ATMO 1300 Section 001
In-class Worksheet #1
July 13th, 2017

1. What are the 3 components of the atmosphere? Think particles that exist in the atmosphere, not just gases.

- *Gases (permanent and variable)*
- *Water (droplets and ice)*
- *Aerosols*

2. a. Name 2 atmospheric permanent gases (there are three!):

-Nitrogen
-Oxygen
-Argon
-Neon

b. Name 2 atmospheric variable gases, and describe why they are important to the atmosphere:

- *Water vapor- clouds, precipitation (rain)*
- *Carbon dioxide- global temperature/climate change*
- *Ozone- absorbs UV in stratosphere/ pollutant at surface*
- *Methane- climate change*

3. What are the 5 ways energy is transferred in the atmosphere?

- *Conduction*
- *Convection*
- *Advection*
- *Latent Heating*
- *Radiation*

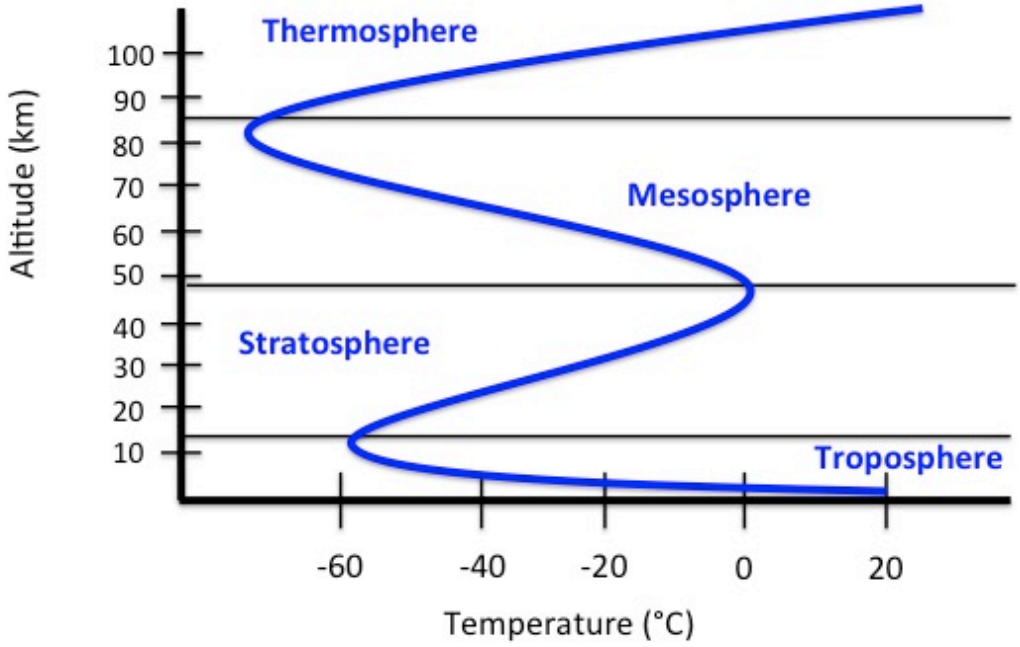
4. Why is the energy transfer process of convection in the polar regions an inefficient heat transfer mechanism (hint: think conduction)?

Surface of the earth is much cooler (less heating from the sun), not as much heat to transfer to the air, air does not become very buoyant and thus, convection does not occur as robust as in the midlatitudes

5. What are the two characteristics needed to classify a radiation wave (hint, think of quantity and quality)?

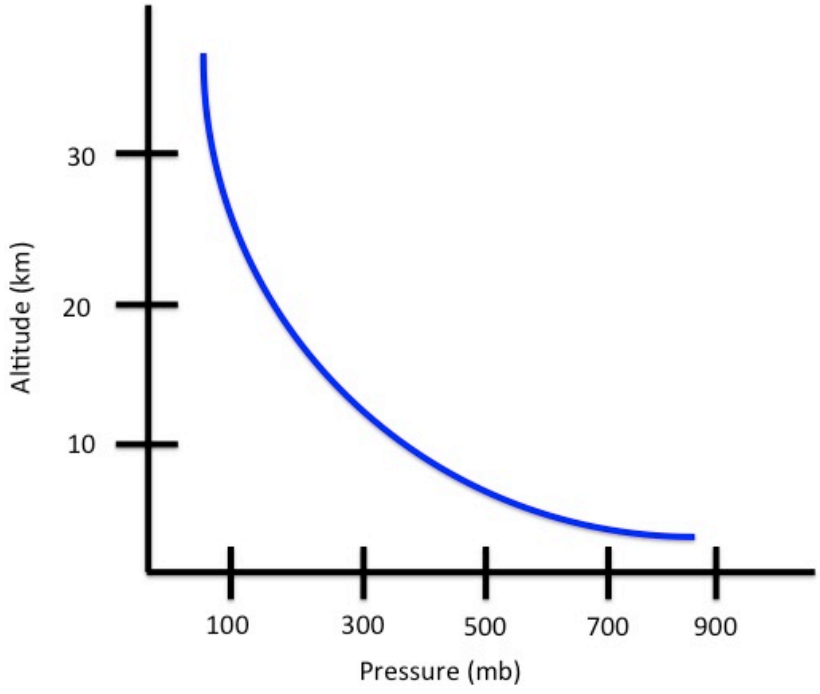
- *Wavelength (the type of radiation)*
- *Amplitude (the amount of radiation)*

6. On the plot below, label the 4 layers of the atmosphere based on temperature. Also draw the atmospheric temperature profile through all 4 layers.



7. On the plot below, draw the atmospheric pressure profile. Does atmospheric pressure decrease faster in the lower atmosphere or in the upper atmosphere?

- *Pressure decreases faster in the lower atmosphere, decreases slower in the upper atmosphere*



Fill-in-the-blank

8) _*Meteorology*___ is the study of day-to-day variations of the atmosphere and __*Climatology*___ is the study of long-term trends.

9) The source of all Earth's energy is ___*The Sun*_____.

10) The "ARTS" acronym stands for the radiative properties ___*Absorbtion*_____, __*Reflection*____, ___*Transmission*____, and __*Scattering*__.

11) ___*Convection*____ is the process of transporting energy and mass in the vertical.

12) __*Shortwave/Visible*___ and __*Longwave/Infrared*____ radiation contribute to the energy balance of the surface of the earth (hint: think electromagnetic spectrum of waves)