

Name: _____ Unit 3: Weather, Climate & The Atmosphere

NOTES: 3.04

FOCUS: Conditions in the Troposphere

ESSENTIAL QUESTION: Can you explain the relationship between air pressure, air temperature, elevation and humidity?

What do you already know?

- Nearly all weather that occurs on Earth occurs in a layer of the atmosphere called the troposphere.
- Air pressure is the weight of the atmosphere pushing down on you.
- Air temperature is determined by how fast the molecules in the atmosphere are moving and can be measured with a thermometer.
- Elevation or ~~_____~~ is the height of a location above sea level.
- The amount of water vapor in a pocket of air is called humidity.

Causes of Weather

- Weather in the troposphere is caused by changes in four related conditions:
 - Air pressure
 - humidity
 - Elevation
 - Air Temperature
- Each condition is affected by the other three.

Air Pressure

- Air Pressure is... the force that air exerts over a certain area due to its weight or motion.

Name: _____ Unit 3: Weather, Climate & The Atmosphere

NOTES: 3.04

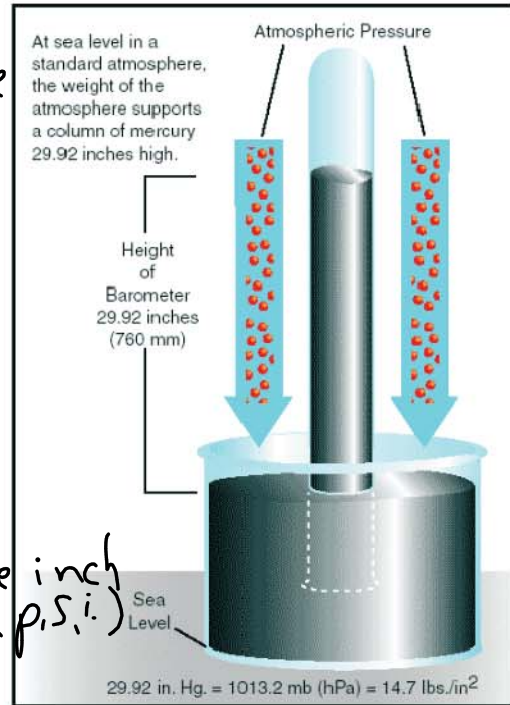


- Air pressure can also be called atmospheric pressure or barometric pressure.

- It is measured using a tool called a barometer.

- Standard air pressure at sea level:

- 29.92 inches of Hg
- 760 mm of Hg
- 1013.2 millibars
- 14.7 pounds/square inch (p.s.i.)
- 1 atm.

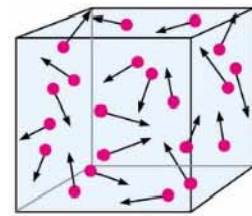


Air Pressure and Air Temperature

- Air temperature is determined by... how fast the air molecules are moving.

- Warm air = faster moving particles

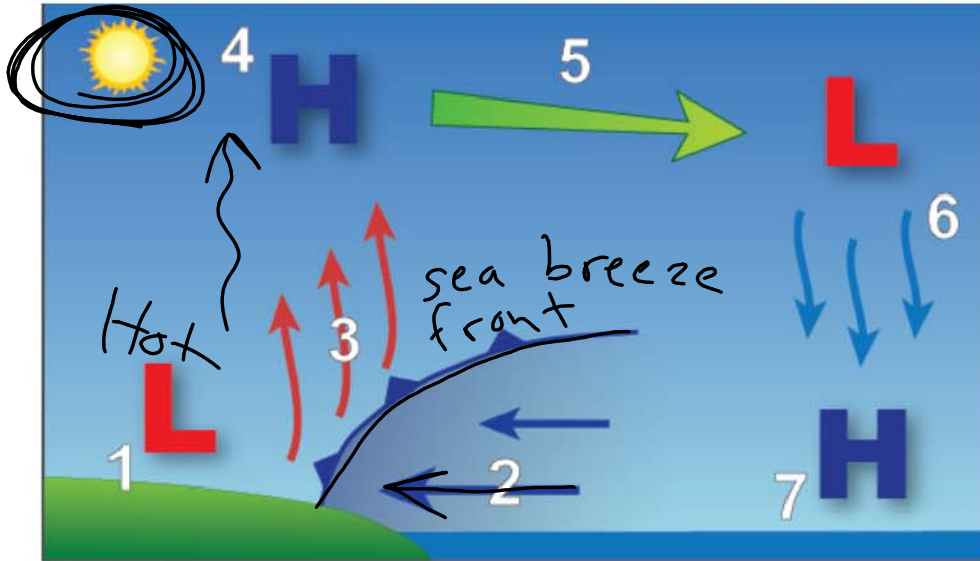
- Cool air = slower moving particles



- Fast-moving particles spread out quickly → less density air → lower pressure air

- Slow-moving particles causes air to contract → higher density air → higher pressure air

- In coastal areas, this cycle creates sea breezes during the day and land breezes at night.



NOTES: 3.04

- 1) The land heats up quickly and warms the air above it. The warm air has a low density and low pressure. Therefore, it rises.
- 2) The water heats up slowly and the air above remains cool (high density, high pressure). The cool sea air blows inland to replace the rising warm air.
- 3) The sea breeze front forces the warm air to rise even higher.
- 4) The air rising in the troposphere begins to cool, increasing both its density and pressure.
- 5) The air now has a higher pressure than the air over the water, so it flows back out over the water.
- 6) The cool, high density, high pressure air sinks back down over the water.
- 7) The cycle continues, creating a convection current. The cycle will reverse direction at night when the land cools quickly and the water holds its heat.

land breeze

Name: _____ Unit 3: Weather, Climate & The Atmosphere

NOTES: 3.04

Air Pressure and Elevation

- Study the table below to answer the question, "What is the relationship between altitude and air pressure?"

Location	Altitude (m)	Approximate Air Pressure (kPa)
Sea level (the beach)	0	101.3
Denver, Colorado	1,700	85
Mt. McKinley (highest mountain in U.S.)	6,193	44
Mt. Everest	8,848	31
Cruising altitude of commercial jets	12,000	19

- As altitude increases, air pressure decreases. In other words, they have an inverse relationship.

- Air pressure increases the closer you are to Earth's surface.
- It is like cheerleaders in a human pyramid: The people at the bottom (sea level)

experience the greatest pressure while the people at the top (mountain top) experience the least pressure.

- This is also the reason there can be very different weather conditions on a mountain top versus at sea level.

