Bellringer Pre-Assessment:

- What contributing factors influence the differences in climates?
- What's the difference between a cold front and a warm front?
- What are some of the Air masses that effect North America?

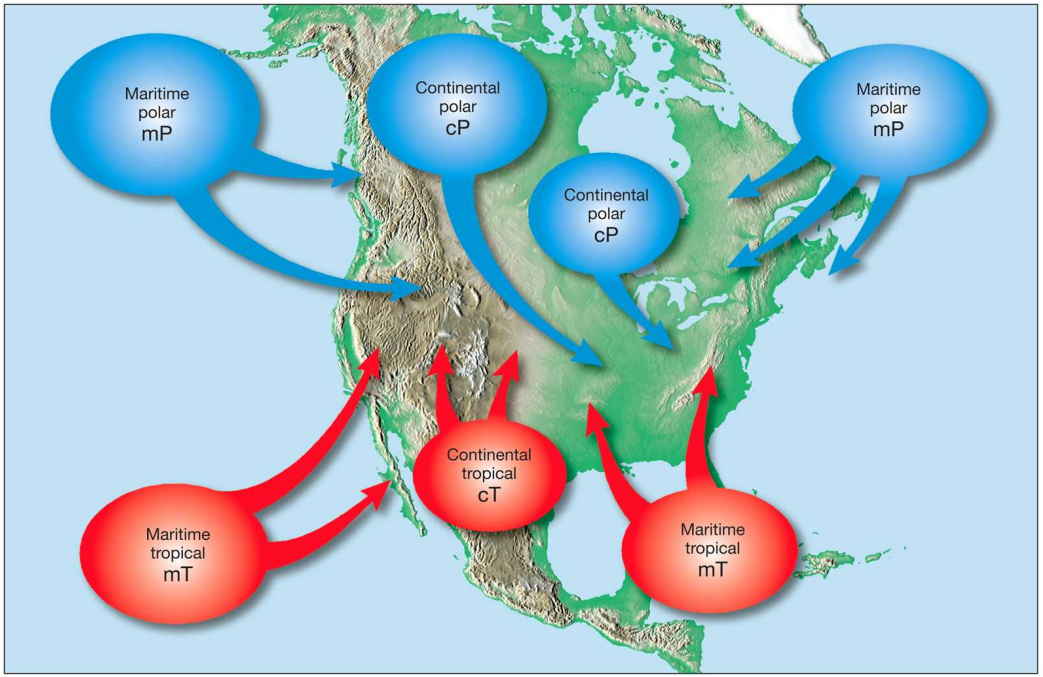
Learning Objectives:

- I can describe the weather that different air masses bring in from different areas of the northern hemisphere.
- I can predict weather patterns associated with each type of front.

Check for Understanding Questions:

- What weather conditions do warm fronts bring?
- What weather conditions do cold fronts bring?
- What are the Air Masses that affect North America?

An air mass is a huge body of air with similar temperature and moisture properties. The types of air masses formed on Earth are determined by their source region.



Air Mass Characteristics

There are two main characteristics that define air masses - temperature and moisture content. Generally, the temperature and moisture content of air masses are abbreviated as two letters. The first letter is a lower case letter and is used to symbolize the overall moisture in the air.

The second letter used to symbolize a type of air mass is capitalized.

The capital letter symbolizes the temperature or thermal properties of the air.

In the horizontal plane, temperature and humidity are essentially consistent in the layers of the air mass. Vertically, the general trend in an air mass is cooling, but the temperature and moisture will remain fairly consistent. The height of the air mass is greater with warm air masses. Cooler air masses are more shallow. In addition to the temperature and humidity in an air mass, the stability of the air can change over time.

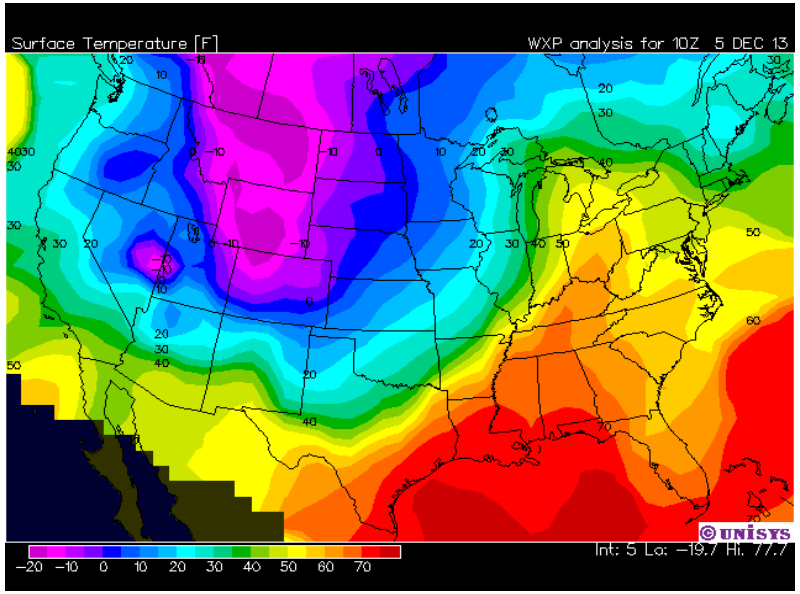
Types of Air

continental air - c

maritime air - m

Tropical air - T

Polar air - P



When each of the 4 properties above are combined, there are 4 possible choices for the types of air masses.

maritime tropical (mT)

continental tropical (cT)

maritime polar (mP)

continental polar (cP)

Other Temperature Symbols for an Air Mass

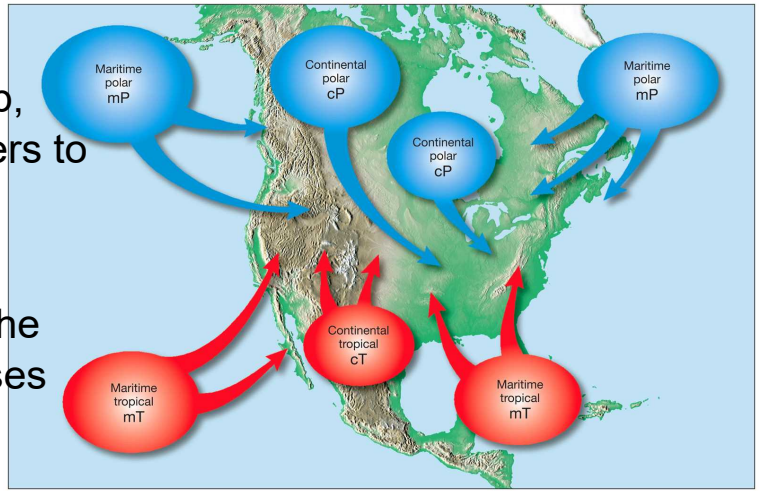
Arctic air is often symbolized with an A. This type of air mass is characterized by extremely cold temperatures. Equatorial air is symbolized with an E. The air is hot because it originates in the equatorial regions.

It is important to remember that the classification system for an air mass is based on source region and not the destination of the air mass.

As the air mass moves over Earth, the characteristics can slowly change and the air mass itself will eventually change.

In your new group, share your answers to the questions.

Now predict what would happen if the different Air Masses were to collide.



mT vs. cP cT vs. mP mT vs. cA mP vs. cT

In the continental US, air masses are commonly moved by the prevailing westerlies and jet streams.

The prevailing westerlies, the major wind belt over the US, generally push air masses from west to east.

Warm Front

Element	Before Warm Front Passes	During Passage of Warm Front	After Warm Front Passes
Pressure	Usually falling	Reaches minimum and then remains steady	slight rise
Temperature	Cool to cold	warms steadily	Becomes slowly warmer
Wind	Generally from south to southeast	Direction varies. Speed may increase as front passes	Direction usually shifts to south to southwest
Clouds	High level clouds, (Ci then Cs), begin increasing, followed by Altostratus, then Nimbostratus and stratus with occasional cumulonimbus clouds near front in summer. Fog often occurs near and ahead of front.	Usually overcast conditions with predominantly stratus and nimbostratus type clouds	Decrease in coverage amount. May have scattered stratocumulus type and occasionally cumulonimbus type in summer months
Precipitation	Light to moderate rain, snow, sleet or drizzle	Possibly light drizzle or no precipitation	Usually none or light showers
Visibility	Poor to near zero in fog and precipitation	Poor but slowly improving as front passes	Fair, may lower in hazy areas.
Dew Point	Steadily rises as precipitation evaporates into cool air ahead of front	Remains steady	Rises in warm, moist air behind front and then remains steady

Cold Front

Element	Before Cold Front Passes	During Passage of Cold Front	After Cold Front Passes
Pressure	Falling; either steady or unsteady	Reaches minimum and then begins rising	Continues to rise
Temperature	Relatively warm	Drops quickly	Drops steadily
Wind	Generally from south to southwest	Increase in speed, often gusty. Direction begins shifting	Direction usually shifts to west to northwesterly
Clouds	High level clouds, (Ci, Cs), begin increasing. Bases lower as mid-level and low-level clouds begin developing. May have convective types (Cu and Cb) develop ahead of front	Overcast, or nearly so, with Cumulus and Cumulonimbus present	Decrease in coverage amount. Fair weather Cu may develop behind front
Precipitation	May have scattered showers associated with few Cu and Cb.	Maximum precipitation, usually of a showery nature, either rain or snow, with lightning, thunder and hail if Cb's are present.	Precipitation ends
Visibility	Fair to poor in haze	Drops quickly to very poor in showers	Quickly improves as precipitation ends
Dew Point	Relatively high	Drops quickly as dryer air behind front moves in	Drops steadily

Check for Understanding Questions:

- What weather conditions do warm fronts bring?
- What weather conditions do cold fronts bring?
- What are the Air Masses that affect North America?

Learning Objectives: Did you accomplish them?

- I can describe the weather that different air masses bring in from different areas of the northern hemisphere.
- I can predict weather patterns associated with each type of front.

Self-Evaluation

- How well did you understand the material today?
  (1-Lost, 2- understand, 3-can teach it)
- How well did you and your team members participate in class?
  (1-didn't do anything, 2-Bare minimum, 3-fully participated)