

Feb 29-5:43 PM

Air Masses

Air Mass: Large body of air that has uniform physical properties.

Ex: Humidity (moisture content)
Temperature

Cover large portions of continents or oceans

Feb 29-5:43 PM

Air Masses

Formed when a large body of air becomes fairly stationary over a region of Earth's surface.

The mass of air becomes strongly influenced by the properties of the region

Feb 29-5:43 PM

Air Masses

Air masses can vary greatly.

For example: Air above the Gulf of Mexico versus air above Canada.

Gulf of Mexico: Humid (wet)
Warm

Canada: Dry
Cold

Feb 29-5:43 PM

Air Masses

Air masses are classified according to where they formed. (Source Region)

Over land = _____

Over water = _____

Over the Tropics = _____

Above 50° latitude = _____

Above 60° latitude = _____

Feb 29-5:43 PM

Air Masses

Air masses are classified according to where they formed.

Over land = Continental (dry)

Over water = Maritime (moist/humid)

Over the Tropics = Tropical (warm)

Above 50° latitude = Polar (cold)

Above 60° latitude = Arctic (very cold)

Temperature Characteristics are determined by LATITUDE

Feb 29-5:43 PM

Air Masses Make these

Air masses are classified according to where
they formed connections

Over land = Continental (dry)

Over water = Maritime (moist/humid)

Over the Tropics = Tropical (warm)

Above 50° latitude = Polar (cold)

Above 60° latitude = Arctic (very cold)

Temperature Characteristics
 are determined by
LATITUDE

Feb 29-5:43 PM

Air Masses

Air masses that most effect North America:

1. Maritime Polar (mP)

Originate in the North Pacific and North Atlantic oceans.

Cool and moist air

Source of precipitation to coastal areas

Feb 29-5:43 PM

Air Masses

2. Continental Polar (cP)

Form over Northern Canada

Cold and dry air

Source of air to central and eastern United States

Feb 29-5:43 PM

Air Masses

3. Maritime Tropical (mT)

Originates over Gulf of Mexico and warm southern oceans

Source of moist, warm air bringing fog and rain to the southern U.S.

Feb 29-5:43 PM

Air Masses

4. Continental Tropical (cT)

Originates over Northern Mexico and dry areas of the southwestern U.S.

Source of dry, warm air to the southern Great Plains

Feb 29-5:43 PM

Air Masses

5. Continental Arctic (cA)

Originates over arctic regions

Occasionally influences our weather (~ February)

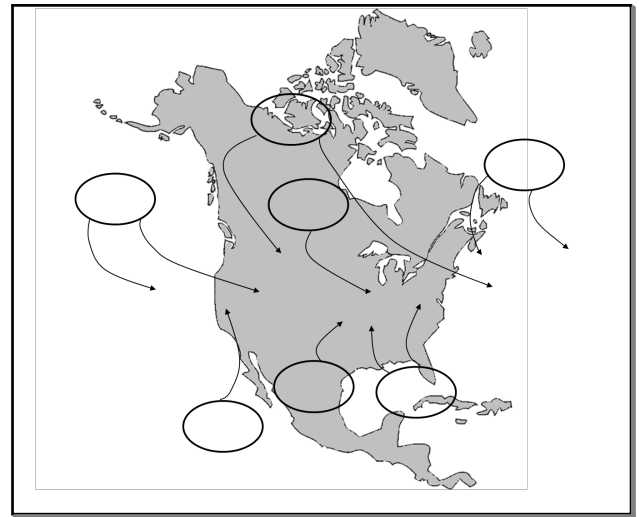
Very cold and very dry air

Feb 29-5:43 PM

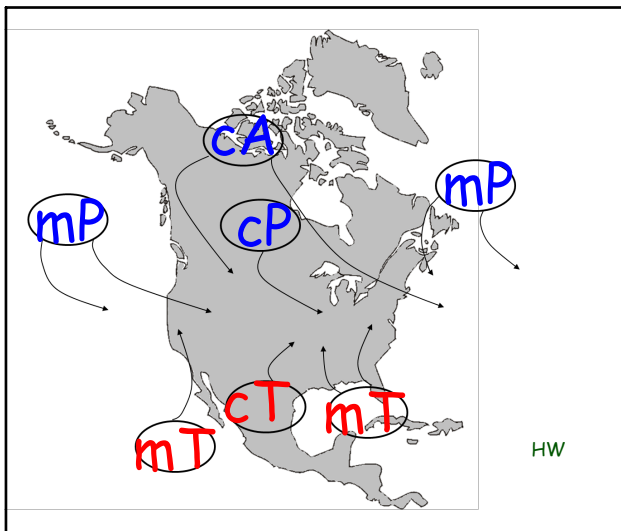
Page 13 of your _____, _____ ESRT

Air Masses	
cA	continental arctic
cP	continental polar
cT	continental tropical
mT	maritime tropical
mP	maritime polar

Feb 29-5:43 PM



Feb 29-5:43 PM



Feb 29-5:43 PM

What type of air mass was over this particular location on Monday and Tuesday?

Day	Temperature (°F)	Wind Speed, Wind Direction, Cloud Cover	Barometric Pressure (mb)	Present Weather	Dew Point
Monday	6		1,028.0	Clear	0
Tuesday	4		1,029.0	Sunny	-1
Wednesday	24		1,017.0	Light snow	25
Thursday	26		1,011.0	Light snow	26

Add to Notes: Closer to Dew Point = Higher RH = wetter (more humid) air mass

Mar 7-6:20 PM

Fronts

Air masses may be moved with the circulation of air around the Earth.

As air masses move, they tend to retain the properties of the region over which they were formed.

Feb 29-5:43 PM

Fronts

When two different air masses meet, they usually don't mix

Instead, a boundary forms between them.

This boundary is called a front.

Front: where two unlike air masses meet.

Feb 29-5:43 PM

Fronts

Air masses are capable of moving at different speeds
~~X~~ Clouds and precipitation often form along fronts.

Four types of fronts:

1. _____
2. _____
3. _____
4. _____

Feb 29-5:43 PM

Fronts

Air masses are capable of moving at different speeds
Clouds and precipitation often form along fronts.

Four types of fronts:

1. Cold
2. Warm
3. Stationary
4. Occluded

Feb 29-5:43 PM

ESRT, Page _____

Fronts

Cold	
Warm	
Stationary	
Occluded	

Feb 29-5:43 PM

'shorthand' drawings:

Fronts

Cold	
Warm	
Stationary	
Occluded	

Feb 29-5:43 PM

Cold Fronts

When a mass of cold air pushes into a mass of warm air.

Feb 29-5:43 PM

Cold Fronts

Characteristics:

- Tend to move faster than a warm front
- Plows under warmer air, lifting it rapidly into the atmosphere
- Very steep frontal boundary
- Produces cumulus and/or cumulonimbus clouds right at the frontal boundary

Feb 29-5:43 PM

Cold Fronts

Identifying features:

Air pressure drops just before passing, then rises sharply as it passes (cold air is more dense)
Gusty winds while passing

Feb 29-5:43 PM

Cold Fronts

Identifying features:

Sudden temperature drop as passing.
 Common for thunderstorms to develop along the front as well as heavy amounts of rain.

- Clouds along the front
- Quick moving/brief storms

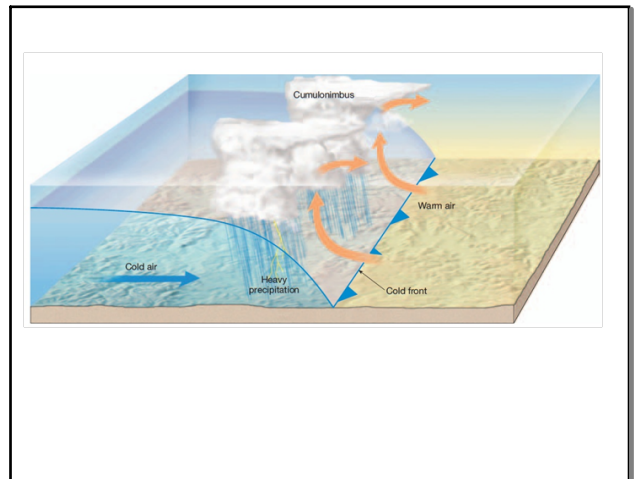
Feb 29-5:43 PM

Cold Fronts

Identifying features:

After passing, skies clear as cold air settles in.

Feb 29-5:43 PM



Feb 29-5:43 PM

Warm Fronts

Advancing warm air mass gradually moves up and over a cold air mass.

May take days to pass
Squeezes the cold air out of the way

Feb 29-5:43 PM

Warm Fronts

Associated cloud types:

Cirrus: furthest in front and highest.

Altostratus

Stratus: closest to the surface

Due to the moisture content of warm air, a steady rain may result as the front is passing.

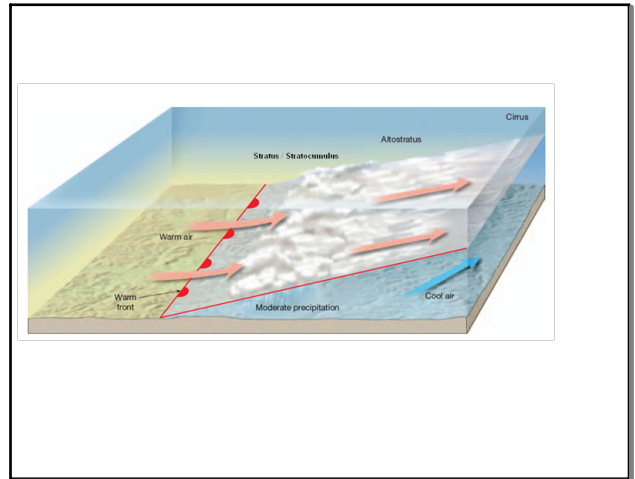
Feb 29-5:43 PM

Warm Fronts

Once the front has passed, the warm air settles in and skies are mostly clear with some "fair weather" cumulus clouds present.



Feb 29-5:43 PM



Feb 29-5:43 PM

Warm Fronts

Identifying features:

Air pressure becomes steady and then falls after passing

Temperatures steadily rise

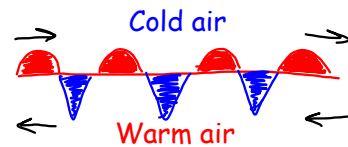
Feb 29-5:43 PM

Stationary Fronts

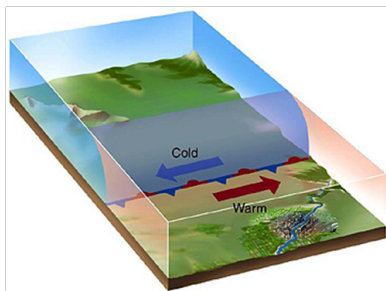
Sometimes neither air mass overtakes the other.

Air masses stay where they are or move sideways very slowly.

Tend to move laterally, similarly to a transform boundary in plate tectonics.



Feb 29-5:43 PM



Feb 29-5:43 PM

Stationary Fronts

Characteristics:

Clouds and steady rain or snow can last for several days.

Identifying features:

A noticeable temperature change and wind shift is common across a stationary front boundary.

Feb 29-5:43 PM

Occluded Fronts

Formed when a cold front overtakes a warm front.

Relatively warmer air mass is caught between two cooler air masses.

Warmer air 'pinched' in the middle, cutting it off from the ground.

Feb 29-5:43 PM

Occluded Fronts

Characteristics:

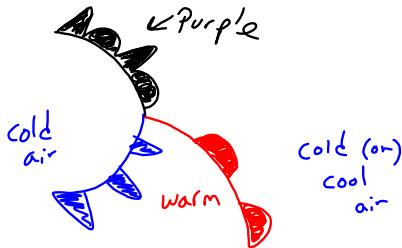
Trapped warm air will rise and water vapor condenses to form clouds and precipitation.

Feb 29-5:43 PM

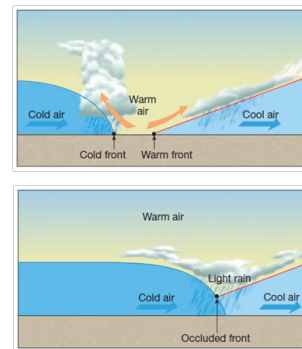
Occluded Fronts

Characteristics:

Trapped warm air will rise and water vapor condenses to form clouds and precipitation.



Feb 29-5:43 PM



Feb 29-5:43 PM

Occluded Fronts

Two types of occluded fronts:

1. Warm Occluded Front

Acts like a warm front

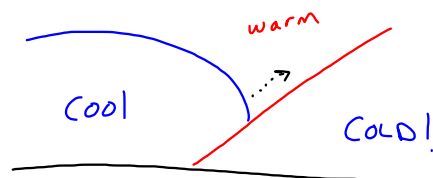
The air behind the approaching cold front is warmer than the cold air ahead of the warm front.

Feb 29-5:43 PM

Occluded Fronts

Two types of occluded fronts:

1. Warm Occluded Front



Feb 29-5:43 PM

Occluded Fronts

Two types of occluded fronts:

2. Cold Occluded Front

Acts like a cold front

The air behind the approaching cold front

is colder than the cool air ahead

of the warm front.

Feb 29-5:43 PM

Occluded Fronts

Two types of occluded fronts:

2. Cold Occluded Front



Feb 29-5:43 PM