March 14, 2019

6th Atmosphere Test Review, New Material

**Density:** the amount of matter in a given volume or area

* Also described as a measure of how compact or condensed matter is

*Atmospheric pressure and wind*

* **Wind is caused by changes in air pressure**
	+ **Air moves from areas of high pressure to areas of low pressure**
	+ In our experiment with the tin foil and books, we saw that dropping the book created a high pressure area which created wind, pushing the foil away
	+ When we picked the book up rapidly, we created a low pressure zone which created wind that pulled the tin foil in
* **The *bigger the difference* between high pressure and low pressure zones, the stronger the wind**
	+ If a super high pressure zone hits a super low pressure zone, the wind will be *intense*
		- Ex. 1060 mb high pressure vs. 1000 mb low pressure (difference of **60** mb)
	+ If a somewhat high pressure zone hits a relatively low pressure zone, the wind will be mild
		- Ex. 1024 mb high pressure vs. 1020 mb low pressure (difference of **4** mb)
* **The *closer the distance* between high pressure and low pressure zones, the stronger the wind**
* A blue **“H”** stands for high pressure/cold air, and a red **“L”** stands for low pressure/warm air

*Cold and warm fronts*

 **cold front warm front**

* **Front:** the boundary between air masses of two different temperatures and densities
* **Cold front**: when *cold air moves* into a stationary mass of warm air
	+ The cold air pushes underneath the warm air and forces the warm air to rise up
* **Warm front**: when *warm air moves* into a stationary mass of cold air
	+ The warm air rolls over the cold air and rises up into the atmosphere
* Warm air rises in both cold and warm fronts – the main difference between a warm and a cold front is *which temperature of air is moving faster*

*Precipitation*

* **Condensation**: a change in phase from a gas to a liquid
	+ Water vapor in the atmosphere cools and turns from a gas into precipitation
	+ Water vapor **must** be present in the air for condensation to occur
* **Precipitation**: liquid or solid water that falls from the sky
	+ Ex. rain, snow, hail, sleet, freezing rain
* **Evaporation**: change of phase from a liquid to a gas, ex. boiling water
* Condensation, precipitation, and evaporation in the atmosphere all depend on **air temperature**
* **Storm front**: as warm, moist air rises into the cold upper atmosphere, water vapor in the air cools and condenses out as precipitation
	+ - Water on Earth’s surface is warmed and evaporates to become water vapor in the air
		- Warm air containing water vapor rises into the cold upper atmosphere
		- As the warm air rises, the water vapor cools and condenses from water vapor back into a liquid
		- The liquid then precipitates out of the air as rain or snow
	+ Both cold and warm fronts are often the site of severe weather events
* **Mountains**: mountains can force warm air up into the atmosphere by

acting like a ramp

* + As warm air reaches colder altitudes, precipitation can occur
	+ Deserts can form on the other side of mountains because air

has no moisture left

*How does our atmosphere help humans live on Earth?*

* Greenhouse effect keeps Earth warm
* Ozone protects us from harmful UV radiation
* Burns up meteors
* Causes weather events, including rain
* Allows us to speak with each other, since we depend on air molecules to produce sound

***Focus Questions***

* *What happens to the volume and density of air as it is heated and cooled?*
	+ The volume and density of air change with changes in temperature.
	+ As the temperature of air increases, its volume increases and its density decreases.
	+ As the temperature of air decreases, its volume decreases and its density increases.
* *Why do changes in density cause air movement?*
	+ Air is a fluid. Fluids that are denser sink below those that are less dense.
	+ The decrease in density as air is heated causes it to rise above cooler, denser air.
	+ The increase in density as air is cooled causes it to sink below warmer, less dense air.
* *How do differences in the temperature of the Earth’s atmosphere affect the movement of air?*
	+ The warmer air in the atmosphere rises and cooler air in the atmosphere sinks. This causes convection currents in the atmosphere.
* *What types of air movements cause areas of high and low pressure?*
	+ Cold air sinking increases the pressure in an area, while warm air rising decreases the pressure in an area.
* *Why do differences in pressure cause wind?*
	+ When there are pressure differences in the atmosphere, air moves from areas of high pressure to areas of low pressure. This movement of air creates wind.
* *What factors are necessary for precipitation to form along fronts?*
	+ Three of the factors necessary for precipitation to occur include:
		- A difference in density between the warm and cold air masses
		- An upper atmosphere that has temperatures lower than the air in the rising warm air mass
		- A significant amount of water vapor in the rising warm air mass.
* *What changes in atmospheric pressure occur with the passing of a cold or warm front?*
	+ In both cold and warm fronts, the rising of the warmer air mass is accompanied by a decrease in the atmospheric pressure.