

Atmosphere

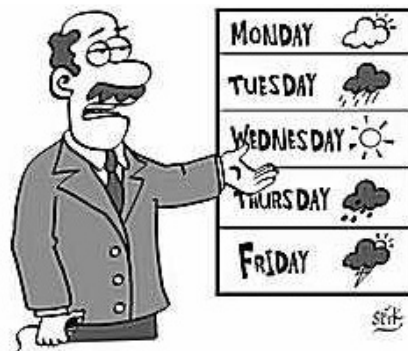


Atmosphere

1. Name the layers of the atmosphere.
2. Identify where the energy in the atmosphere comes from.
3. Explain how temperature, pressure and water vapor changes with altitude in the atmosphere.
4. Explain how the Earth got its atmosphere.
5. Describe how human activity affects the atmosphere.
6. Explain what the atmosphere does for life on Earth.
7. State the atmospheric composition.
8. Identify greenhouse gases and what they do in the atmosphere.

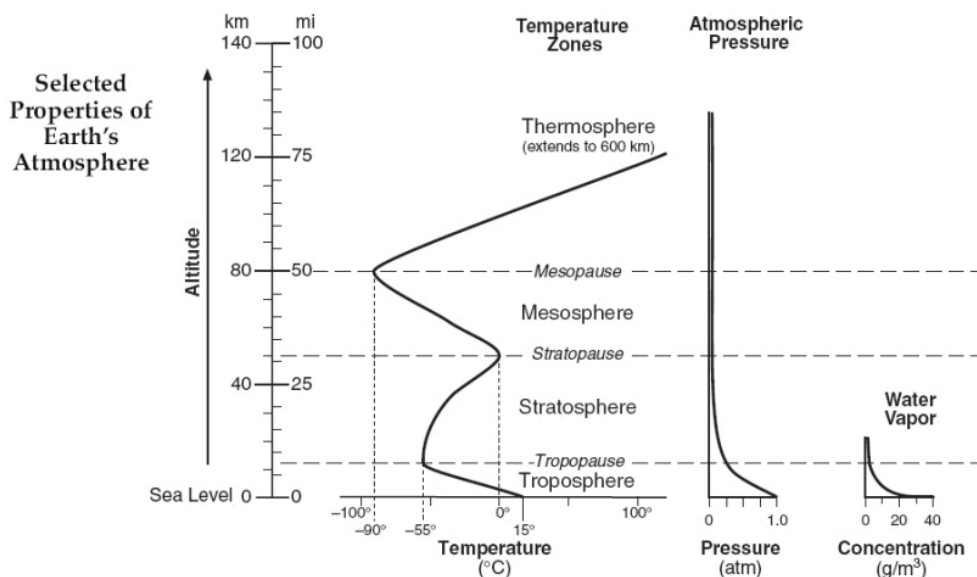
Weather

9. Differentiate between weather and climate.
10. Describe the water cycle.
11. Identify and measure the characteristics of weather: Humidity, Air Pressure, and Wind.
12. Identify the proper instruments used to measure weather.
13. Identify air masses in the United States.
14. Differentiate between warm, cold, stationary and occluded fronts.
15. Formulate a safety plan in preparation for hazardous weather.



Here's the 5 day forecast. To be honest, after tomorrow, your guess is as good as mine!

Atmosphere



What are the four layers of the atmosphere?

What happens to temperature as altitude increases in the:

Troposphere: _____

Stratosphere: _____

Mesosphere: _____

Thermosphere: _____

What happens to pressure as your altitude increases? _____

What is the boundary between the Troposphere and Stratosphere called? _____

What is the boundary between the Stratosphere and the Mesosphere called? _____

What is the boundary between the Mesosphere and Thermosphere called? _____

What layer of the atmosphere do you live in? _____

What happens to water vapor concentration when you go up in the atmosphere? _____

What is the Atmosphere made of?

Table 1-2 Principal gases of dry air

Constituent	Percent by Volume	Concentration in Parts Per Million (PPM)
Nitrogen (N ₂)	78.084	780,840.0
Oxygen (O ₂)	20.946	209,460.0
Argon (Ar)	0.934	9,340.0
Carbon dioxide (CO ₂)	0.036	360.0
Neon (Ne)	0.00182	18.2
Helium (He)	0.000524	5.24
Methane (CH ₄)	0.00015	1.5
Krypton (Kr)	0.000114	1.14
Hydrogen (H ₂)	0.00005	0.5

What gas makes up the greatest volume of the atmosphere? _____

What gas do you need most from the atmosphere? _____

What percent volume is the above gas in the atmosphere? _____

What does PPM stand for?

Where did the atmosphere come from?

- Early atmosphere is believed to have resulted from outgassing by early volcanoes.
- ~2.4 billion years ago oxygen began accumulating → photosynthesis by cyanobacteria.

Humans and the Atmosphere

- Human activity has negatively affected the atmosphere → Pollutants like gases, soot and ash
- Deforestation and burning fossil fuels have increase CO₂
- Greenhouse gases like Carbon Dioxide (CO₂), Water Vapor (H₂O(g)), and Methane (CH₄)
- Greenhouse gases trap heat close to the Earth's Surface

Ozone Layer- Three oxygen's (O₃), that prevents ultraviolet (UV) radiation from reaching the surface

- located in the stratosphere
- human's added *Choloroflouorocarbons* (CFC's) that have destroyed the ozone in certain parts
- less ozone → more skin cancer and can hinder plant and animal growth.

Atmospheric Conditions

Weather- day to day conditions of the atmosphere (short term)

Climate- the long term conditions (30 years) → more predictable

Sun cause the Earth to heat up unevenly, the Earth's atmosphere is a fluid that moves that heat around. We measure: temperature, pressure, humidity, wind, clouds and precipitation.

Temperature- measurement of the avg. kinetic energy of the air molecules, (caused by the sun)

- measured with a *thermometer* → 3 scales: Fahrenheit, Celsius, Kelvin
- changes based on time, latitude and elevation

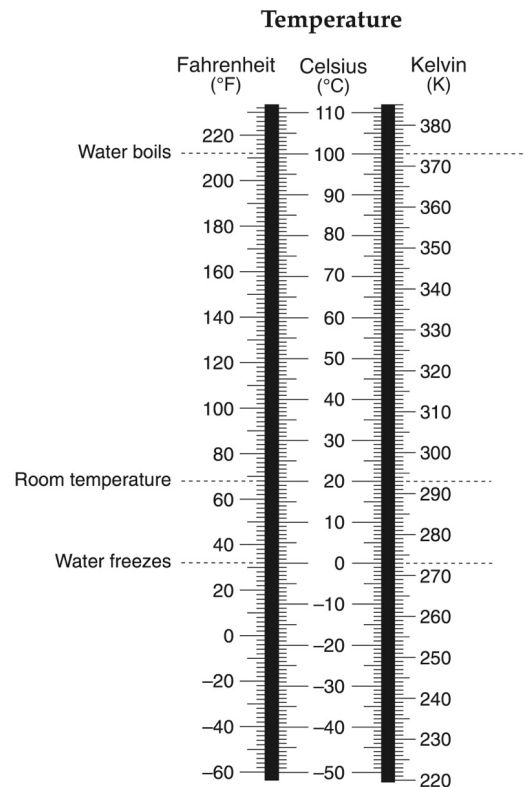
1. What is room temperature in each scale?

2. Convert 55°C to Fahrenheit: _____

3. Convert 100°C to Kelvin: _____

4. Water freezes at: _____ K

5. 260K = _____ °F & _____ °C



Humidity- water vapor in the air

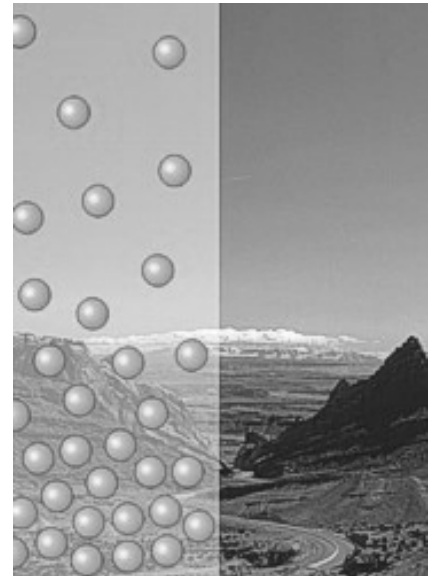
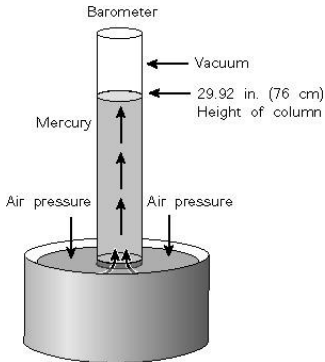
- solid: snow/ice liquid: rain gas: water vapor
- measured with a *psychrometer*

Air Pressure- weight of the air pushing down

- as altitude increase air pressure decrease
- measured with barometer

- high pressure → cool, dry, calm day

- low pressure → warm, moist, cloudy

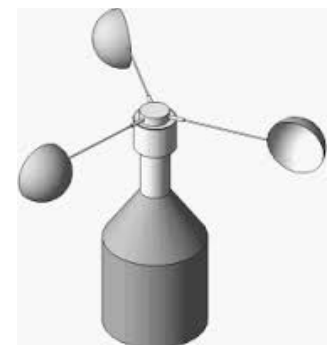


Explain Bernoulli's Principle in regards to the Can Activity:

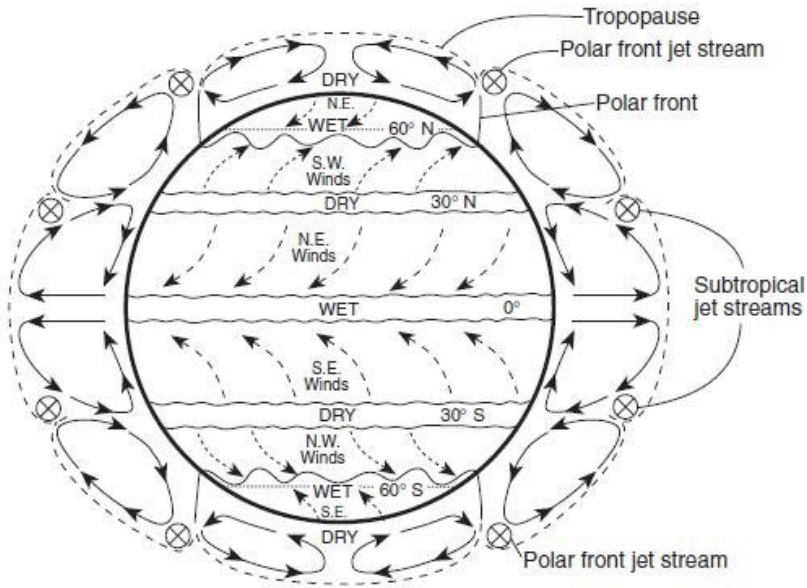


Wind-horizontal movement of air due to pressure differences.

- move from high to low
- named for the direction from which they originated
- speed measured with **anemometer**
- Wind curves to the right in the Northern Hemisphere due to the **Coriolis Effect** (Earth's rotation)



Planetary Winds



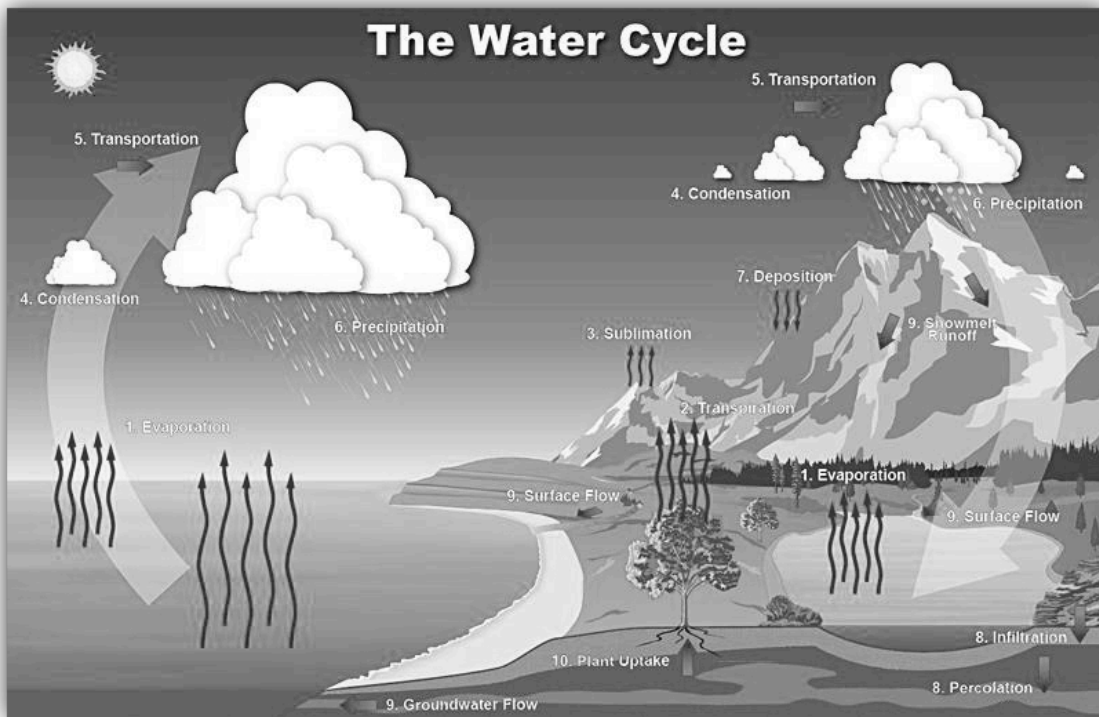
1. What is the wind direction here in Monroe? _____
2. What type of weather is at 30 N?

3. Is the air rising or sinking at 60S?

4. What is the wind direction at 22N?

5. Why is the air at the north pole dry?

Hydrological Cycle (Water Cycle)



Explain in your own words the diagram above:

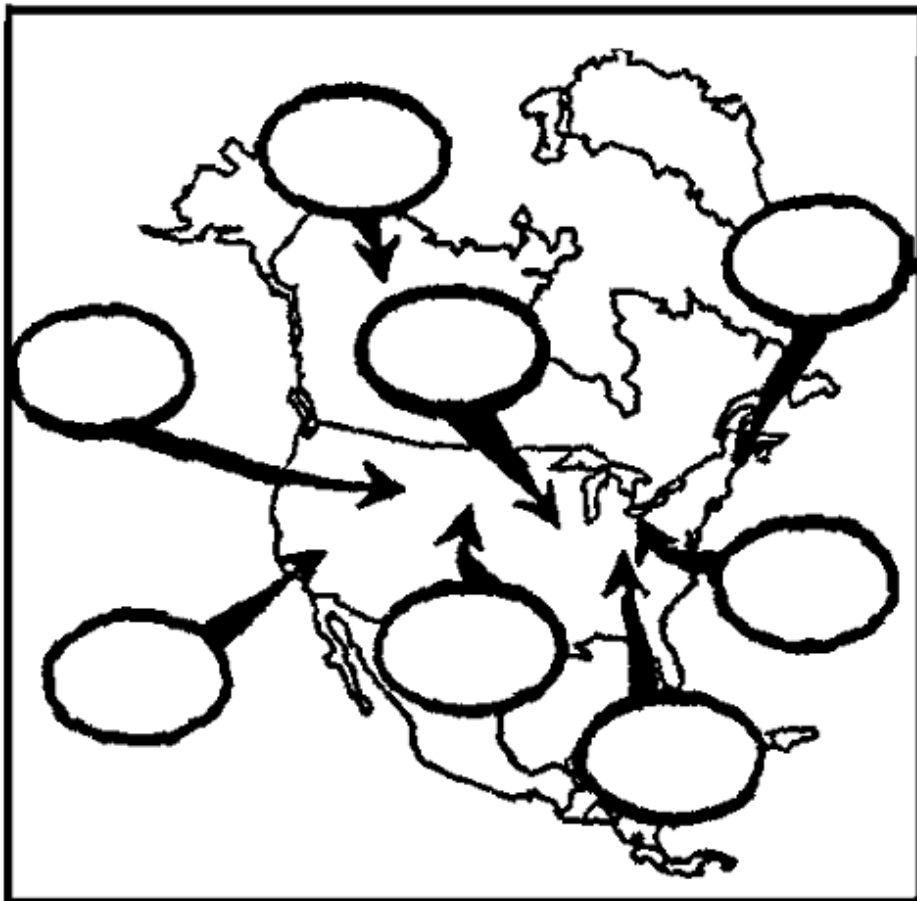
Explain in your own words the "Cloud In A Bottle" demonstration:

Air Masses- Large body of air with the same temperature and moisture throughout

- takes on characteristics from its source region (where the air came from)
- air forming over water will be moist (low pressure), over land dry (high pressure)
- air forming in polar regions → cold, tropical regions → warm

Air Mass Type	Map Symbol	Source Region	Characteristics

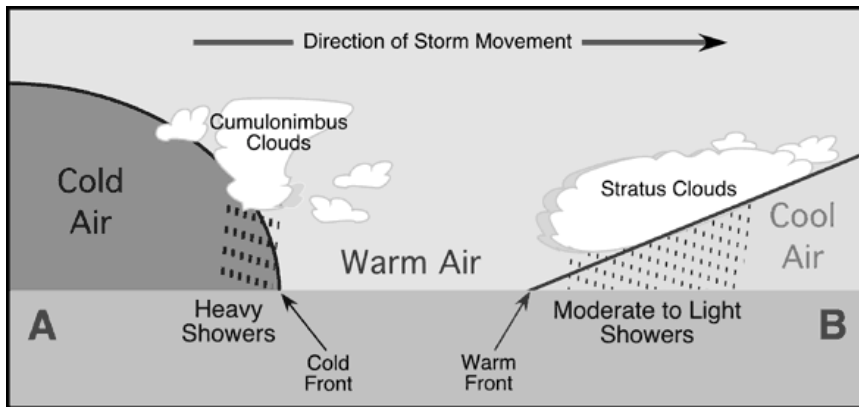
Air Masses of North America



Fronts- boundaries (interfaces) between different air masses

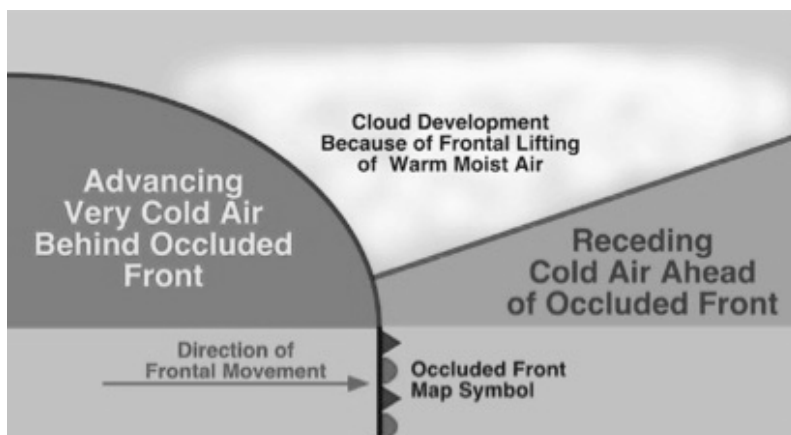
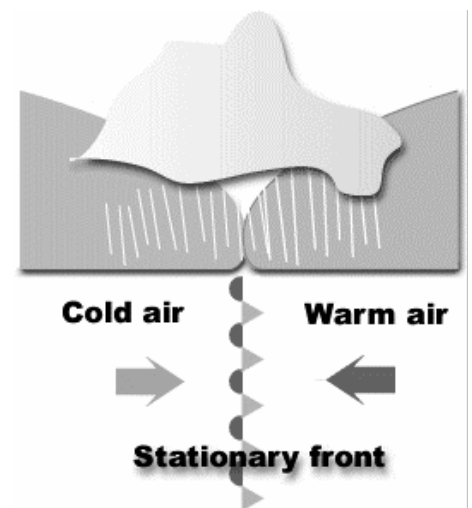
-*Cold fronts*- cold air moves into warm air → Faster

-*Warm fronts*- warm air moves into cold air → Slower



-Stationary front- two air masses sitting side by side

-Occluded front- cold front over takes a warm front



-Precipitation occurs at front because cold air pushes warm air up which causes it to cool, making the water vapor in the air condense into clouds → precipitation

- Fronts mean a change in weather

U.S. Base Map

