



# What is Weather?

An Introduction



Take good notes!

There will be a quiz at the end of this presentation.



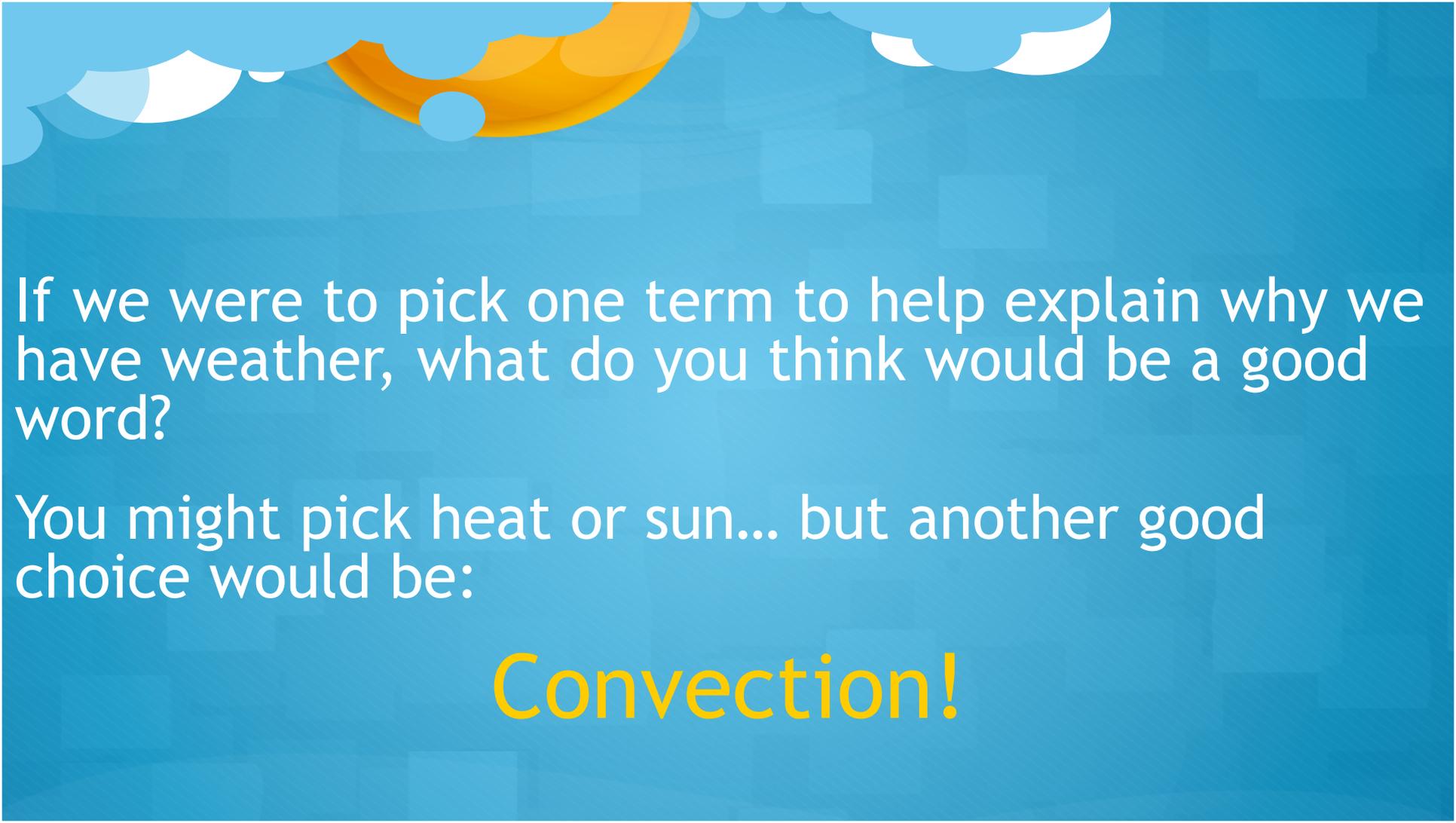
# Why do we have weather ?

- What drives the weather?
- Why is it rainy one day and dry the next?
- What are weather highways, and what causes them?
- How many types of weather fronts are there, and what are they called?
- What is the difference between a high and a low pressure system? What types of weather do they cause?

# Let's take a look at what causes weather!

really hot	 sunny	 windy	 stormy	
hot	What's the			 partly cloudy
warm	<b>weather</b>			like today?
cool	 cloudy	 rainy	 snowy	
cold				
really cold				

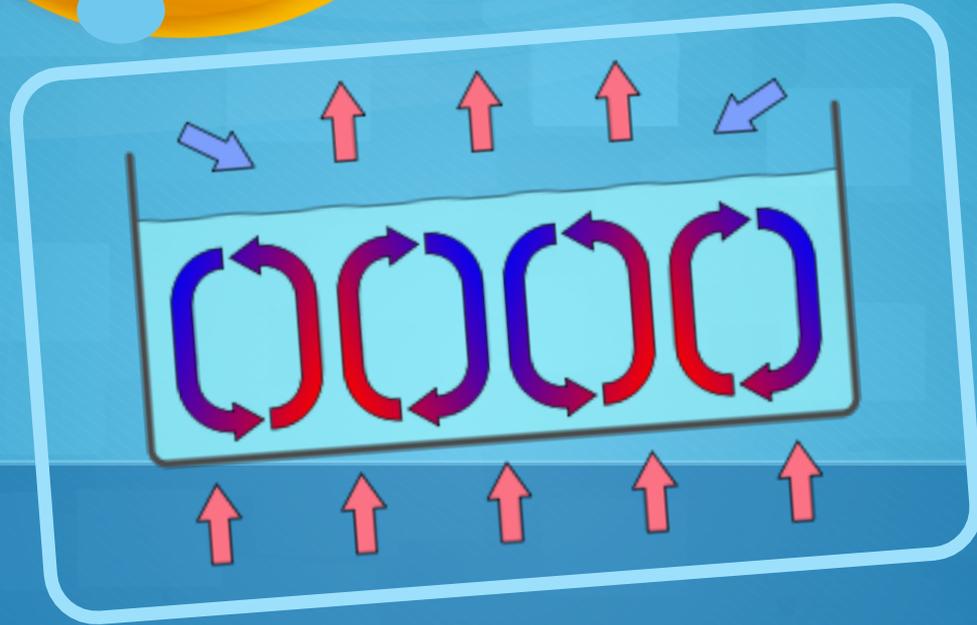
www.yayforpek.blogspot.com



If we were to pick one term to help explain why we have weather, what do you think would be a good word?

You might pick heat or sun... but another good choice would be:

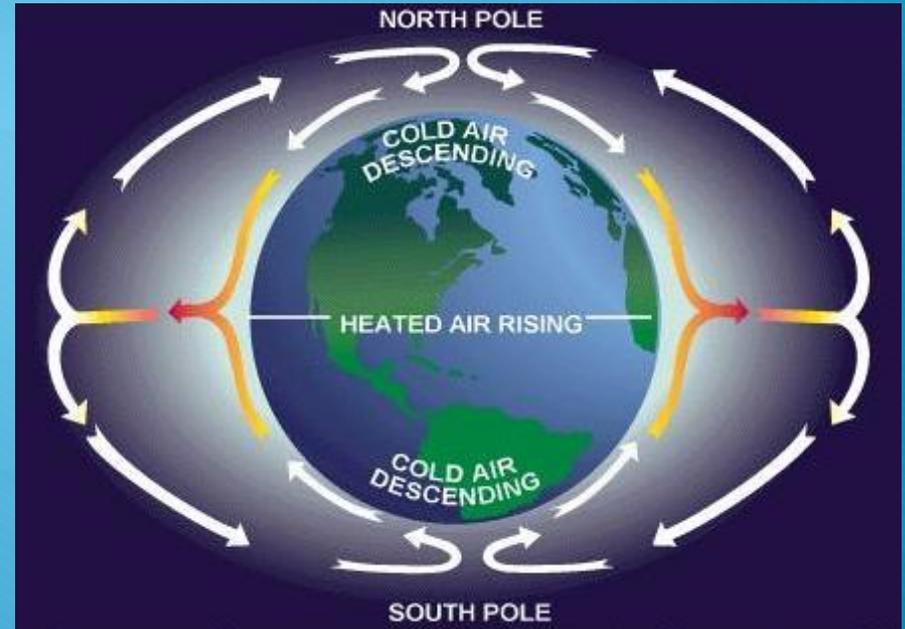
**Convection!**



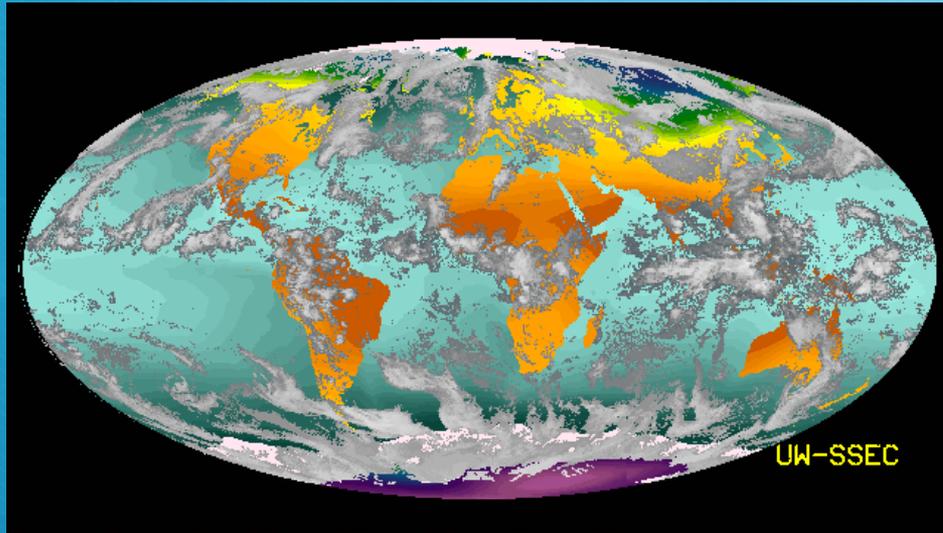
Convection is the transfer of heat,  
usually in gases or liquids.

# Heat is transferred by convection.

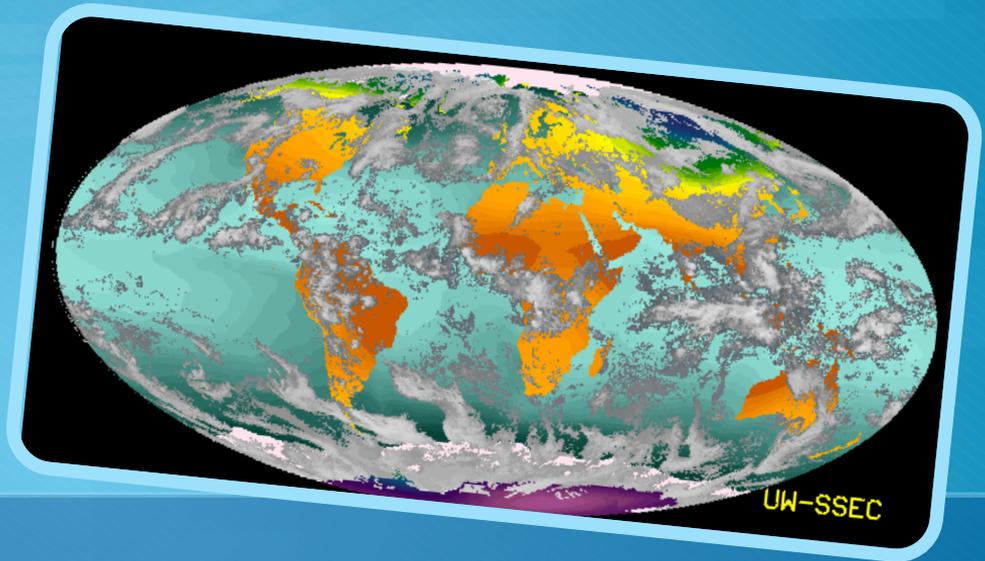
- Since warmed air has more space between the molecules, it's less dense and rises.
- Cool air is more dense and tends to descend, or sink.
- Air near the equator tends to rise, and air near the poles tends to descend, or sink.



Notice the band of clouds around the equator ?



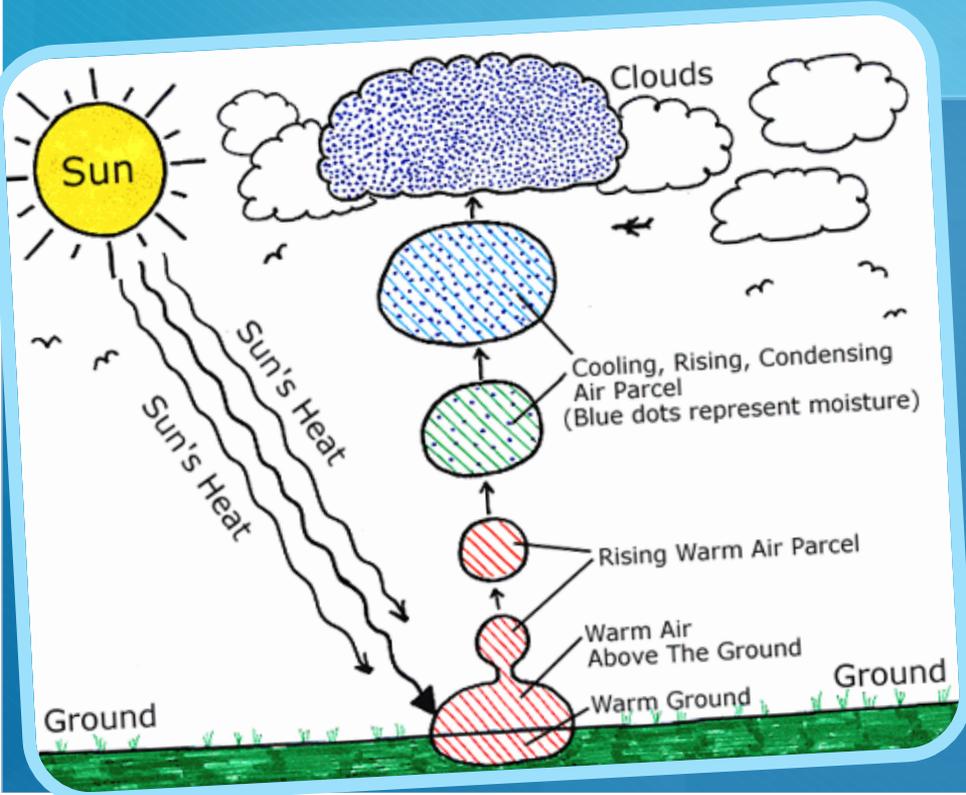
This is the **inter tropical convergence zone** or **ITCZ**.



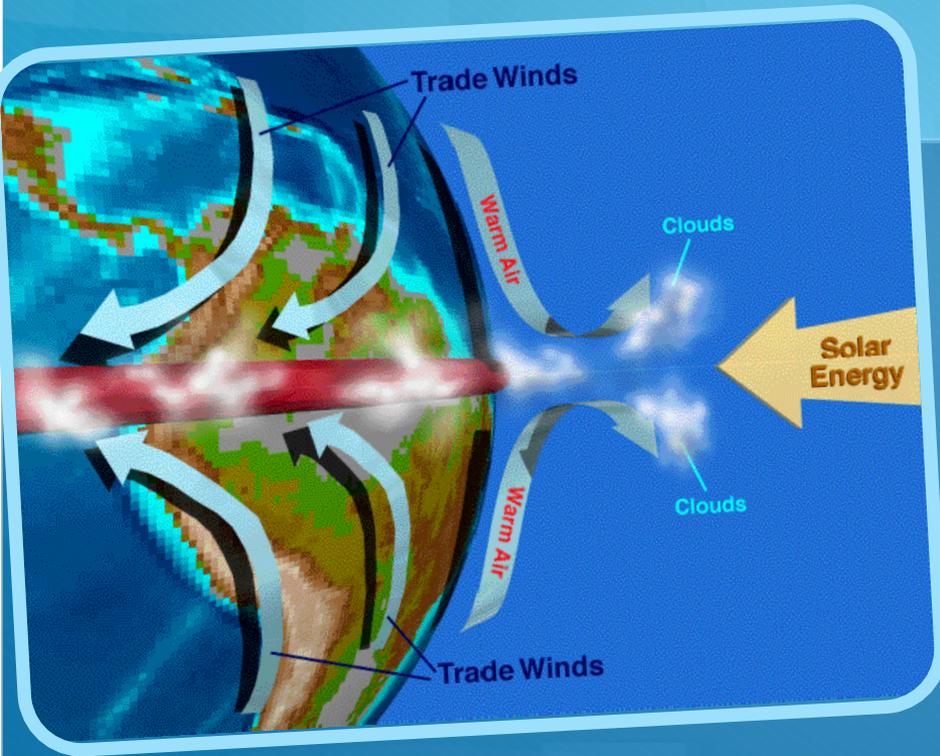
Why do you think this band of clouds is there?

Let's take a look at how clouds are formed.

# 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!

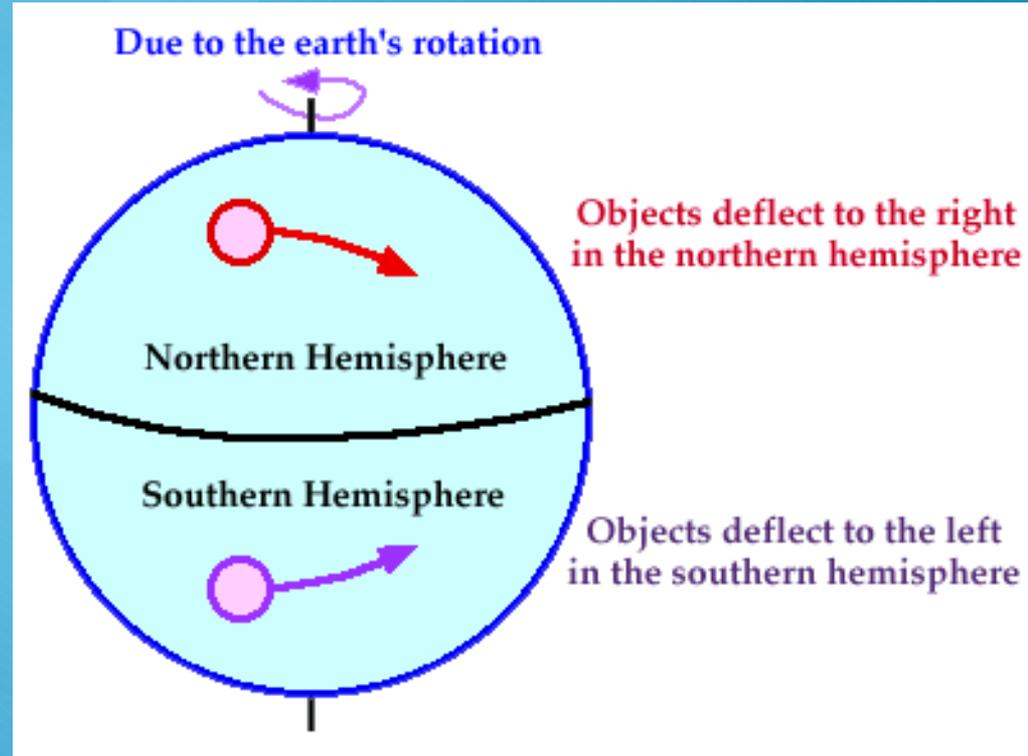


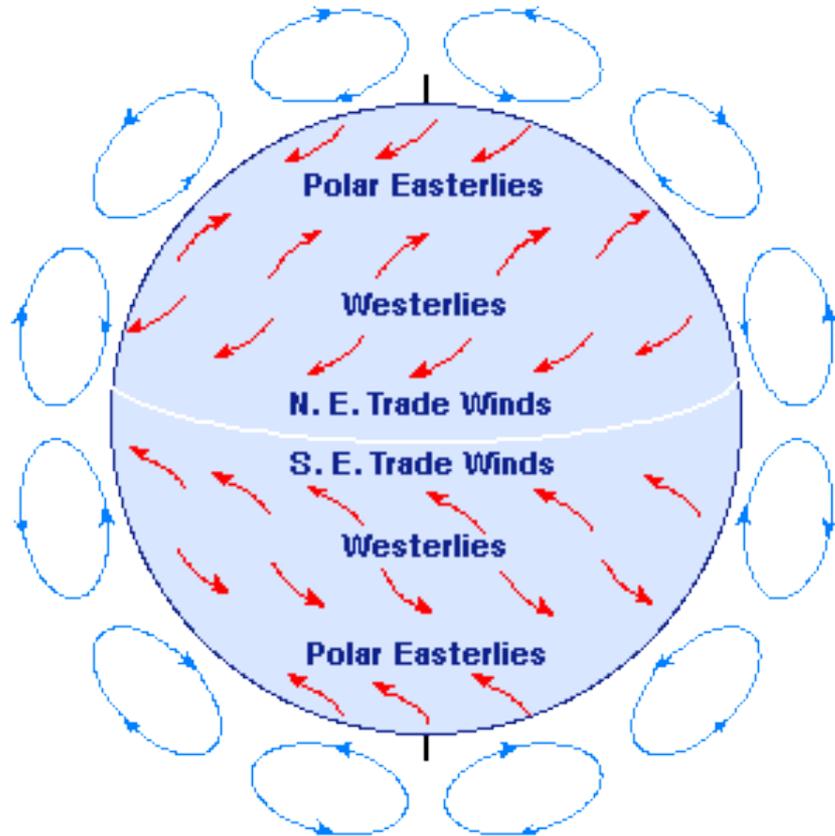
## Now we know!

- 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.

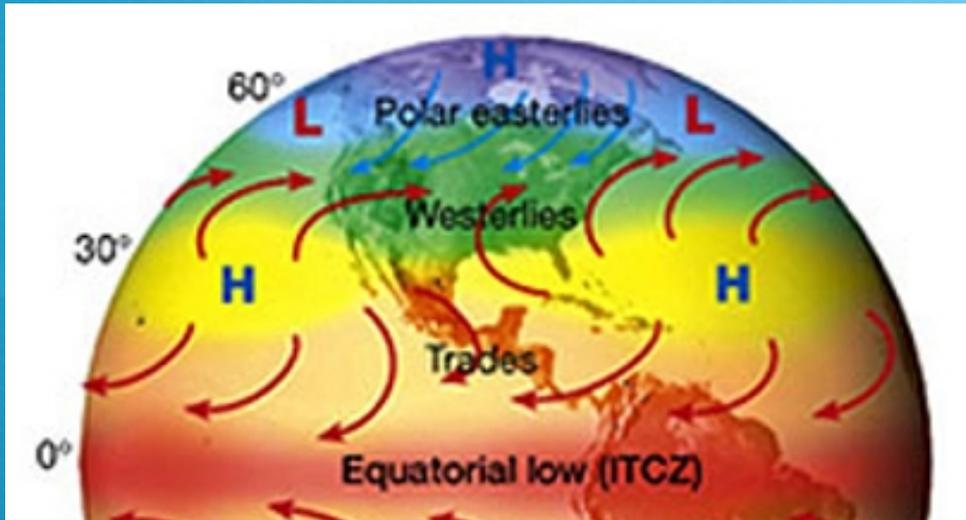




# Weather Highways

- 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.



# How did you do?

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

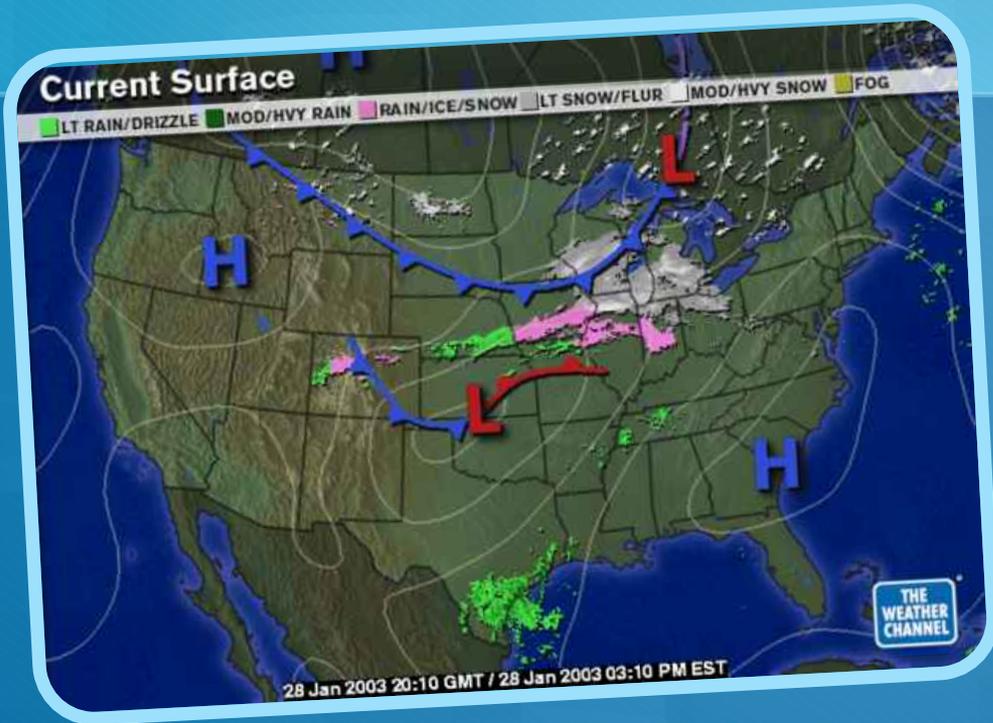


# Why does the weather change?

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?

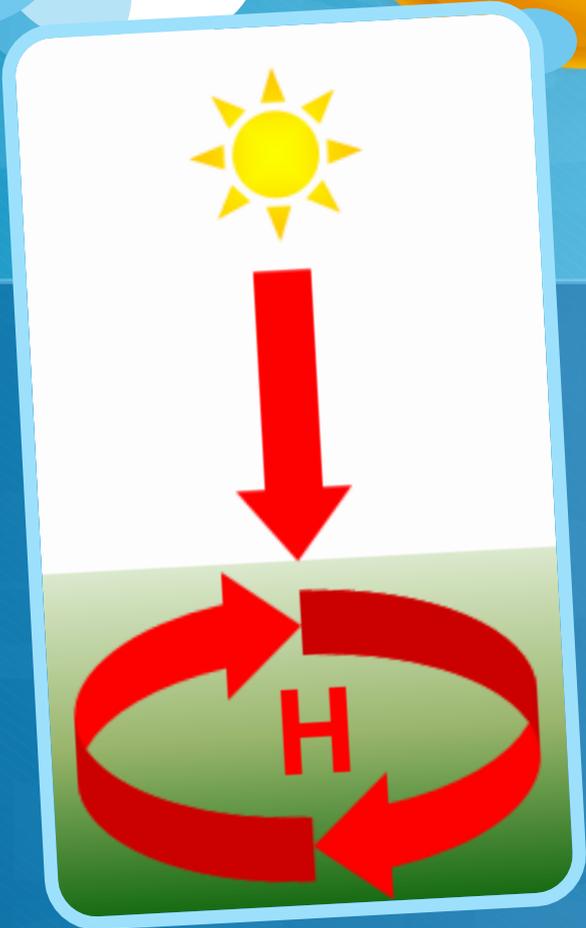
# The Weather Map



- 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.

# L = 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 affect the United States.



## Air Masses

This map shows the regions where air masses are formed, and the paths the air masses take.

# Air Masses

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

# Air Masses

## Air Masses are Named according to Where they are formed

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

# Air Masses

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

<b>Temperature</b> <b>Moisture</b>	<b><u>P</u>olar (Cold)</b>	<b><u>T</u>ropical (Hot)</b>	<b>Behavior</b>
<b><u>c</u>ontinental (dry)</b>	<b><u>c</u>ontinental <u>P</u>olar cP dry, Cold</b>	<b><u>c</u>ontinental <u>T</u>ropical cT dry, Hot</b>	usually stable
<b><u>m</u>aritime (moist)</b>	<b><u>m</u>aritime <u>P</u>olar mP moist, Cold</b>	<b><u>m</u>aritime <u>T</u>ropical mT moist, Hot</b>	usually unstable

# Weather Fronts

Warm front



Cold front



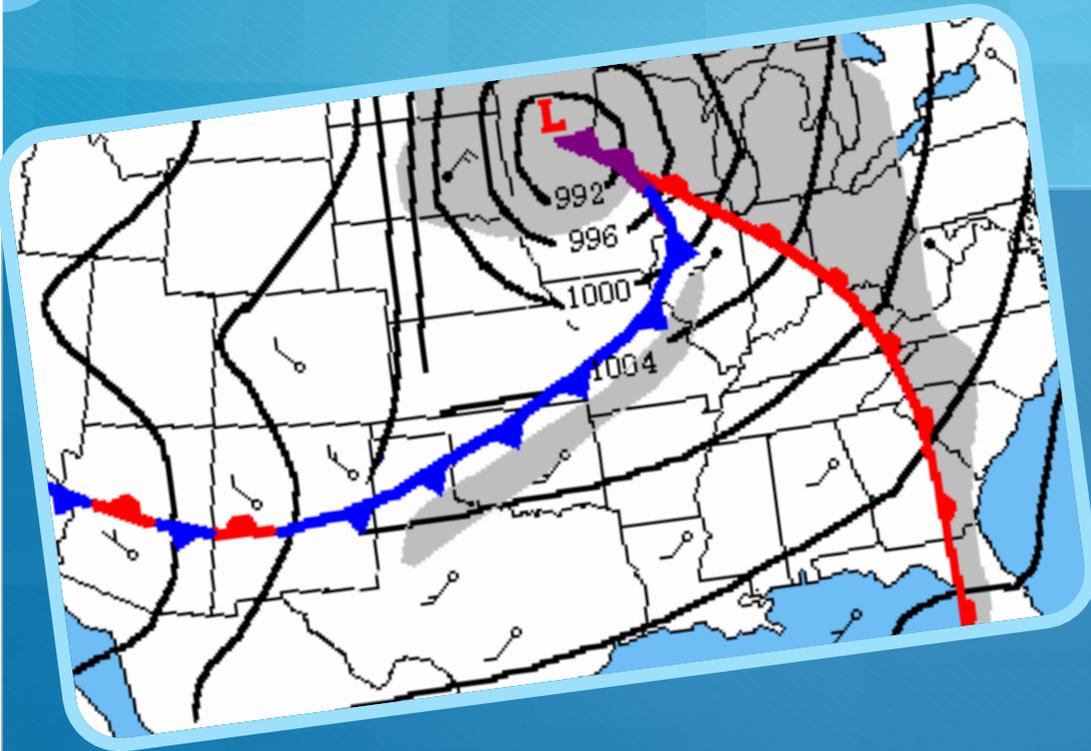
Stationary front



Occluded front



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

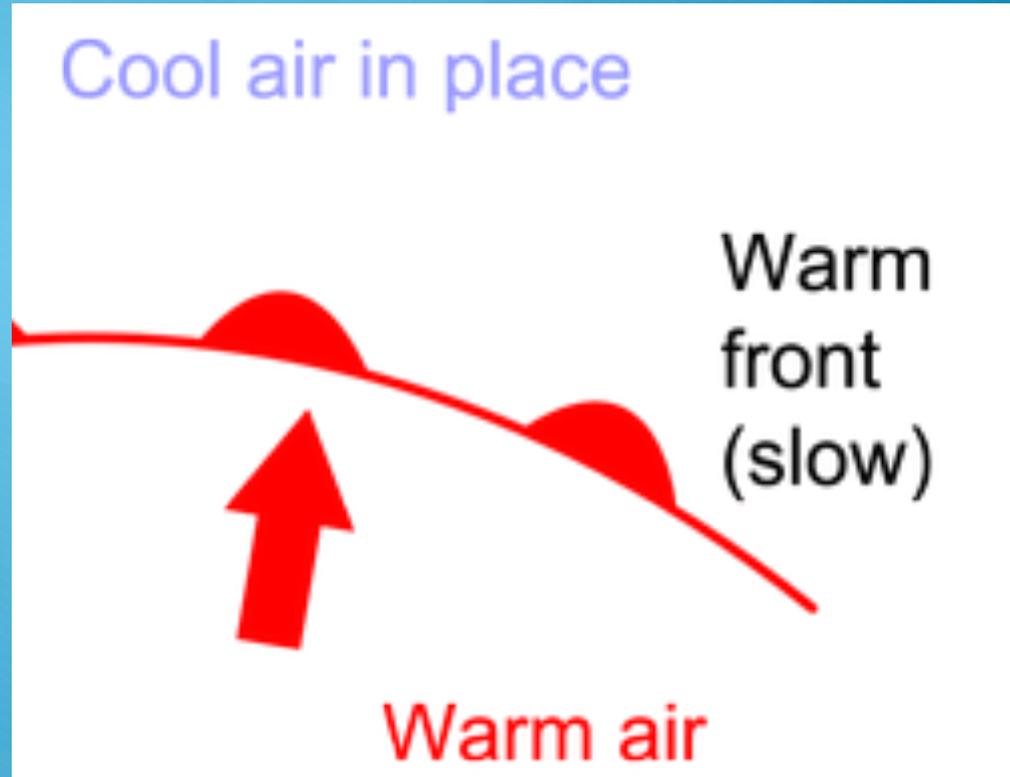


# Weather Fronts

- 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.

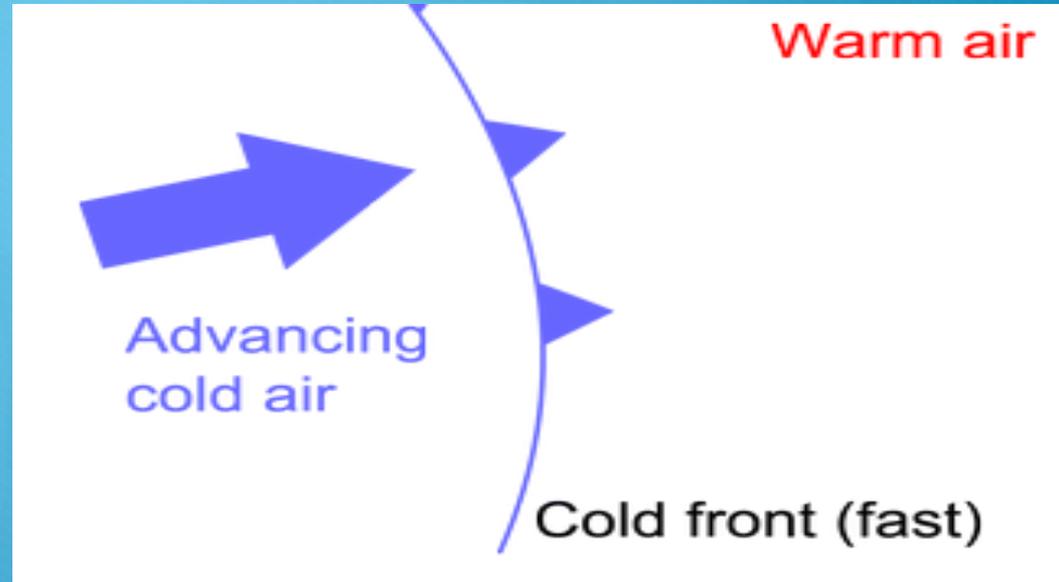
# Warm Fronts

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

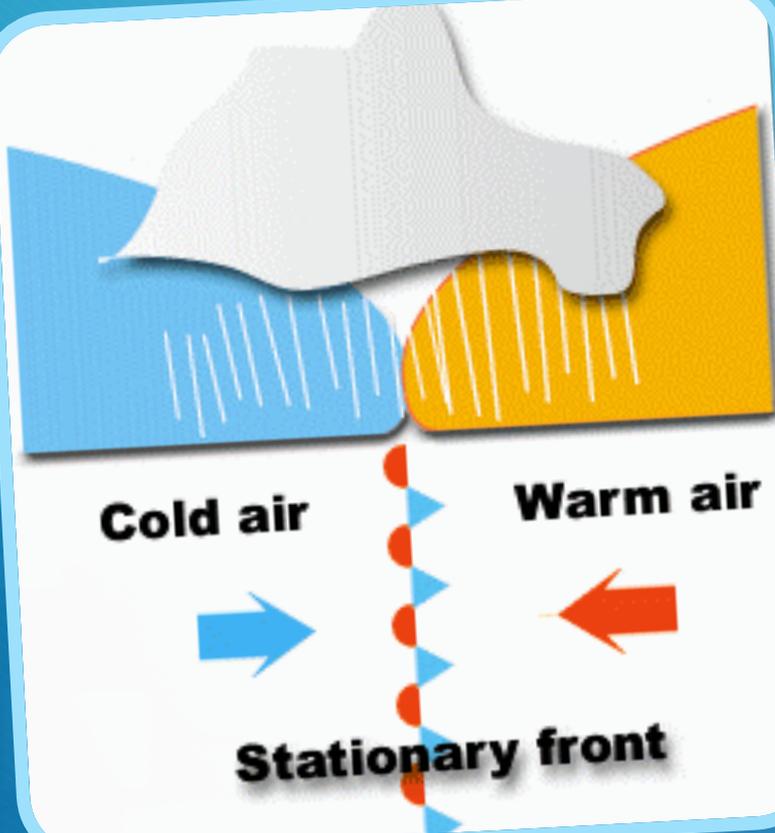


# Cold Fronts

- 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.



# Stationary Fronts



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

# Occluded Fronts

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



That was a lot of information about...





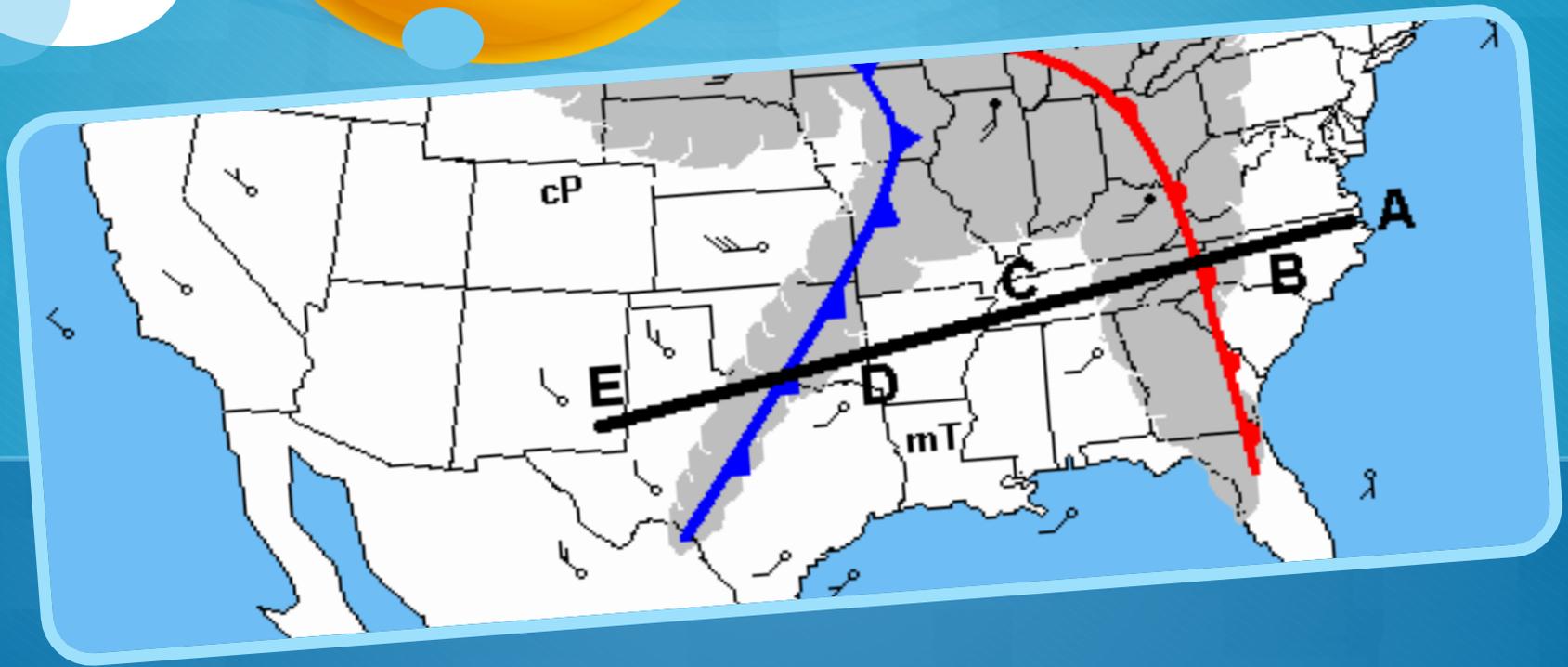
Ready for a little quiz?

Write your answers as you go.



L

1. Winds in a low pressure system move \_\_\_\_\_ around the low.



2. What type of front can be found close to point D ?

3. Which of these fronts would you expect to have greater precipitation, but be short lived as the front passes?



Warm Front

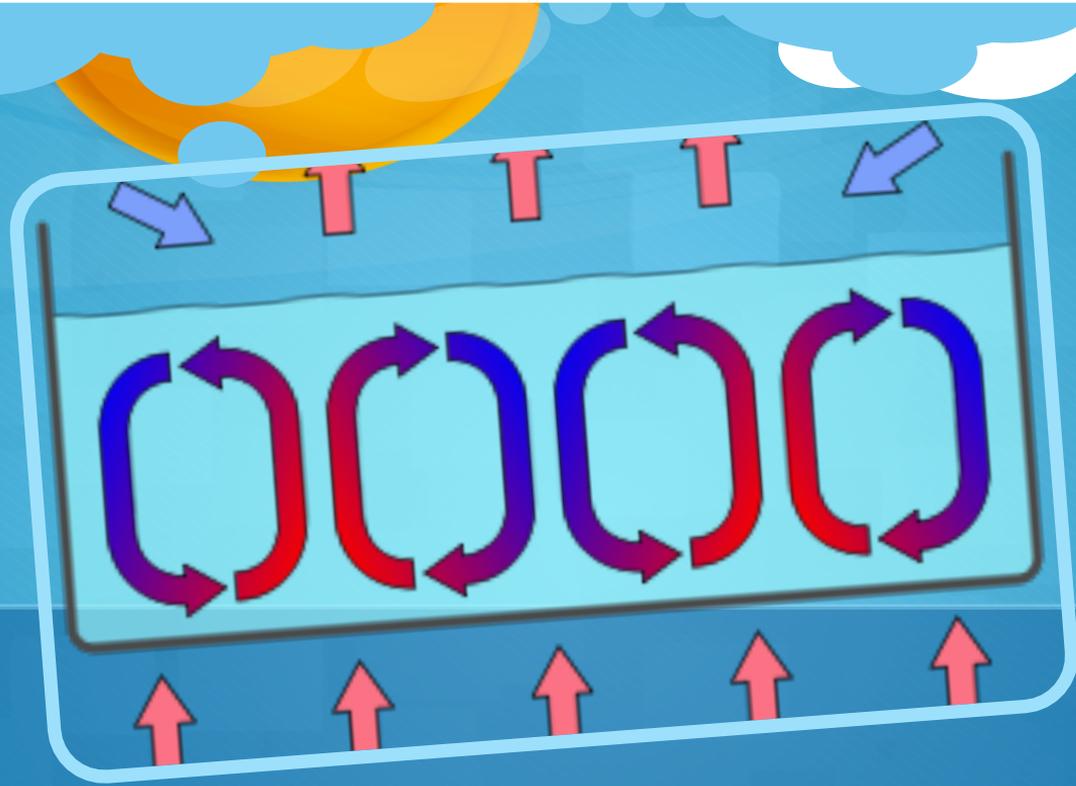


Cold Front

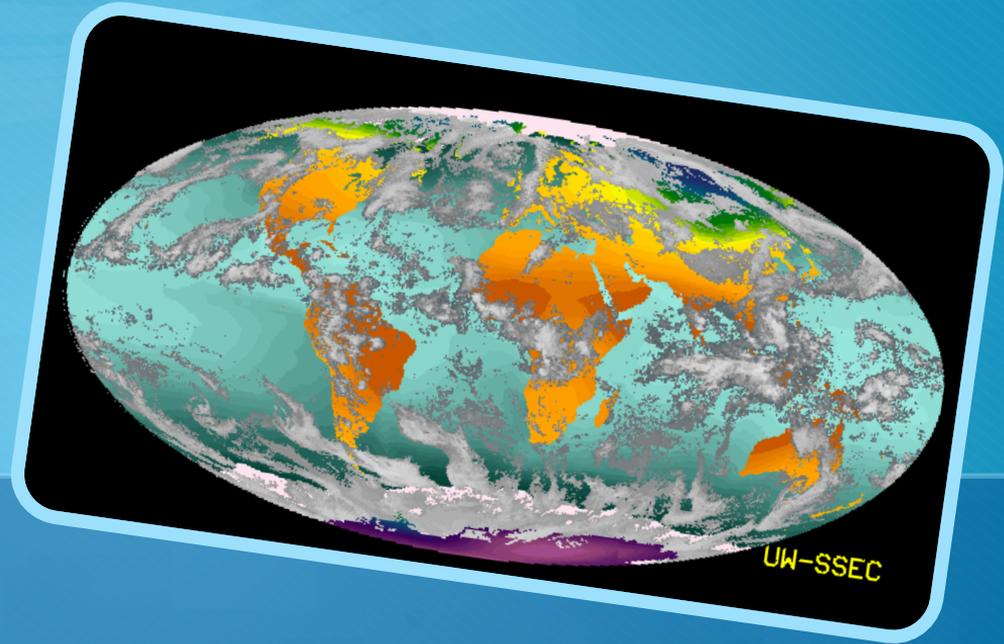


4. Give the name of the air mass that would have the following properties:

**cool**, **moist**, unstable

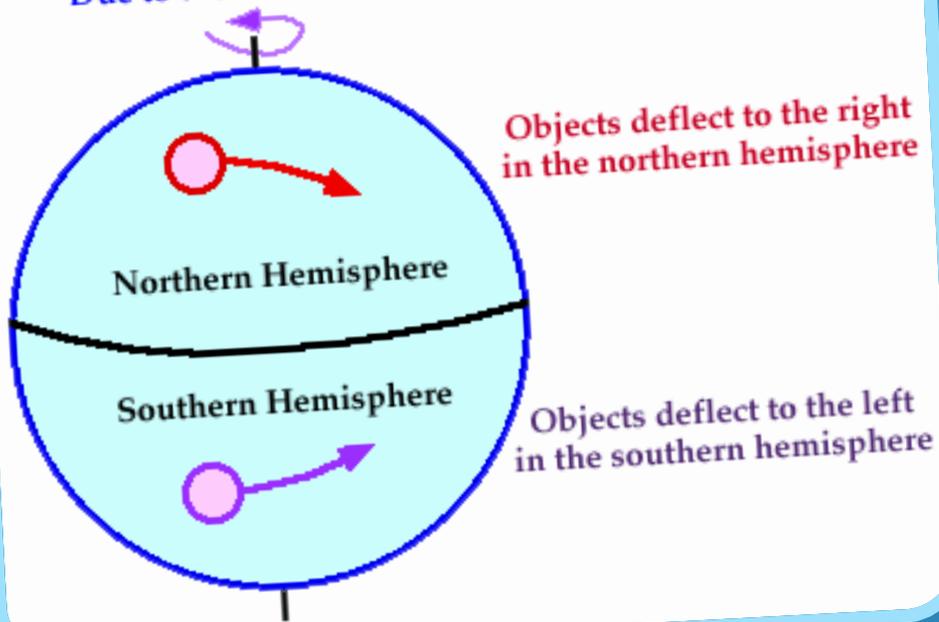


5. That important weather word that refers to the transfer of heat.

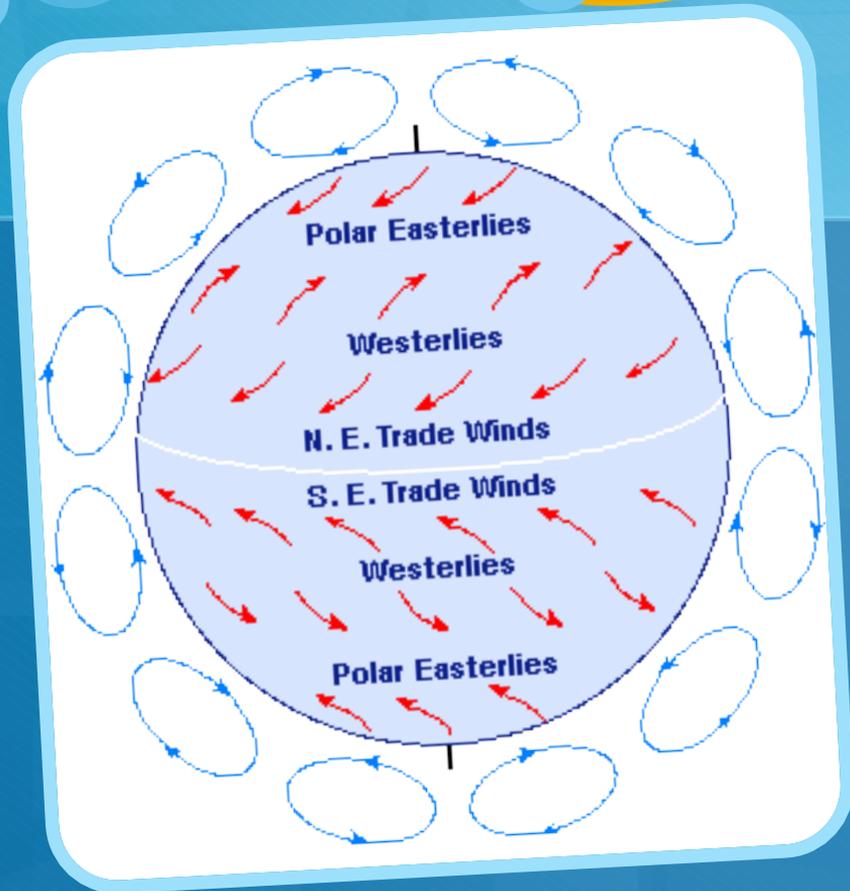


6. In general, air near the equator tends to \_\_\_\_\_ ( rise OR fall ).

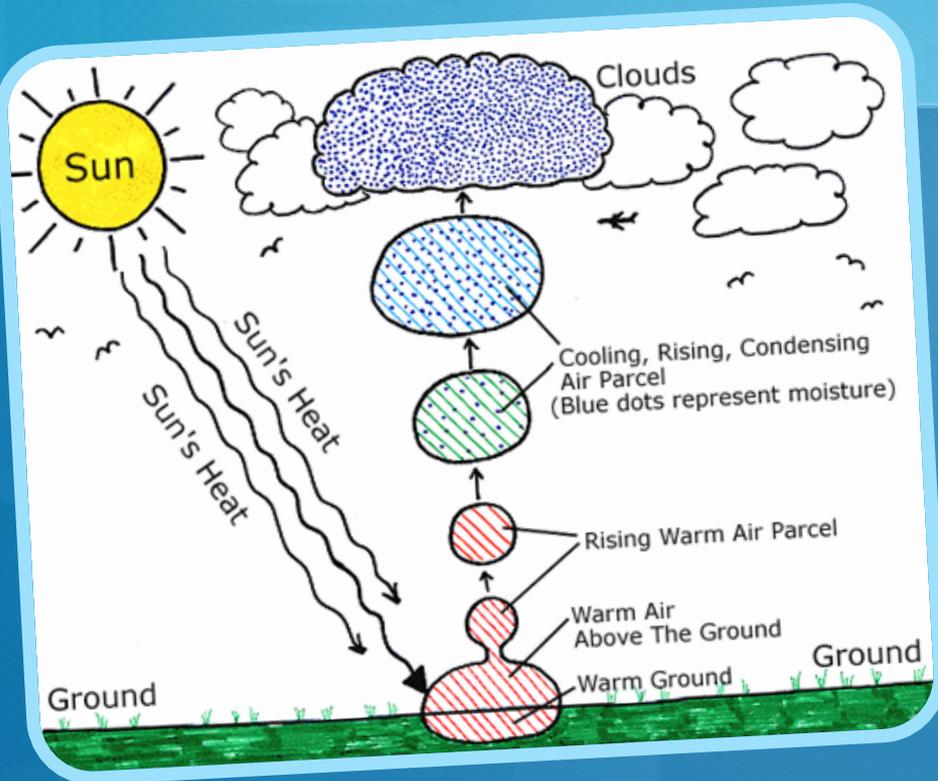
Due to the earth's rotation



7. It causes air and water to be deflected to the right north of the equator.



8. Which of the weather highways usually controls our weather?



9. Warm air holds \_\_\_\_\_ moisture than cold air.

(more OR less)



10. If there is a big “H” on the weather map where you live, would you expect sunny or stormy weather?



H



How did you do?

The Answers

- 
1. Winds in a low pressure system move **counterclockwise** around the low.
  2. What type of front can be found close to point D ? **Cold front**
  3. Which of these fronts would you expect to have greater precipitation, but be short lived as the front passes?  
**Cold front**
  4. Give the name of the air mass that would have the following properties:  
**cool, moist, unstable = maritime Polar (mP)**

- 
5. That important weather word that refers to the transfer of heat: **Convection**
  6. In general, air near the equator tends to **rise**.
  7. It causes air and water to be deflected to the right north of the equator: **Coriolis effect**
  8. Which of the weather highways usually controls our weather?  
**Westerlies**
  9. Warm air holds **more** moisture than cold air.
  10. If there is a big “H” on the weather map where you live, would you expect sunny or stormy weather? **Sunny**