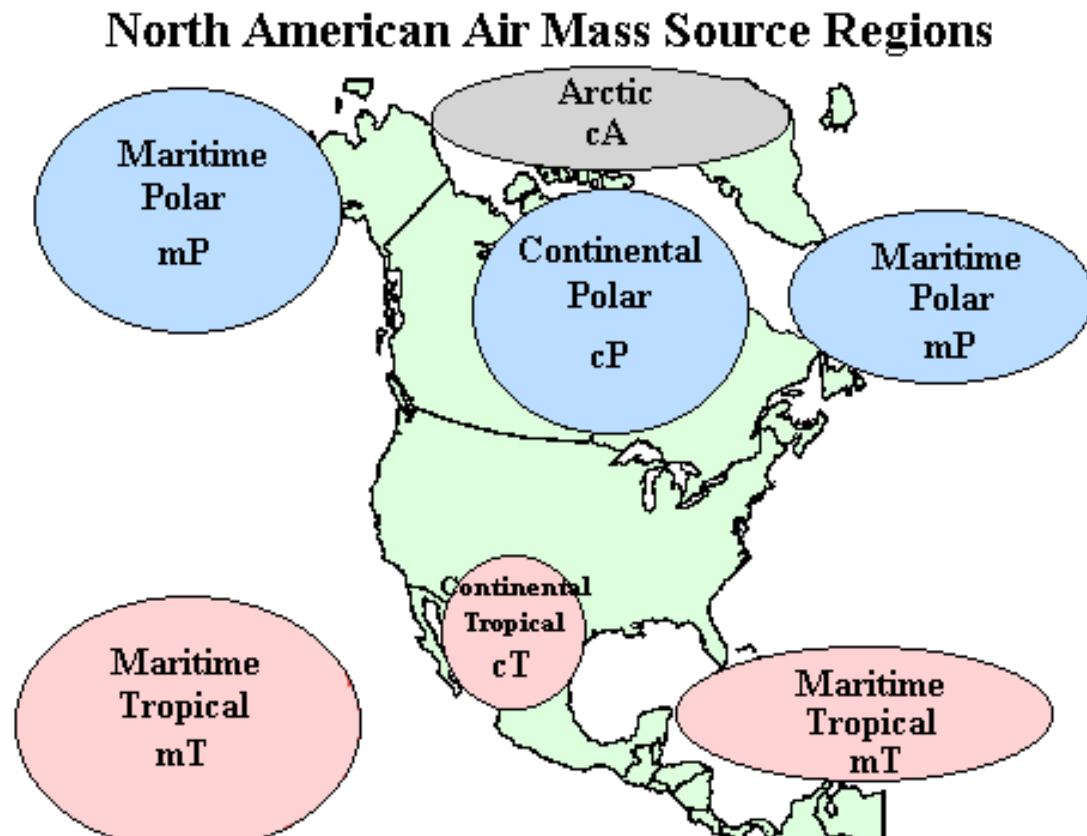
1. Energy reaches Earth as solar radiation
2. The Earth experiences differential heating
3. Cold air is denser than warm air
4. **Warm air holds more moisture than cold air**

Why did this happen?

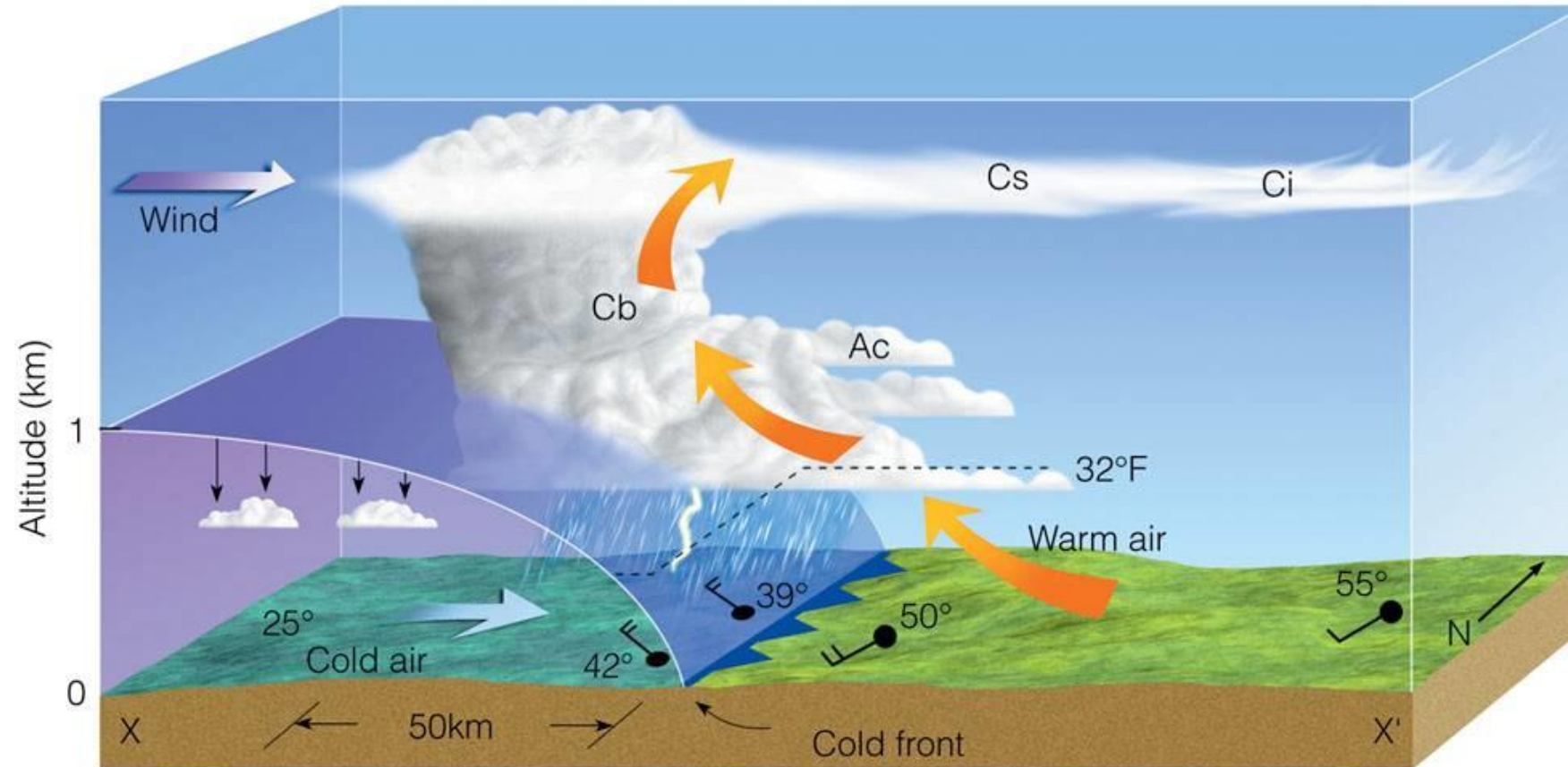
- With your group, draw a diagram

Air Masses

- How does air move? From high-density areas to low-density areas or vice-versa?

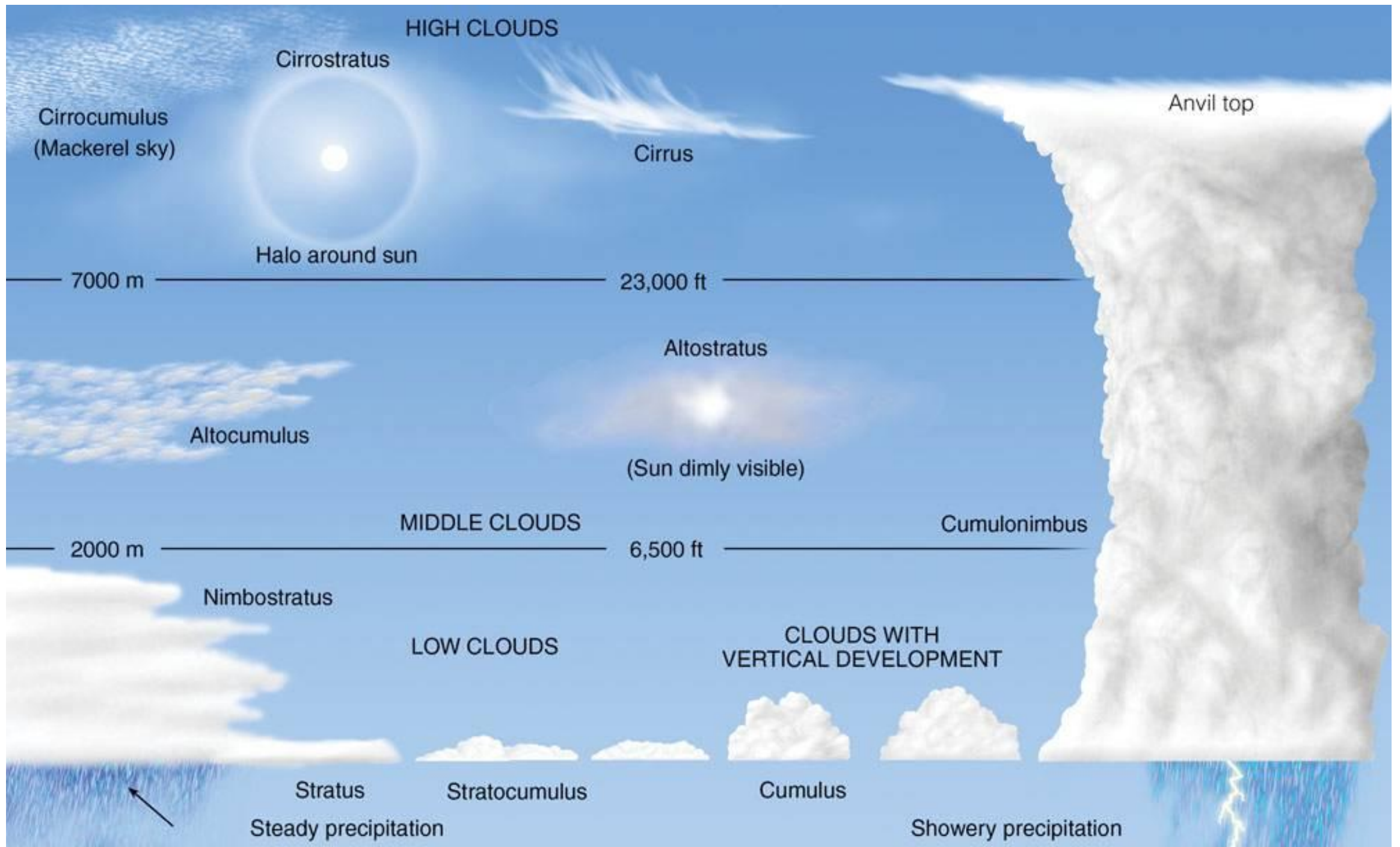


Fronts: When Air Masses Collide

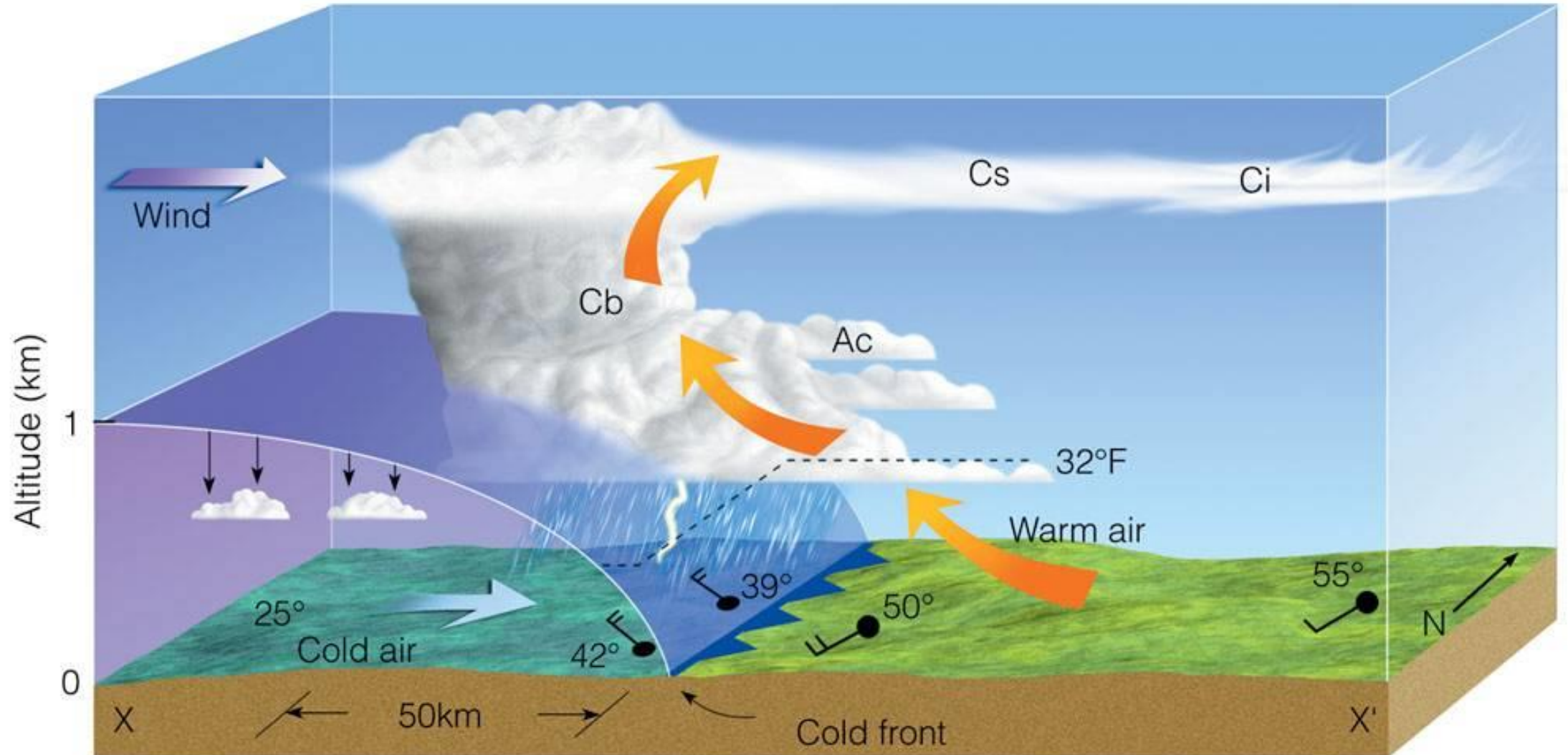


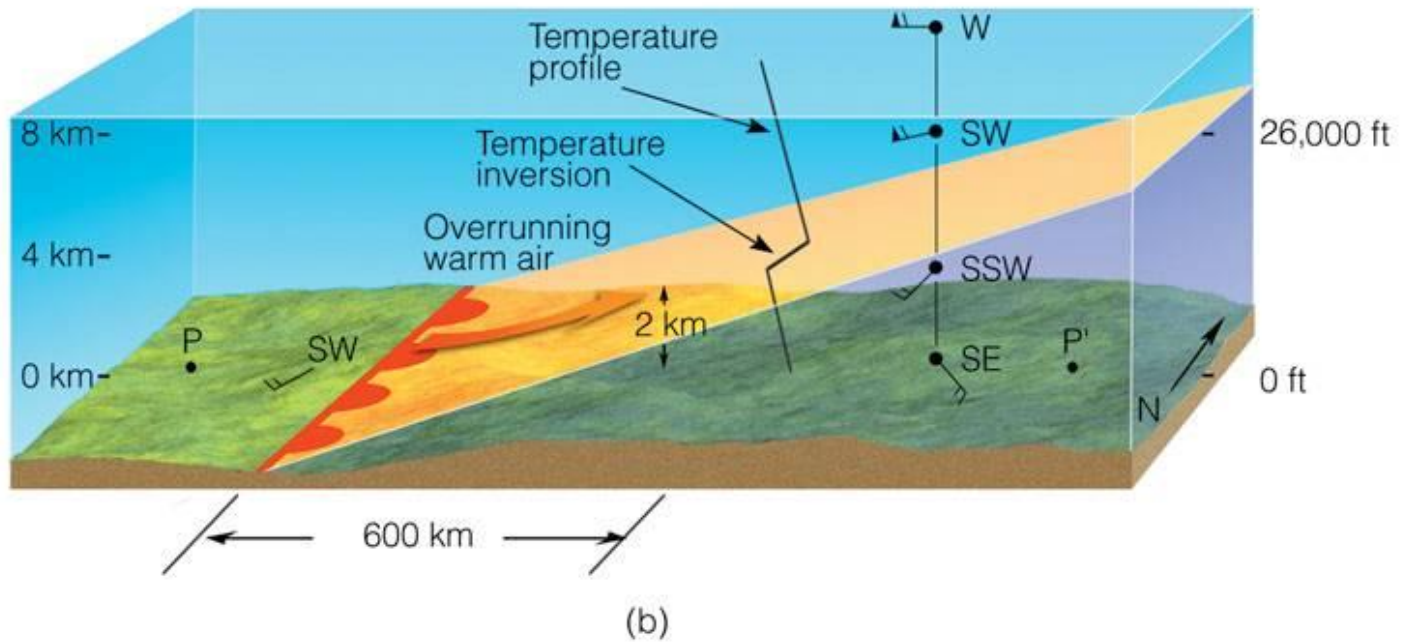
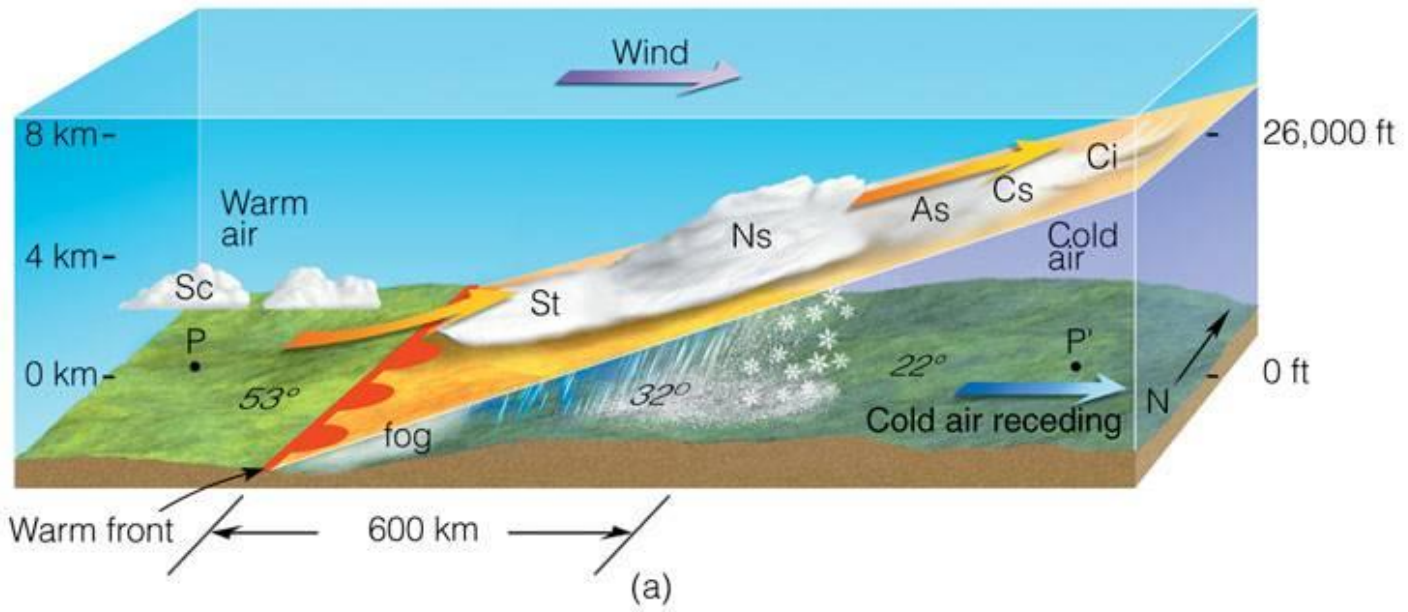
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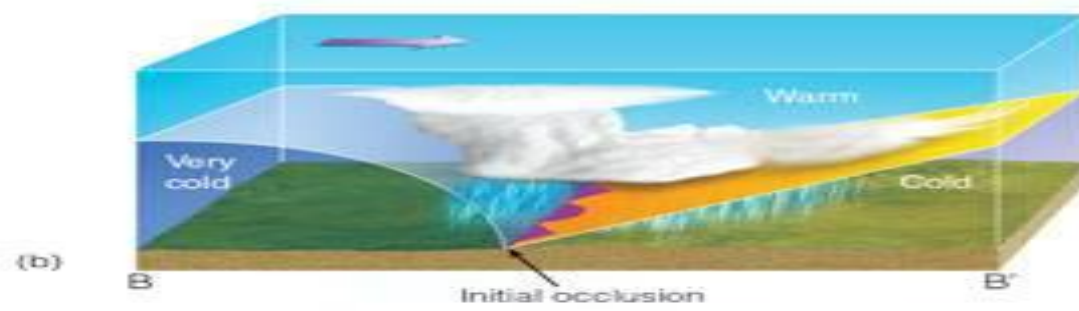
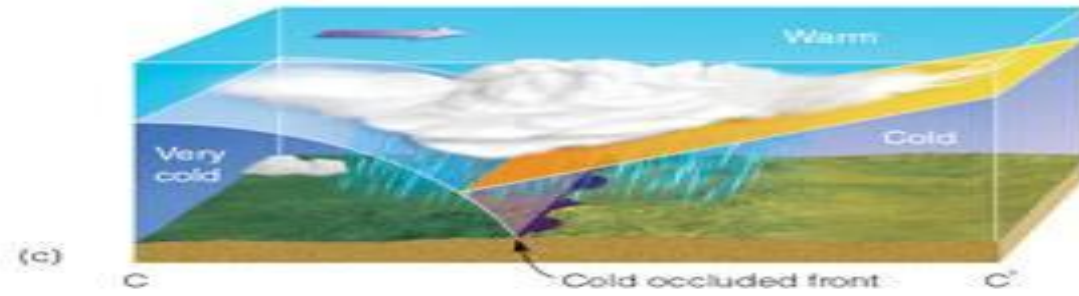
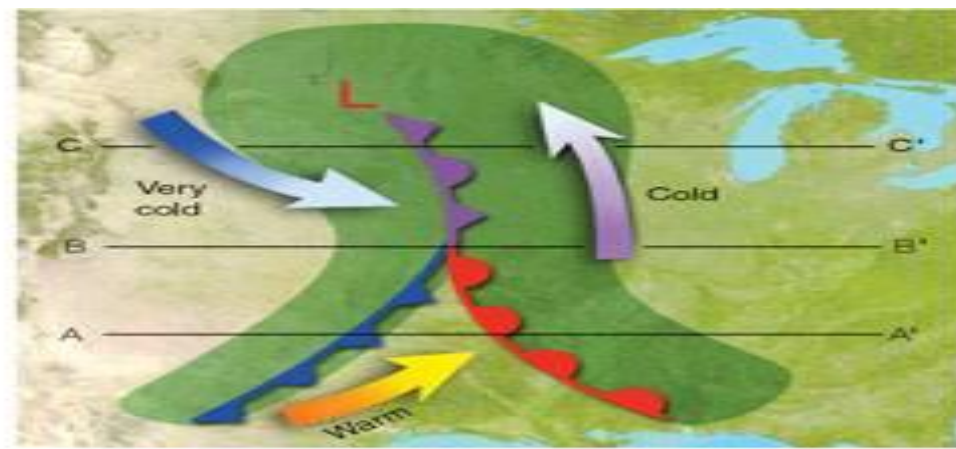
- Why do clouds form? What ingredients are needed for cloud formation?
- What kind of cloud is this?



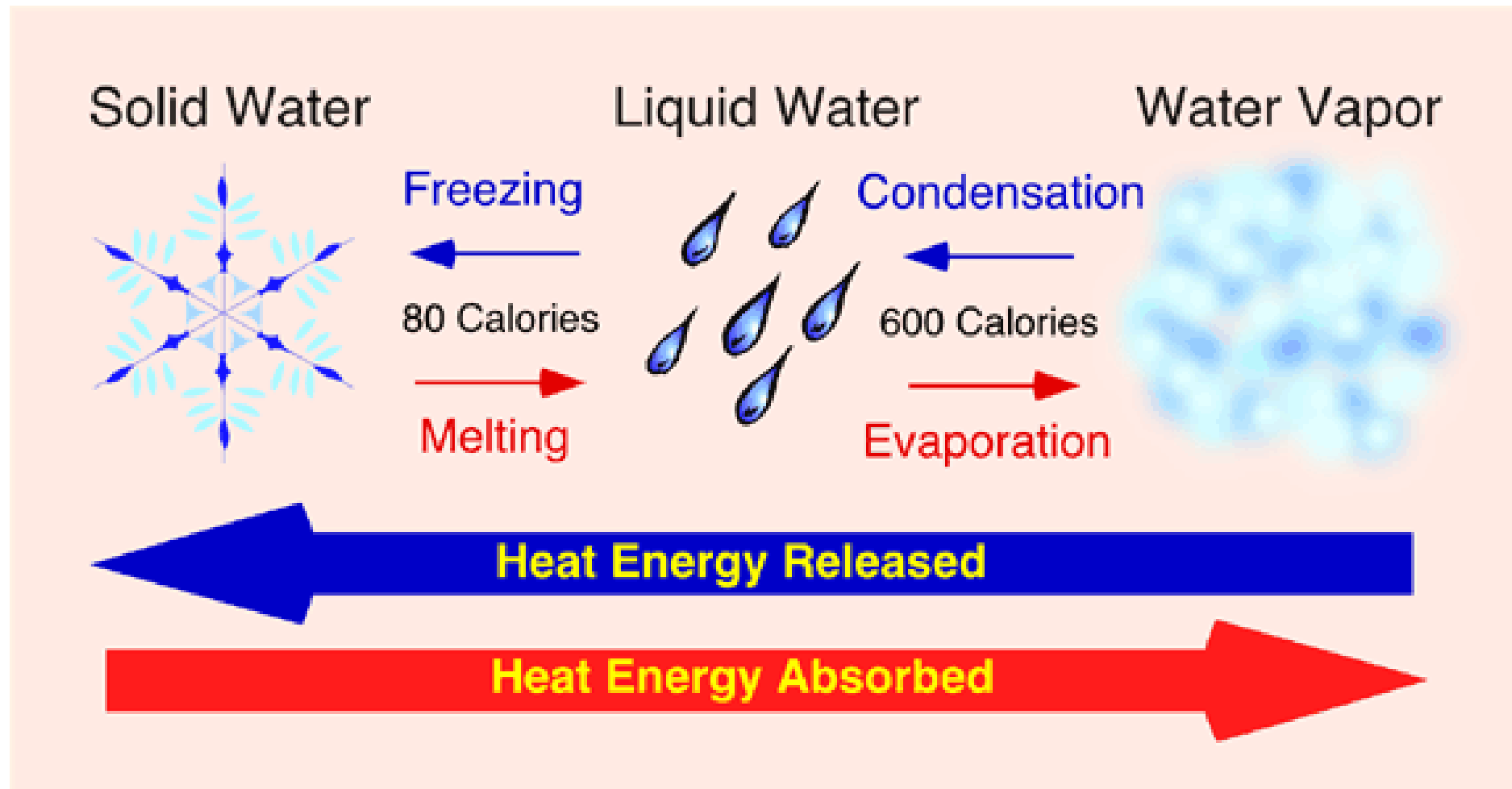
Fronts: When Air Masses Collide







Latent Heat



Key Weather Principles

1. Energy reaches Earth as solar radiation
2. The Earth experiences differential heating
3. Cold air is denser than warm air
4. Warm air holds more moisture than cold air
5. Changes of state (evaporation, condensation, etc.) involve the absorption or release of latent heat, which fuels severe weather events