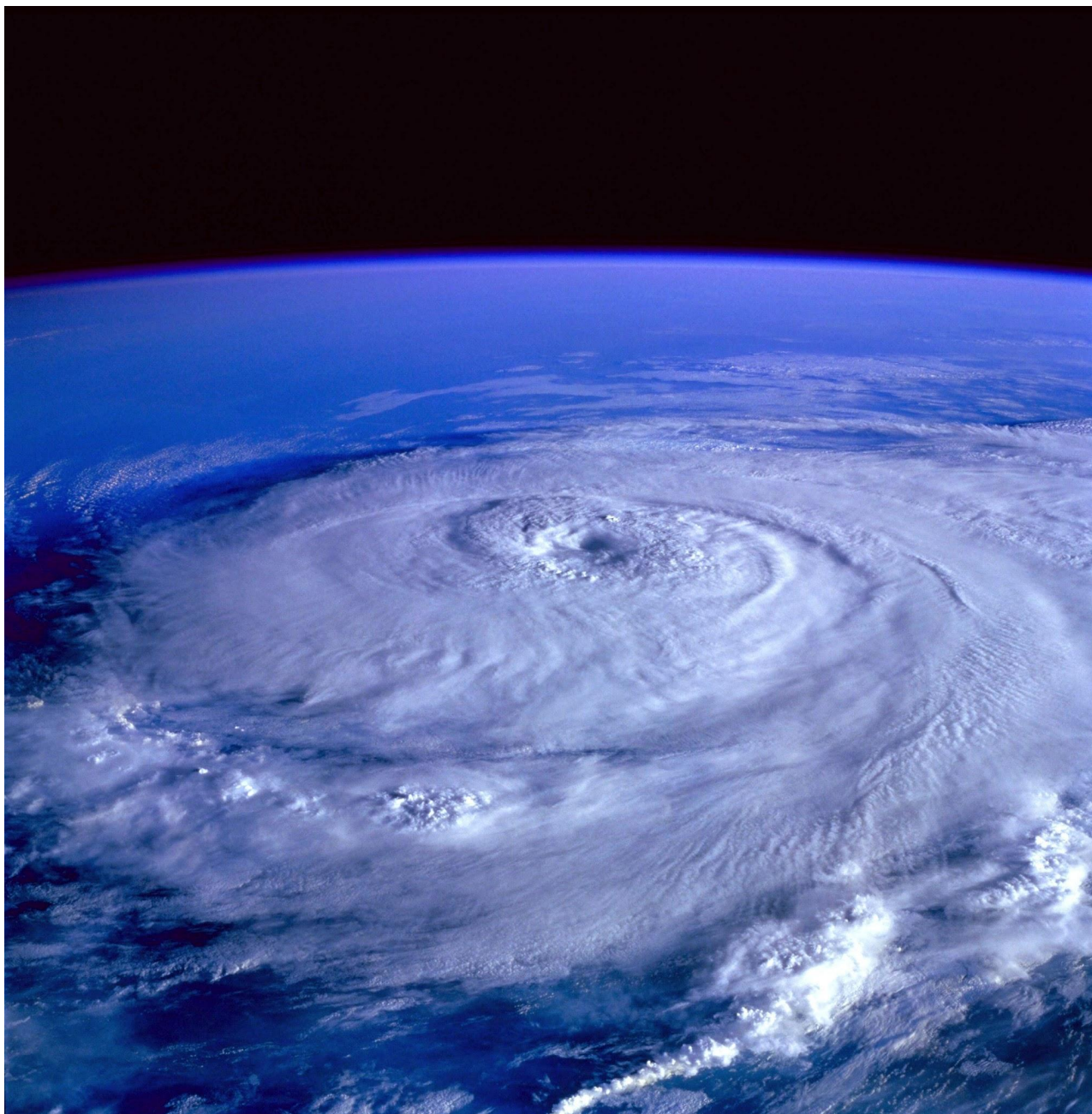


Name: _____

Period: _____

Date: _____

UNIT 8

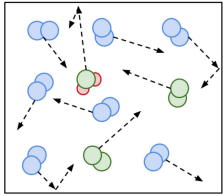
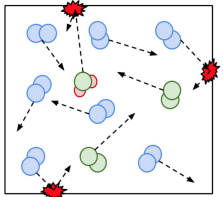


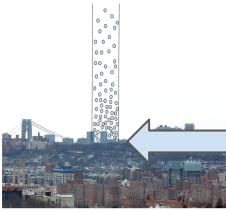
Weather

Notes Packet

Objective: How does temperature and air pressure vary with altitude?

Do Now: When you breathe in, what are the elements of air molecules that you are breathing?

What is temperature ?	What is air pressure ?
 _____ _____ _____ _____	_____ _____ _____ _____ 



Air has _____ on the Earth.
 Because _____... just like us!

Converting Temperature and Pressure

ESRT PG _____

Temperature

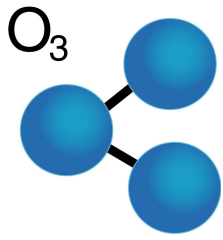
Fahrenheit	Celsius	Kelvin

Air Pressure

millibars	Inches of Hg

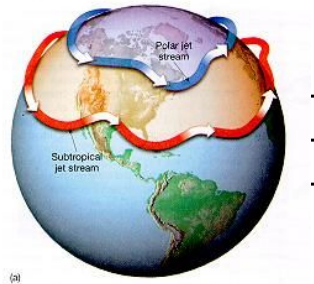
Atmospheric Phenomena

Layer of the Earth



Ozone (20 - 30 km) : _____

Jet Stream (16 km):



Aurora's (The Northern and Southern Lights) (97 km)



Meteoroids (70 km): _____



Weather Balloons (39 km)

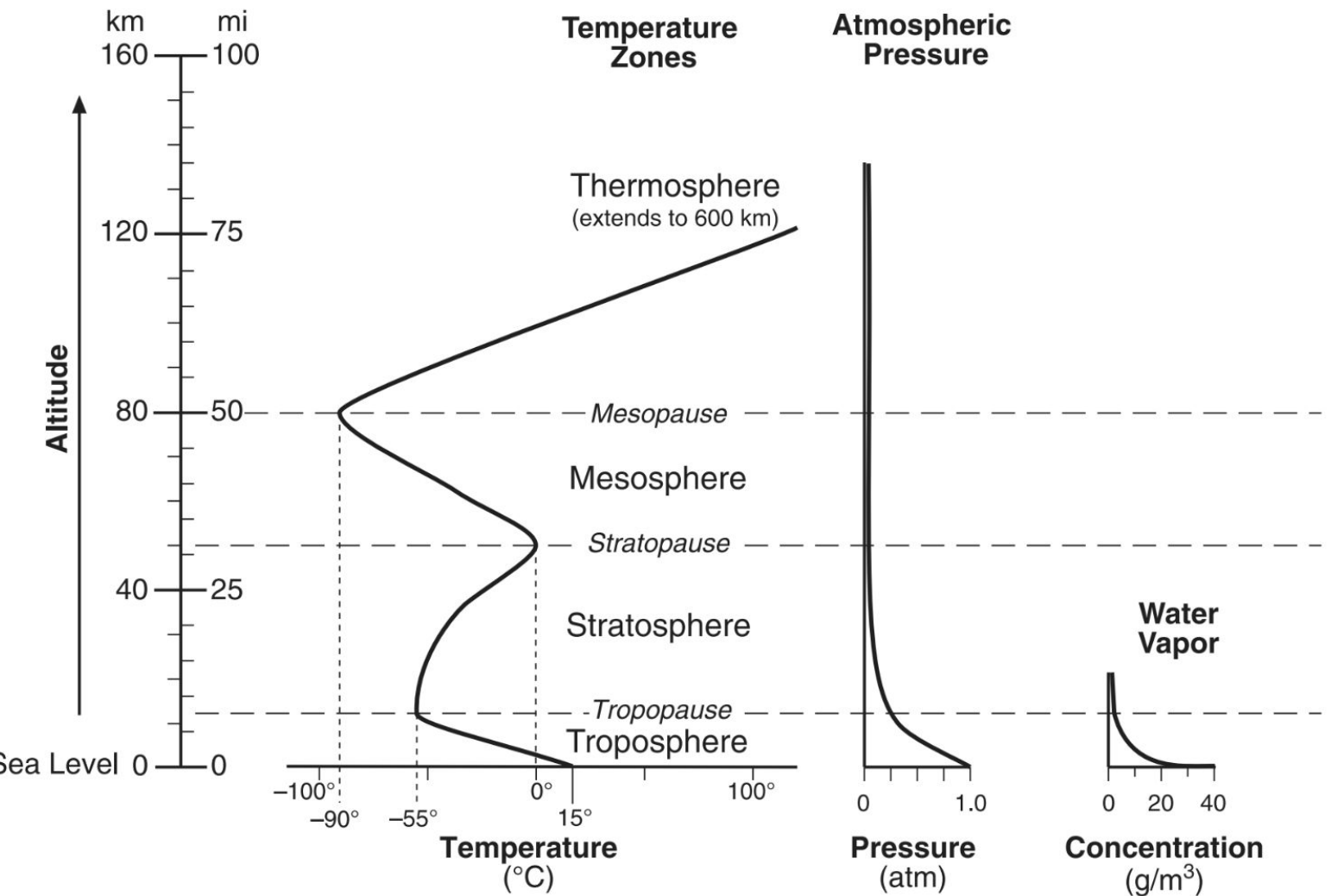


Airplanes (11 km)



Clouds/Weather (2 to 10 km)





Layers of the Atmosphere

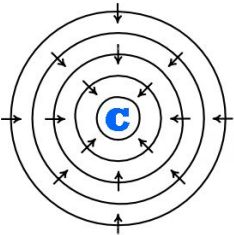
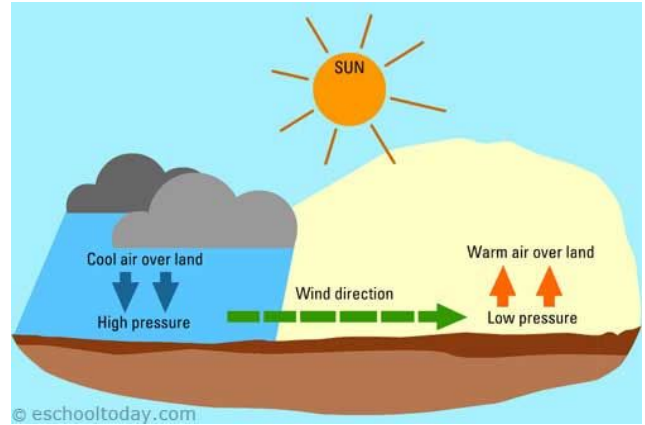
Troposphere	Stratosphere	Mesosphere	Thermosphere
Altitude: _____ km to _____ km	Altitude: _____ km to _____ km	Altitude: _____ km to _____ km	Altitude: _____ km to _____ km
As altitude increase, temperature _____	As altitude increase, temperature _____	As altitude increase, temperature _____	As altitude increase, temperature _____
As altitude increases, air pressure _____	As altitude increases, air pressure _____	As altitude increases, air pressure _____	As altitude increases, air pressure _____
The troposphere contains.....	The stratosphere contains.....	The mesosphere contains.....	The thermosphere contains.....

Today's Objective:

How do pressure systems cause winds?

Wind – is the _____

Air moves from _____ pressure to _____ pressure



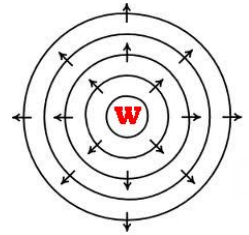
Cold air

- _____
- _____
- _____
- _____



Warm air

- _____
- _____
- _____
- _____

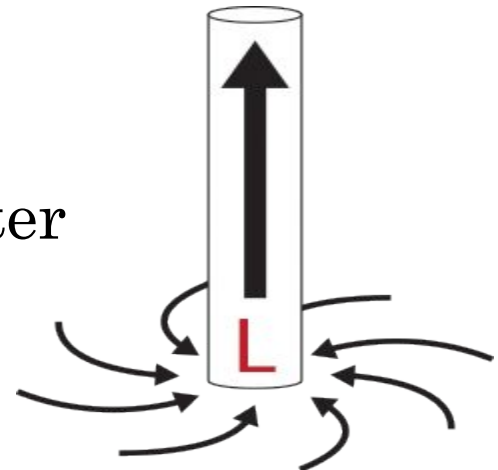


Humid air is _____ than dry air, lighter means it has _____.

Low Pressure System

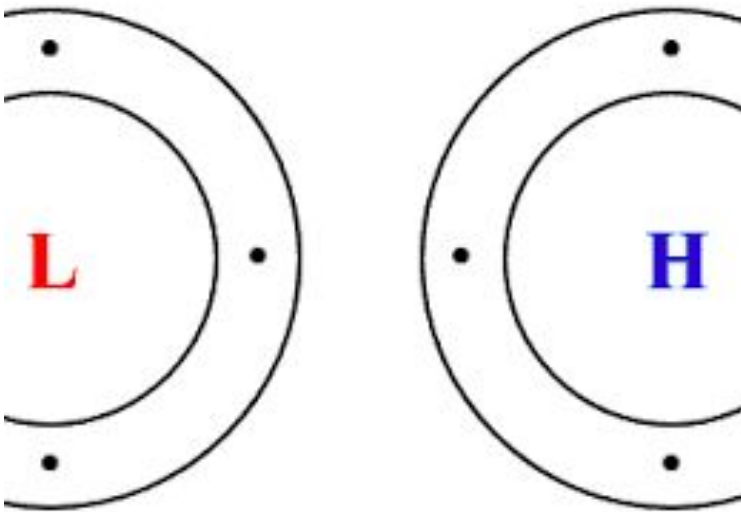
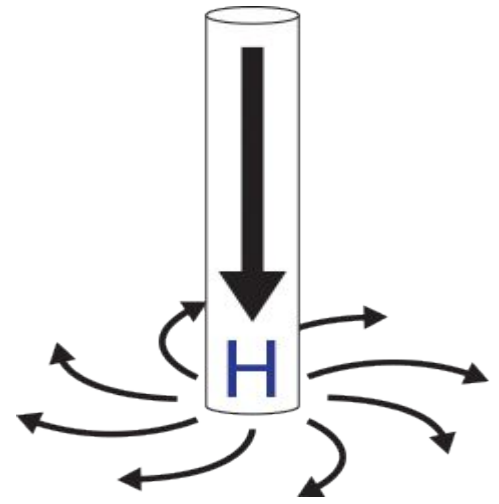
(AKA cyclone)

- Warm humid air rises in the center
- Wind blows _____ and _____



High Pressure System (AKA anticyclones)

- Cool dry air sinks in the center
- Wind blows _____ and _____



Tricks for remembering:

-
-
-

Specific Heat

Specific heat is the amount of energy needed to _____.

- _____ has the highest specific heat
- Water needs _____ energy & _____ time to heat up or cool down

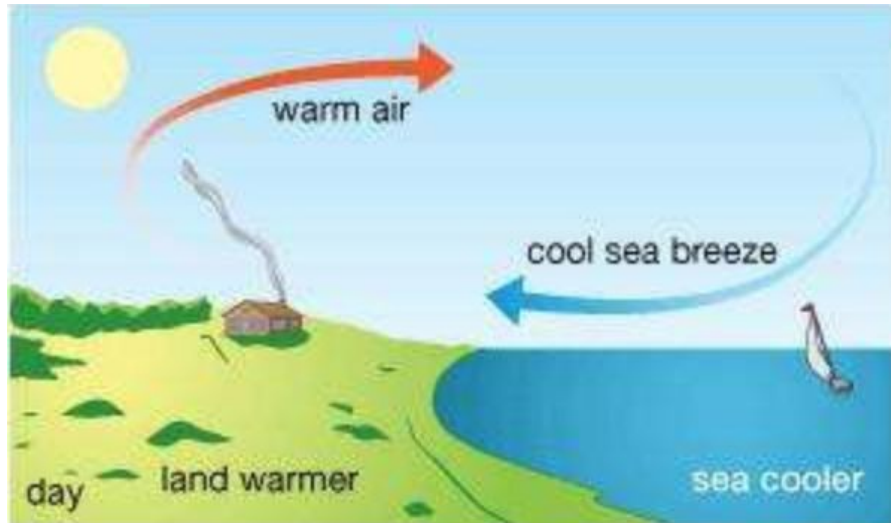
ESRT PG _____

Specific Heats of Common Materials

MATERIAL	SPECIFIC HEAT (Joules/gram • °C)
Liquid water	4.18
Solid water (ice)	2.11
Water vapor	2.00
Dry air	1.01
Basalt	0.84
Granite	0.79
Iron	0.45
Copper	0.38
Lead	0.13

Sea Breeze

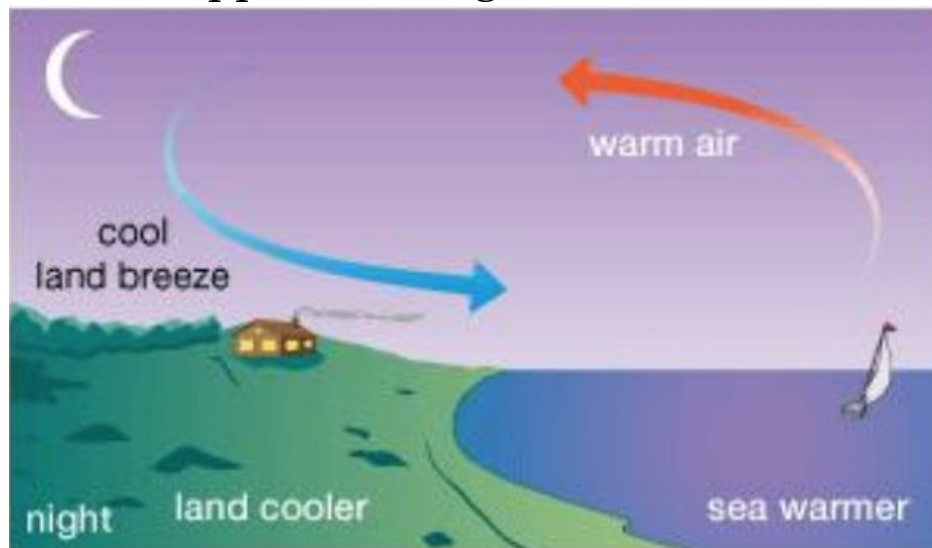
- Land heats up faster lowering the pressure
- The air flows from the _____ to the _____.
 - Happens during _____.



Label the diagram with the correct pressures

Land Breeze

- Land cools down faster, increasing the pressure
- The air flows from the _____ to the _____.
 - Happens during at _____.

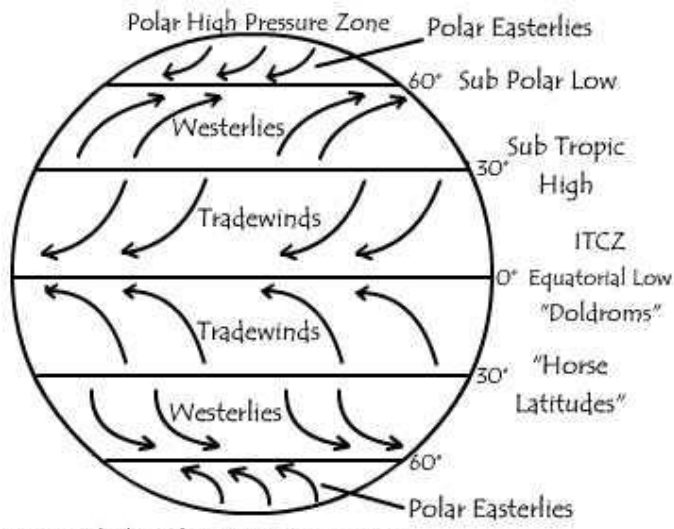
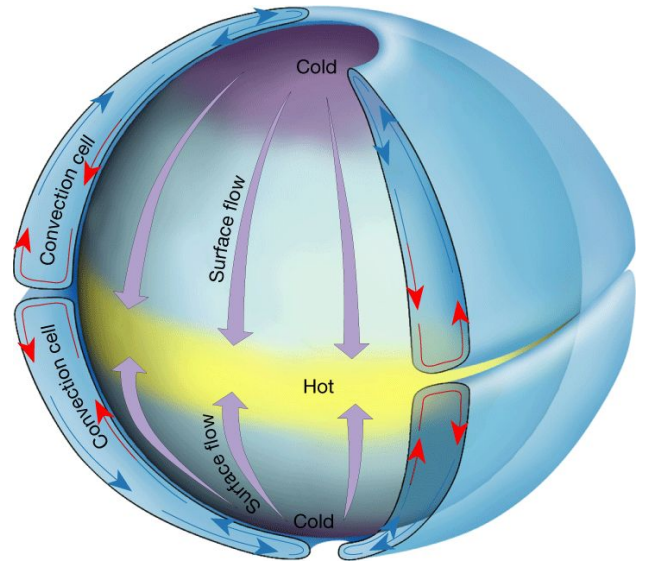


Label the diagram with the correct pressures

Global Winds

- Unequal heating of the Earth's surface forms global winds
- These winds blow from a specific direction and travel long distances.
- At the equator the warm air _____

- At the poles the cooler air _____



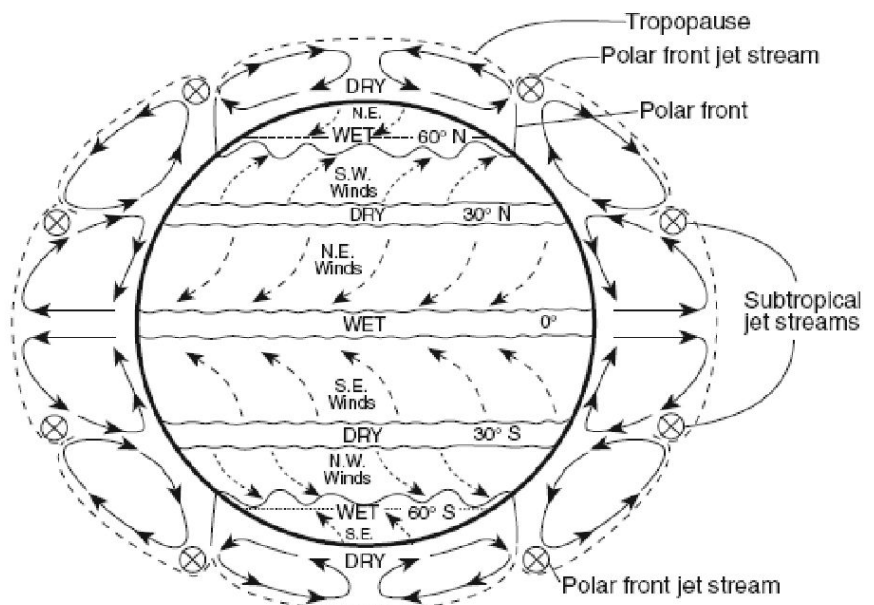
Wind is named based on the

ESRT pg 14

Planetary Wind and Moisture Belts in the Troposphere

The drawing on the right shows the locations of the belts near the time of an equinox. The locations shift somewhat with the changing latitude of the Sun's vertical ray. In the Northern Hemisphere, the belts shift northward in the summer and southward in the winter.

(Not drawn to scale)



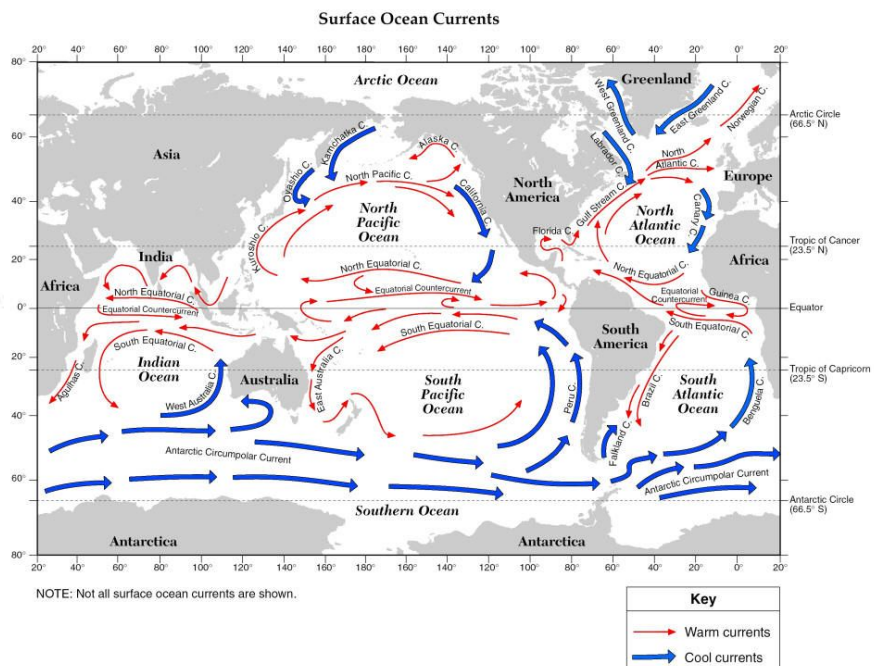
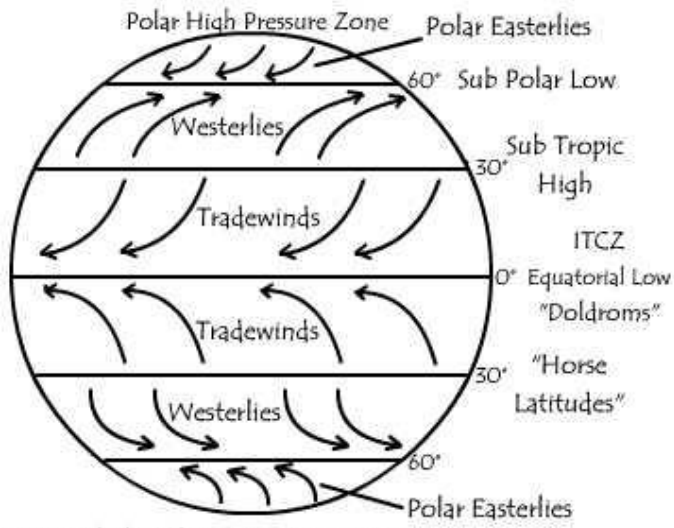
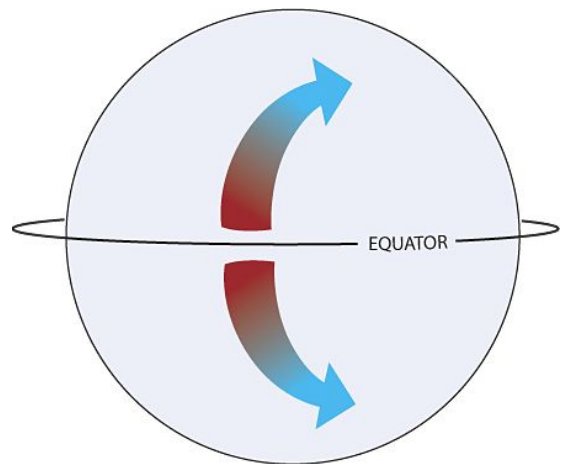
The Coriolis Effect

• Caused by the _____

• Responsible for curving the path of air and ocean currents across the Earth

• Winds in the northern hemisphere curve to the _____

• Winds in the southern hemisphere curve to the _____



Surface Ocean Currents are determined by _____ which may block or deflect their direction.

Today's Objective:

What are Air Masses?

An **Air Mass** is an immense body of air that has _____
_____ that depend upon their _____
_____, called their **source region**.



Air masses carries weather
over the area in which it
moves to.

Air masses are classified by _____

Maritime (m)

Air masses that

OR

Continental (c)

Air masses that

(_____)

(_____)

Polar (P)

Air masses that develop

OR

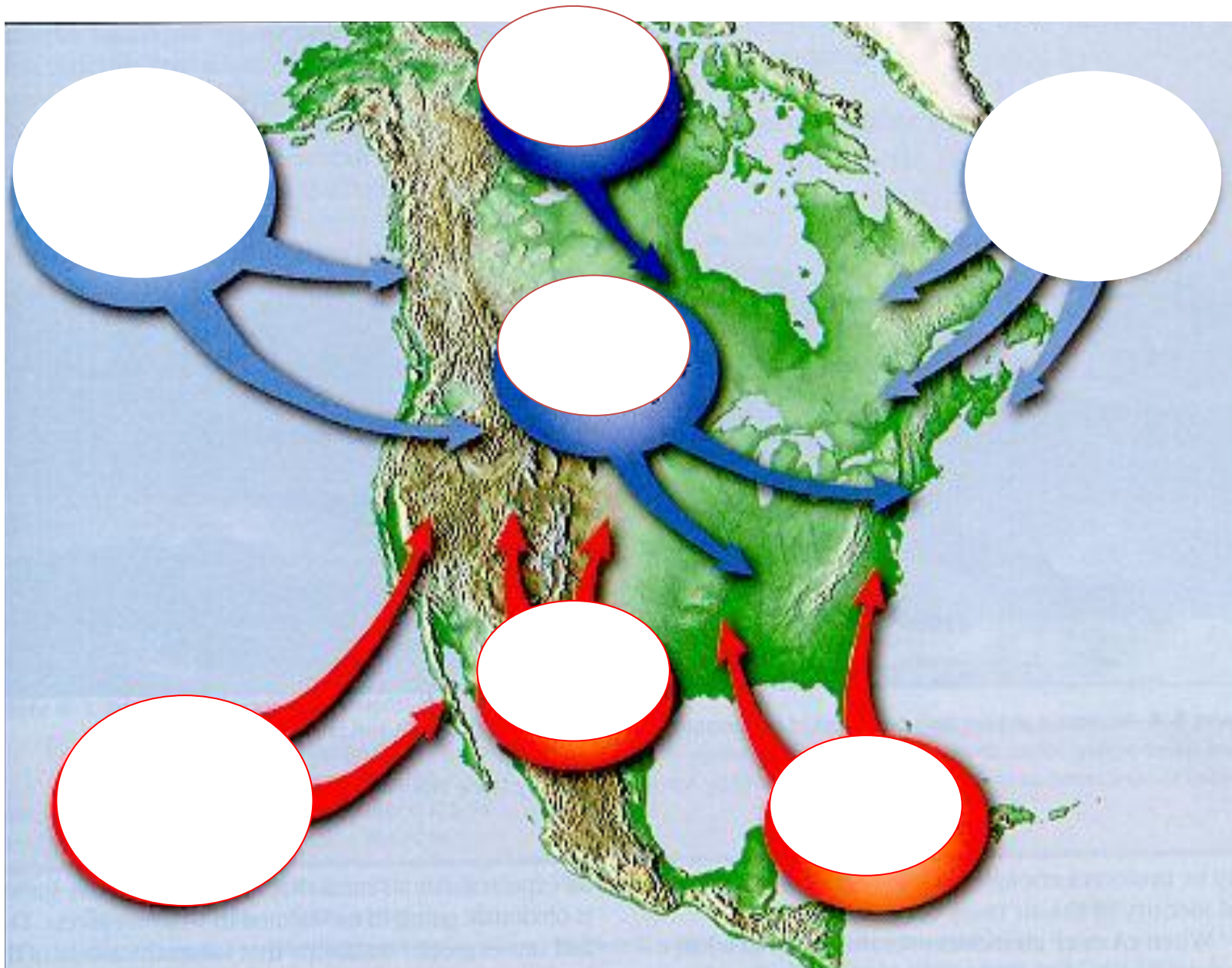
Tropical (T)

Air masses that develop

(_____)

(_____)

Label each air mass with the correct abbreviation.



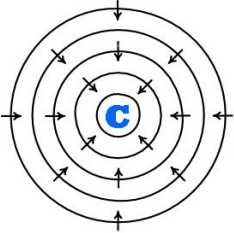
The movement of **air masses**, influenced by the _____,
has the greatest effect on our day-to-day temperature changes.

Today's Objective:

What are the Characteristics of Fronts?

What is a Front?

_____, they form a **front**, which is a boundary that separates two air masses.

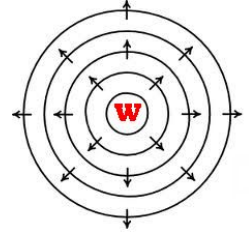


Cold air

- _____
- _____
- _____
- _____

Warm air


- _____
- _____
- _____
- _____

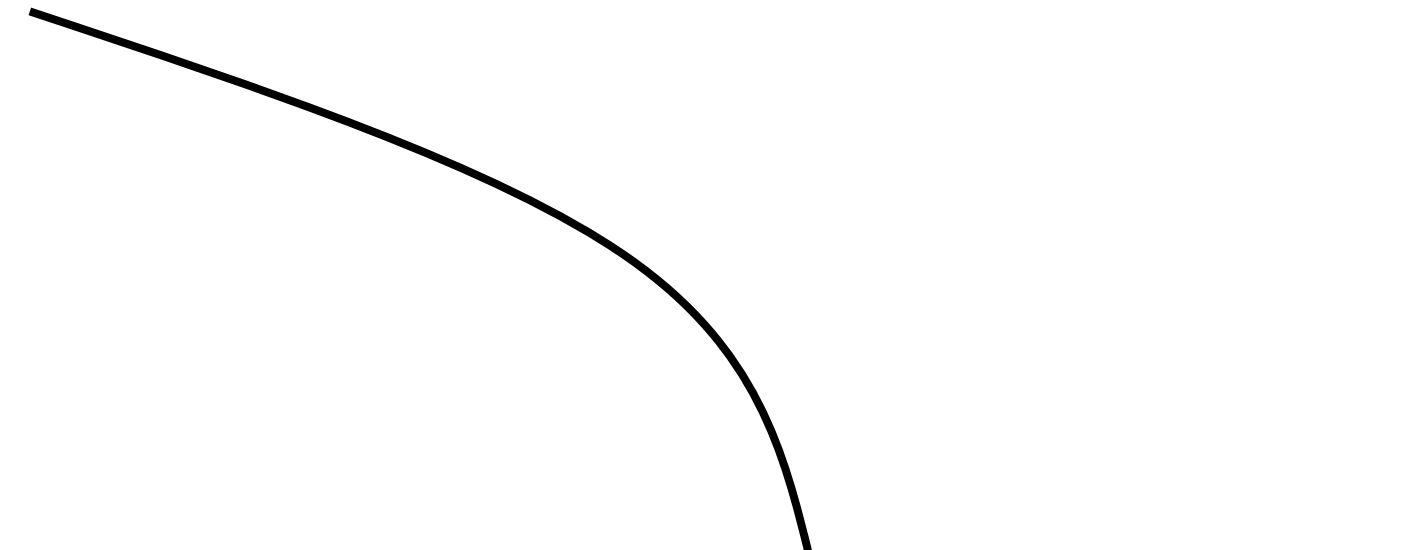


Humid air is _____ than dry air, lighter means it has _____.

Types of Fronts

Cold Fronts:

- _____
- Brief but _____ followed by cool, dry weather.
- Map Symbol - 

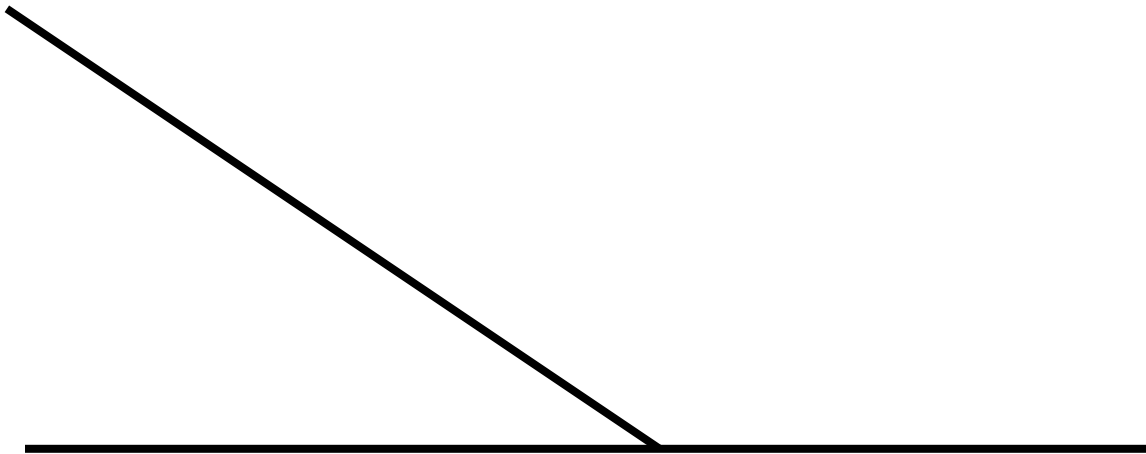


** Heavy rain behind the front **

Warm Fronts:

- Form when _____

- _____ followed
by hot, humid weather.
- Map Symbol -

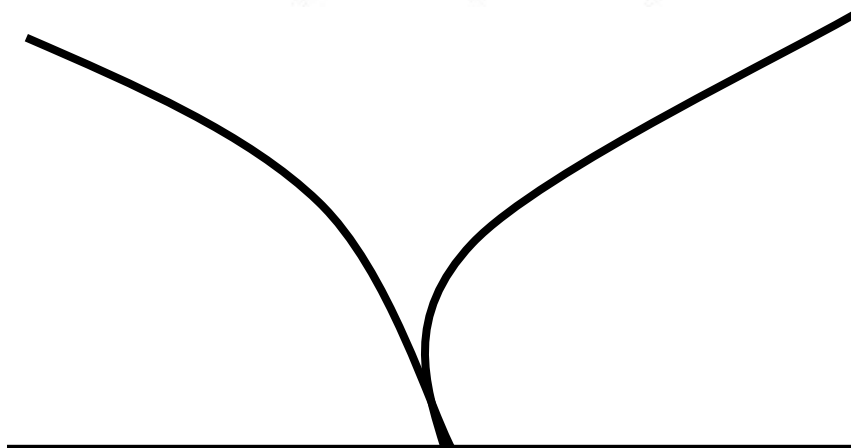


** Light rain in front of the front **

Stationary Fronts:

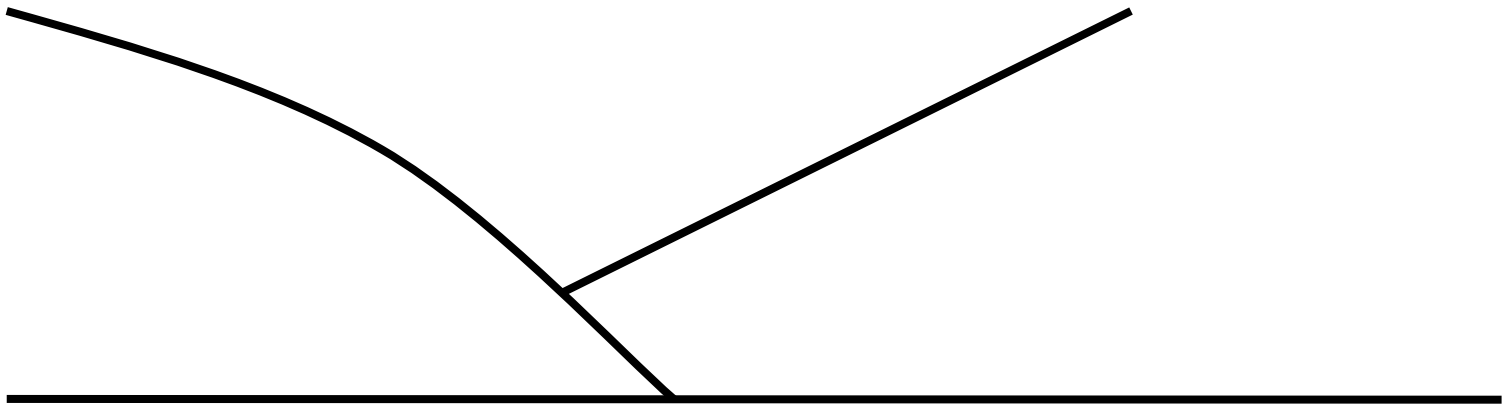
- When the air on _____

- Weather remains _____ until the front shifts
- Map Symbol -



Occluded Fronts:

- When a _____
and pushes _____
- Map Symbol -



**** Severe Weather ****

Cyclone

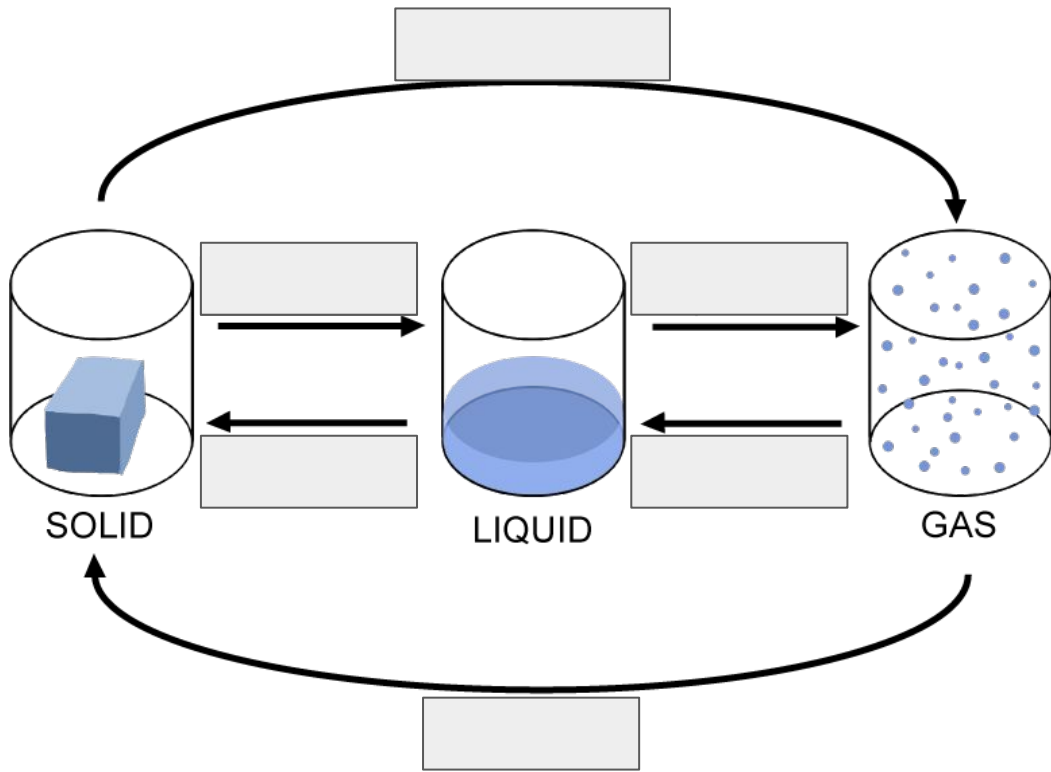


Anticyclone



Middle Latitude Cyclones

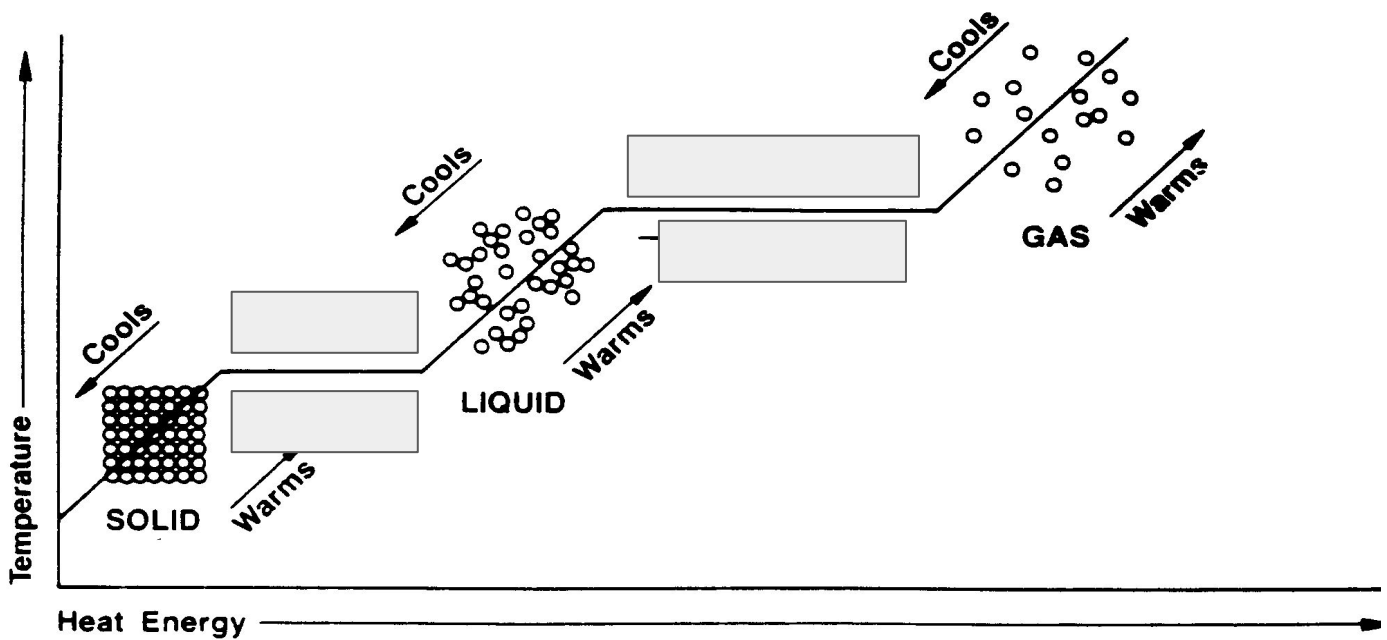
- Are large centers of low pressure that generally travel
from _____ and cause



Latent (or “hidden”) Heat: The heat that is needed to _____

*

!!



Properties of Water

Heat energy gained during melting	334 J/g
Heat energy released during freezing	334 J/g
Heat energy gained during vaporization	2260 J/g
Heat energy released during condensation	2260 J/g
Density at 3.98°C	1.0 g/mL

ESRT PG _____

Melting and Vaporization both _____ heat

Freezing and Condensation both _____ heat

Today's Objective:

How Are Relative Humidity and Dewpoint Related?

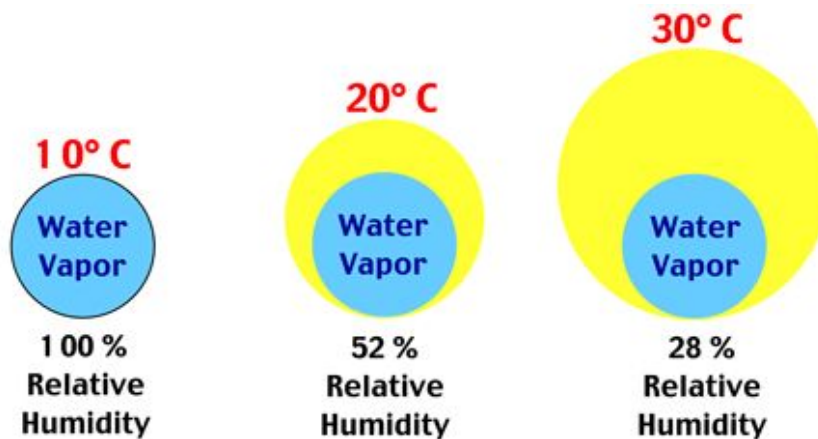
Humidity –

is a measure of how much _____
is in the air.

** _____ can hold more water vapor
than _____.**

Relative Humidity (RH) –

is _____,
expressed as a %.



Since warm air expands _____,

Saturation:

Occurs when the air contains the _____

_____ at a specific temp. and pressure.

*****When saturated, _____ contains more water vapor than cold air.*****

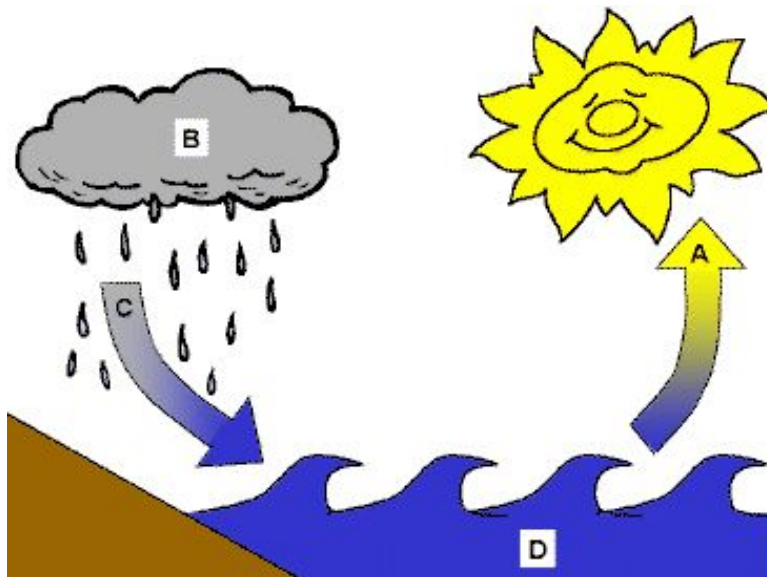
When the Relative Humidity is 100%

- the air is _____
- _____ may occur.

The relative humidity changes when:

- Water vapor enters or leaves the air.
- The temperature changes.

take water out
of the
atmosphere.



puts water
back into the
atmosphere.

The **Dew Point Temperature** is the temp. at which the air becomes saturated with water vapor (or the relative humidity = 100%)

When **dewpoint** is _____ than **air temperature**, condensation _____ happen.

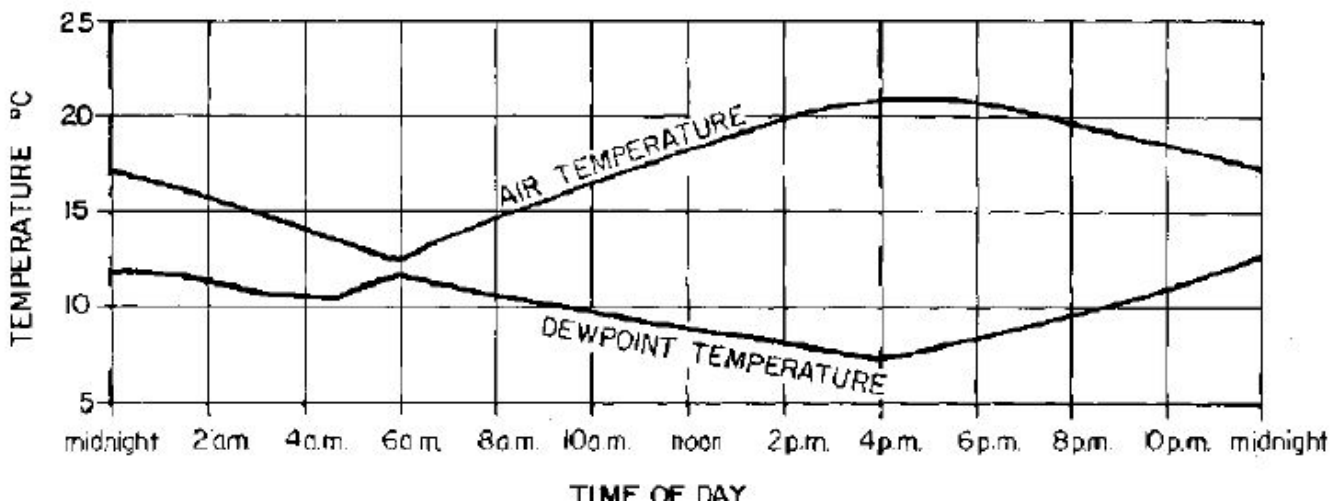


When **dewpoint** is _____ to **air temperature**, _____ happens.

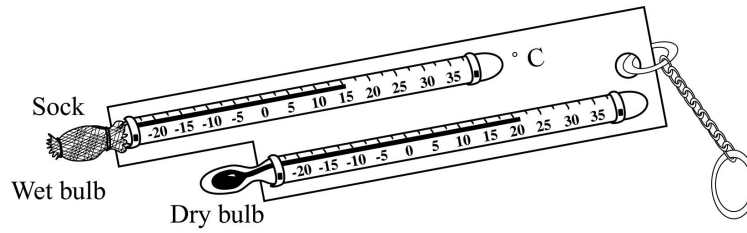
****Dew point temperature is _____ than the air temperature****

The closer the **air temp.** is to the **dewpoint temp.**:

- The higher the _____
- the greater the chance of _____



Dew Point Temp. and Relative Humidity are measured using a Sling Psychrometer.



A Sling Psychrometer

As this instrument is "slung" through the air, rapid evaporation from the wet "sock" will result in a lower temperature reading on the wet-bulb thermometer. the dry-bulb thermometer will read the true air temperature

Can be found on ESRT
pg 12

- Dry bulb is the air temperature
- Wet bulb is the temperature of a thermometer that has a wet "sock" attached to it
- The wet bulb depression is the difference between the two, it shows how much evaporation has taken place,

Relative Humidity (%)

Dry-Bulb Temperature (°C)	Difference Between Wet-Bulb and Dry-Bulb Temperatures (C°)															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-20	100	28														
-18	100	40														
-16	100	48														
-14	100	55	11													
-12	100	61	23													
-10	100	66	33													
-8	100	71	41	13												
-6	100	73	48	20												
-4	100	77	54	32	11											
-2	100	79	58	37	20	1										
0	100	81	63	45	28	11										
2	100	83	67	51	36	20	6									
4	100	85	70	56	42	27	14									
6	100	86	72	59	46	35	22	10								
8	100	87	74	62	51	39	28	17	6							
10	100	88	76	65	54	43	33	24	13	4						
12	100	88	78	67	57	48	38	28	19	10	2					
14	100	89	79	69	60	50	41	33	26	18	8	1				
16	100	90	80	71	62	54	46	37	29	21	14	7	1			
18	100	91	81	72	64	56	48	40	33	26	19	12	6			
20	100	91	82	74	66	58	51	44	36	30	23	17	11	5		
22	100	92	83	75	68	60	53	46	40	33	27	21	15	10	4	
24	100	92	84	76	69	62	55	49	42	36	30	25	20	14	9	4
26	100	92	85	77	70	64	57	51	46	39	34	28	23	18	13	9
28	100	93	86	78	71	65	59	53	47	42	36	31	26	21	17	12
30	100	93	86	79	72	66	61	55	49	44	39	34	29	25	20	16

Dewpoint Temperatures (°C)

Dry-Bulb Temperature (°C)	Difference Between Wet-Bulb and Dry-Bulb Temperatures (C°)															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-20	-20	-33														
-18	-18	-29														
-16	-16	-24														
-14	-14	-21	-36													
-12	-12	-19	-29													
-10	-10	-14	-22													
-8	-8	-12	-18	-29												
-6	-8	-10	-14	-22												
-4	-4	-7	-12	-17	-29											
-2	-2	-5	-8	-13	-20											
0	0	-3	-6	-9	-15	-24										
2	2	-1	-3	-6	-11	-17										
4	4	1	-1	-4	-7	-11	-19									
6	6	4	1	-1	-4	-7	-13	-21								
8	8	6	3	1	-2	-5	-9	-14								
10	10	8	6	4	1	-2	-5	-9	-14	-28						
12	12	10	8	6	4	1	-2	-5	-9	-16						
14	14	12	11	9	6	4	1	-2	-5	-10	-17					
16	16	14	13	11	9	7	4	1	-1	-6	-10	-17				
18	18	16	15	13	11	9	7	4	2	-2	-5	-10	-19			
20	20	18	17	15	14	12	10	7	4	2	-2	-5	-10	-19		
22	22	21	19	17	16	14	12	10	8	5	3	-1	-5	-10	-19	
24	24	23	21	20	18	16	14	12	10	8	6	2	-1	-5	-10	-18
26	26	25	23	22	20	18	17	15	13	11	9	6	3	0	-4	-9
28	28	27	25	24	22	21	19	17	16	14	11	9	7	4	1	-3
30	30	29	27	26	24	23	21	19	18	16	14	12	10	8	5	1

Measure Dry Bulb Temperature and Wet Bulb Temperature by swinging instrument for 30 seconds.

Ex. Dry Bulb Temp. = 24 C

Wet Bulb Temp. = 20 C

- Calculate _____ between dry and wet bulb temps.
- This is called the _____

Ex.: $24\text{ C} - 20\text{ C} = 4\text{ C}$.

** Use ESRT pg 12 to find the RH or DP **

Guided Practice

Classroom

Dry Bulb =

Wet Bulb =

Relative Humidity:

Dewpoint:

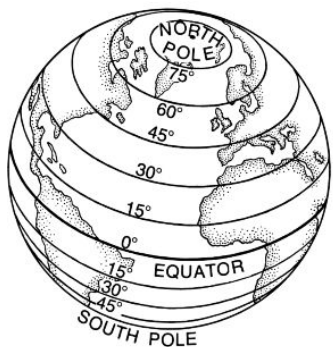
Today's Objective:

What Are Some Factors That Affect Weather?

Factor

Affect on Climate

Latitude



As latitude increases :

- _____
- _____
- _____
- _____
- _____
- _____

Altitude
(Elevation)

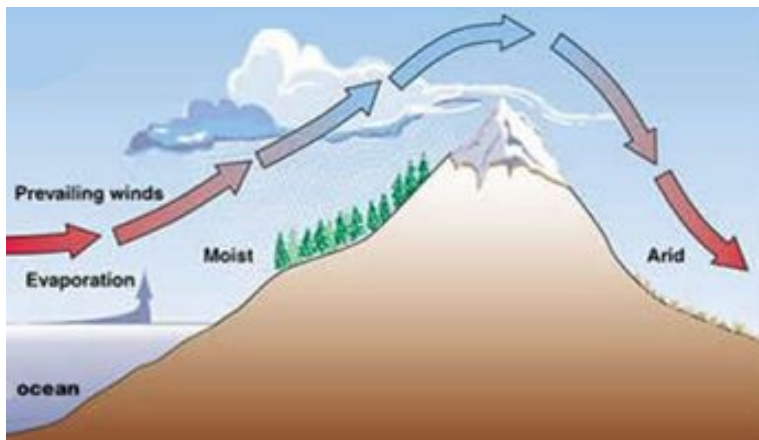


The higher the elevation _____

Topography
(Mountains)

Windward

Leeward



Factor

Affect on Climate

Land
vs.
Water

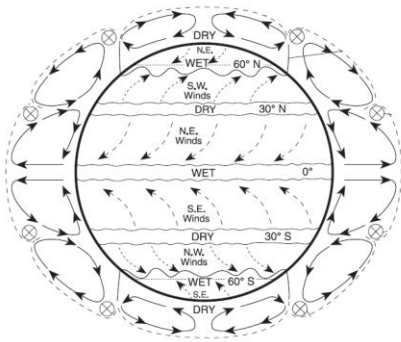


Areas near a **large body of water** _____

Areas **surrounded by land** _____

** This is due to their specific heat

Atmospheric
Circulation
(Global Winds)

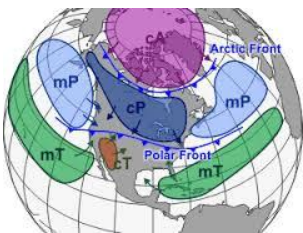


- _____

- _____

- _____

Geographic
Position
(Air Masses)



- _____

Factor

Affect on Climate

Vegetation



- _____

- _____

Clouds



- _____

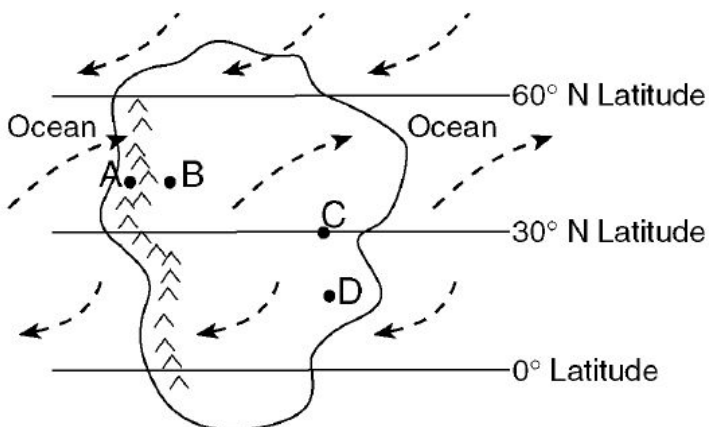
- _____

Directions: Explain how each factor would affect the climate of each city.

- Latitude of D/A- _____

- Topography of A/B- _____

- Prevailing winds at D/C - _____



Today's Objective:

How Can You Interpret A Weather Map?

Weather Maps are used to show _____
_____ and _____

**** Important Vocabulary ****

Isolines connect points of equal _____.

Isotherms connect points of equal _____.

Isobars connect points of equal _____.

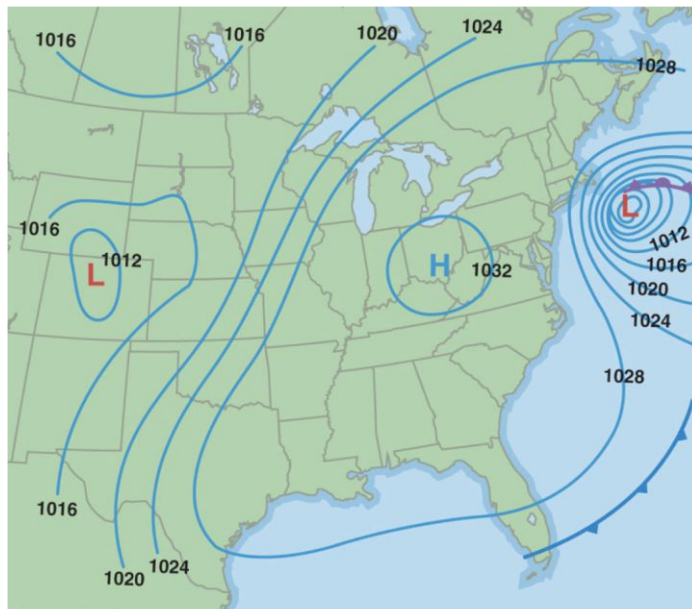
Pressure Gradient

- Is the rate of change in air pressure.

-The closer the isobars the

- The greater the pressure gradient the

Label the map where it would be calm and where it would be windy.



© 2007 Thomson Higher Education

Isobars close together = _____ pressure gradient = _____ wind speeds

Isobars far apart = _____ pressure gradient = _____ wind speeds

Today's Objective:

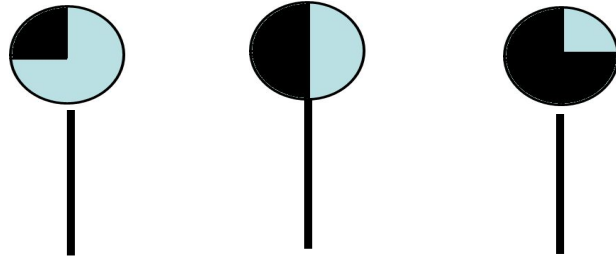
What Information Is Provided On A Station Model?

ESRT PG _____

Station models are symbols used to represent

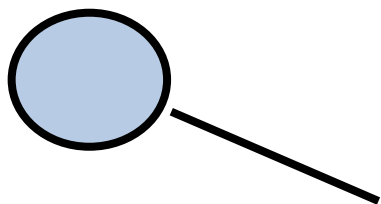
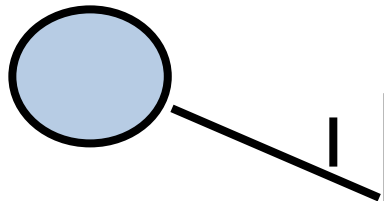


Cloud Coverage



Wind Speed

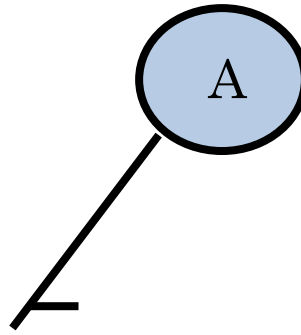
Wind Direction



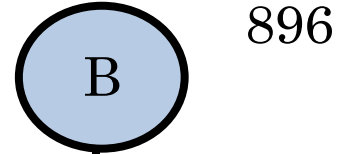
1 feather = 10 knots
½ feather = 5 knots

Top right

Air Pressure



196



896

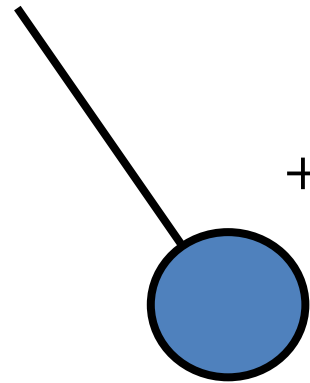
If reported value GREATER than 500:

If reported value LESS than 500:

Middle right

Pressure Trend

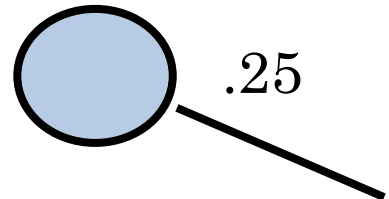
+ means there was a rise
- means there was a decrease



+19/

Bottom right

Precipitation



.25

Top left

Temperature

Middle left

Present Weather

Visibility

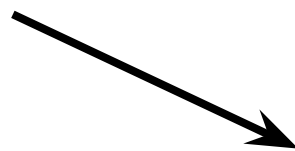
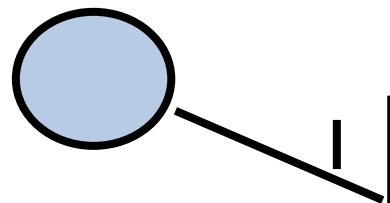
Bottom left

Dewpoint

Closure

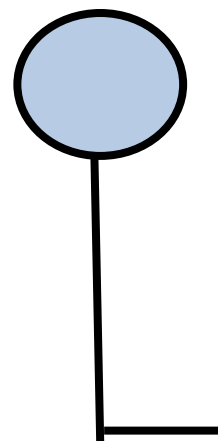
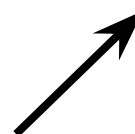
Use **THREE** measurements from the station model to create a weather forecast.

28

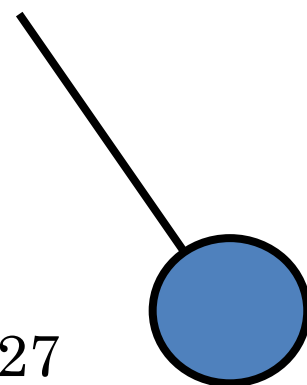


1/2

*



27

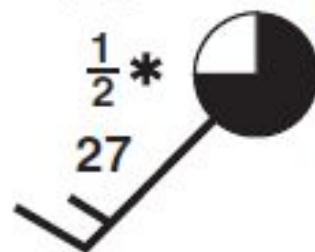


Station Model

28

1/2 *

27









196

+19/

.25

Weather Instruments

					
Instrument name:	Instrument name:	Instrument name:	Instrument name:	Instrument name:	Instrument name:

Pressure	Rainfall	Relative Humidity/ Dewpoint	Wind Direction	Temperature	Wind Speed
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Today's Objective:

How do greenhouse gases affect our climate?

Weather

vs.

Climate

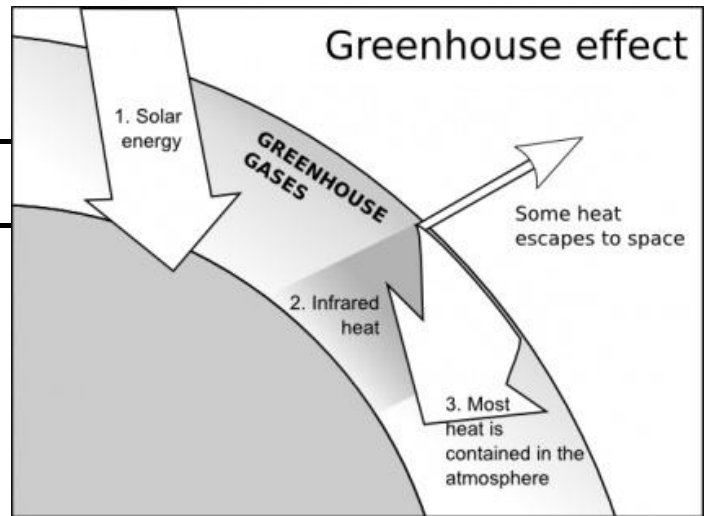
Greenhouse Effect – What is it?

1. Solar energy _____

2. Some of that energy gets _____.

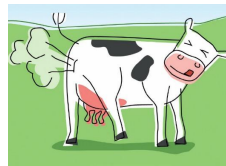
3. Some of that energy is

4. Thus _____



The Main Greenhouse Gases are:

1.



2.



3.



Global Warming

Over the last 100 years the Earth's temperature has raised _____.

Over the next 100 years scientist predict that the Earth's temperature can rise another _____.

What are some of the Causes of Global Warming?

What could happen if the Earth continues to warm?

What can be done to slow global warming ?