

Day 1: Fill-in-the-blank

June 3, 2015 6:44 PM

Demo: Why is the sky blue??

- > Not a reflection from the ocean!
- > Is refraction of light in the atmosphere

Day 1 Atmosphere hand out notes

- Atmosphere's composition (in homosphere)

Nitrogen (N) 78%

Oxygen (O) 21%

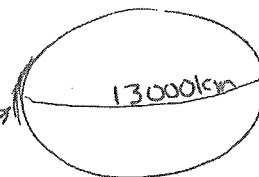
Argon (Ar) <1%

Carbon dioxide (CO₂) 0.03%

Other gases (Ne, He, CH₄, Kr) 0.01%

- 99% of the atmosphere's weight is in the bottom 32 km (closest to Earth)
- Earth is almost 13,000 km in diameter (for scale - thin atmosphere!)

same composition throughout the layer



Layers:

- Homosphere : atm extends up to 80km with the same composition (the mixture of N, O, Ar, etc)

- Heterosphere : from 80km to 1000km there is a layer of Oxygen, then up to 2400km is a layer of Helium, and then Hydrogen extends into interplanetary space.

- Ionosphere : the UV rays from the sun knock electrons out of atoms; creates 4 layers of ions (charged atoms); these layers are used to reflect radio waves to many locations on Earth; extends from 60km to 300km or above.

- Ozonosphere : a layer of active form of oxygen; absorbs UV rays; located 15 to 50km up; destroyed by Freon (spray cans) and hydrocarbons from supersonic jets

Temperature layers:

- Troposphere : the layer we live in; temperature drops as you climb up; weather occurs in this layer; surface to 18km up where the Tropopause is

- Stratosphere : from 18 to 50km up where the Stratopause is found; temperature rises as you go up in elevation

- Mesosphere : from 50 to 80km up where the Mesopause is found; temperature drops as you go up

- Thermosphere : from 80 to 500km or into space; temperature rises as you go up

Other things in the atmosphere:

- water vapour : only in Troposphere, amount determines humidity level and number of clouds

- dust : water vapour condenses around dust and salt particles forming clouds

- clouds : found in the lower part of the troposphere usually

- airplanes : fly around 11 km up at the highest

- auroras (northern lights): solar flare particles interact with Earth's

magnetic field about 300km up creating auroras

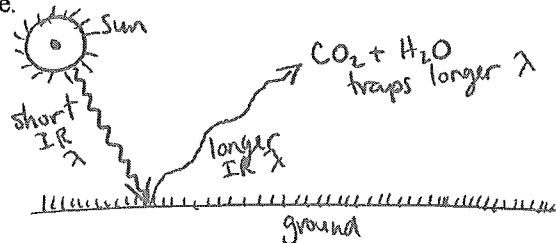
- meteors : rock particles from space enter our atmosphere and burn up at the bottom of the thermosphere (around 90km up)

- Mt. Everest is 9 km high (for scale)

Pgs 406-407

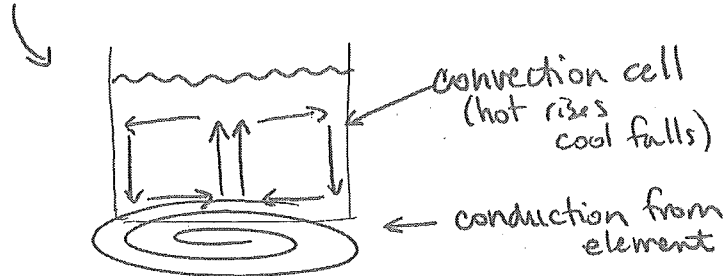
Changing the content of the atmosphere:

- Ozone depletion: more UV rays will reach Earth causing more burning and skin cancer (NOTE: UV rays are not heat !)
- Greenhouse Effect: the trapping of the sun's heat by CO₂ and H₂O vapour in the atm. so the more CO₂ and H₂O vapour there is, the more heat is trapped.
- How the greenhouse effect works:
 - o Sun emits short wavelength infrared (heat) radiation which can pass through the atmosphere and reaches the ground
 - o The ground absorbs the heat and re-emits it with a longer wavelength (it kind of grows in the ground)
 - o The long wavelength waves can not pass through the atm as easily so some of them get trapped by CO₂ and H₂O vapour thus heating the atmosphere.
 - o Diagram:

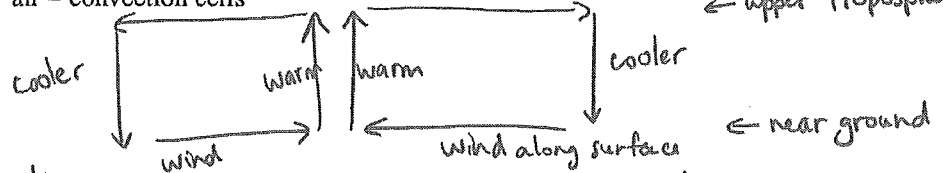


Four ways the sun's energy moves:

- Radiation: electromagnetic waves travel through space at the speed of light
- Conduction: object receives heat from contact with a hotter object
- Convection: heat moves by currents (circulation) in a heated liquid or gas i.e. a pot of boiling water: conduction from the element, then convection



- o air currents/winds are created by uneven heating of the air - convection cells ← upper Troposphere

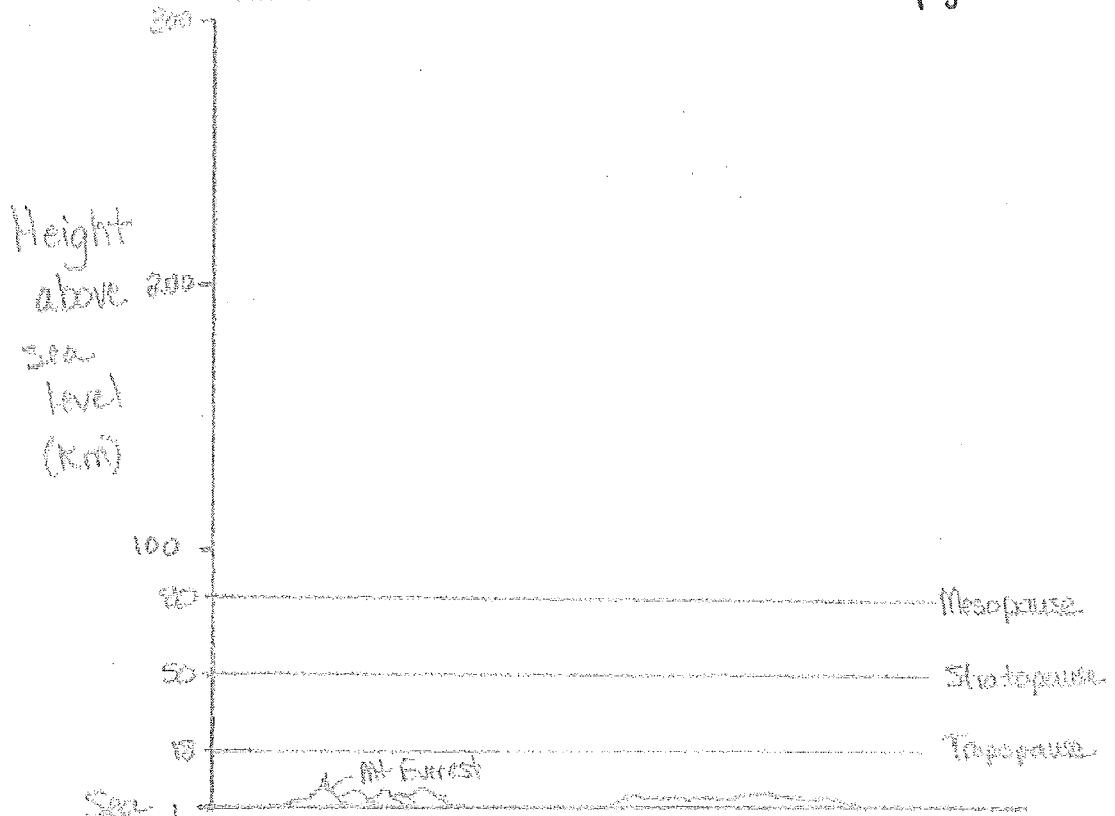


- Advection: the bottom arrow of a convection cell; the wind arrow

Day 1 Atmosphere Blooms Questions

Name: _____

1. List the elements and compounds found in the ^{99%} Homosphere with their percentages.
2. Explain why people are so worried about the depletion of the ozone layer.
3. Think of a way to categorize the temperature layers into 2 groups of 2.
4. Assemble all the information on the Earth's atmosphere (given in the notes) to construct a detailed layers diagram in the graph started for you below. pg 481



5. Predict good and bad effects that may occur on Earth if the Greenhouse effect causes temperatures to rise

a. A few more degrees

Pros (Good effects)	Cons (Bad effects)

b. To make Earth more like Venus! (I'm having difficulty thinking of any pros for this one!)

6. Write a story describing the progress of a heat wave (infrared) from the sun which eventually ends up in your cup of hot chocolate (mmmm.) Use the 4 energy motion terms (radiation, conduction, convection and advection) correctly in your story.