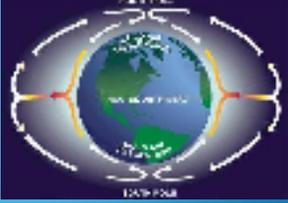
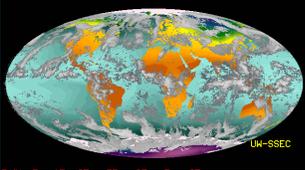


Heat is transferred by convection.

- Since warmed air has more space between the molecules, it's less dense and rises.
- Cool air is more dense and tends to descend, or sink.
- Air near the equator tends to rise, and air near the poles tends to descend, or sink.

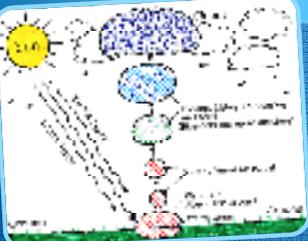


Notice the band of clouds around the equator?

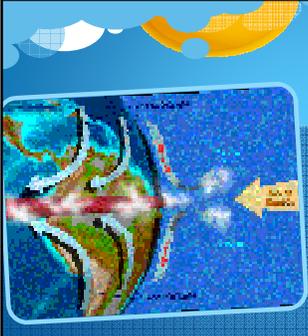


This is the **inter tropical convergence zone** or **ITCZ**.

How are clouds formed?

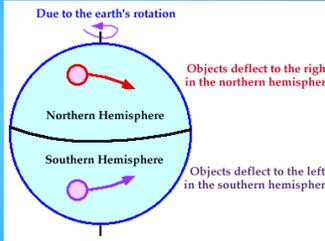


- Warm, moist air rises.
- Cold air can hold less moisture than warm air.
- As the moist air rises, it cools, condenses and forms clouds!



Now we know!

- Solar energy is focused near the equator.
- As warm air rises, it cools and condenses, and clouds are formed.



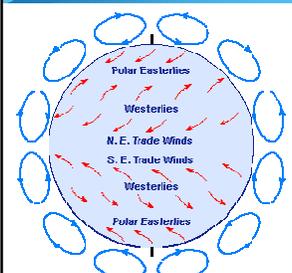
Coriolis Effect

- Because the earth rotates, air and water north of the equator move to the right.
- This is called the Coriolis effect.

Due to the earth's rotation

Northern Hemisphere: Objects deflect to the right in the northern hemisphere

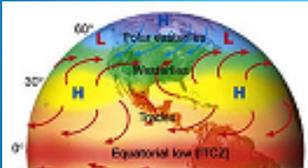
Southern Hemisphere: Objects deflect to the left in the southern hemisphere



Weather Highways

- The rotation of the earth creates the **Coriolis effect**.
- The Coriolis effect creates global weather highways.

Our Weather Highway: The Westerlies



- Because of our latitude in the United States, most of our weather comes from the west.
- Looking at the map, from which direction would most of Canada's weather come?

Let's break for a short review

1. Transfer of heat in liquids or gases is called ____.
2. ____ air is dense and tends to descend, or sink.
3. The band of clouds found around the equator are called ____.
4. Cold air holds ____ moisture than warm air.
5. The Coriolis effect causes the air and water to be deflected to the ____ north of the equator.

Why does the weather change?

Ok, so we know that the weather moves around on these weather highways and that warm air rises and cold air sinks.

But why is it sunny one day, and rainy the next?

The Weather Map



- Notice that there are H's and L's on the map
- What do these letters mean?

H = High Pressure Areas



- When cooler air sinks it puts pressure on the ground. This is called a High Pressure Area.
- The air is warmed, and can hold more moisture.
- This usually means sunny skies.
- Winds tend to move clockwise around a high pressure area.



When you see a big H in your area, there will probably be nice, sunny weather.



Low Pressure Areas

- When warm air rises it takes pressure off the ground. This is called a **Low Pressure Area**.
- When warm air rises and is cooled, clouds are formed. The cooler air can not hold as much moisture.
- This usually means stormy weather.
- Winds tend to move counter clockwise around a low pressure area.



When you see a big L in your area, there will probably be stormy weather.



Jet Stream

These high and low pressure areas generally move along the jet stream and bring us our weather changes.

Air Masses

- An air mass is a large body of air with similar temperature and moisture.
- There are four different types of air masses that effect the United States.

Air Masses



Air Masses

Name	Abbr.	Properties
continental Polar	cP	dry, cold, stable
continental Tropical	cT	hot, dry, stable air high up, but unstable at the surface
maritime Polar	mP	cool, moist, unstable
maritime Tropical	mT	warm, moist, unstable

Air Masses are Named according to Where they are formed

continental	formed over continents , these are dry air masses
maritime	formed over water , these are moist air masses
Polar	formed near the poles , these are cold air masses
Tropical	formed near the tropics , these are warm air masses

Air Masses

Air Masses get their Properties based on Where they were formed.

Temperature Moisture	Polar (Cold)	Tropical (Hot)	Behavior
continental (dry)	continental Polar cP dry, Cold	continental Tropical cT dry, Hot	usually stable
maritime (moist)	maritime Polar mP moist, Cold	maritime Tropical mT moist, Hot	usually unstable

Air Masses

Weather Fronts

Warm front
Cold front
Stationary front
Occluded front

- There are four major types of weather fronts.
- Each has its own color and symbol.

Weather Fronts

- Can you see the four different types of fronts on the map?
- Let's look at the different fronts and their impact on the weather.

Warm Fronts

- A warm front is warm air displacing cool air.
- Shallow leading edge warm air must "overrun" cold air.
- These are usually slow moving.

Cool air in place

Warm front (slow)

Warm air

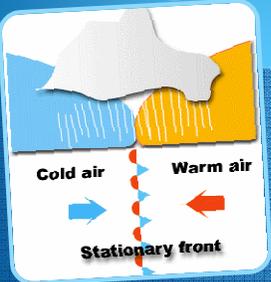
Cold Fronts

- Cold air advances into region of warm air.
- Intensity of precipitation greater, but short lived.
- Clearing conditions after front passes.
- Usually approaches from W or NW.

Advancing cold air

Warm air

Cold front (fast)



Stationary Fronts

- Surface positions of the front do not move
- Often a region of clouds

The diagram shows a cross-section of a stationary front. On the left, a blue area labeled 'Cold air' has a blue arrow pointing right. On the right, a yellow area labeled 'Warm air' has a red arrow pointing left. The two air masses meet at a vertical dashed line labeled 'Stationary front'. Above the front, there are clouds and rain falling from a grey cloud mass.



Occluded Fronts

- Cold front overtakes warm front
- Often found close to the low pressure center

The diagram shows a cross-section of an occluded front. A purple cold front with a triangular symbol is moving from the left, overtaking a warm front with a semi-circular symbol from the right. The warm front is being pushed under the cold front. The area between the fronts is labeled with a purple arrow pointing right.
