

**Atmosphere:** Layers of gas around earth's surface. Regulates gases, absorbs radiation, moderates climate.

**Troposphere:** Extends 1-25 km from earth. **Weather** takes place here, and it is increasingly cold with increasing altitude.

Tropopause: acts as a buffer between the troposphere and stratosphere.

**Stratosphere:** sits on top of the troposphere and extends 25-50 km. gases are not well mixed, temperature increases with altitude, THIS IS WHERE THE OZONE LAYER IS.

**Mesosphere:** sits on top of the stratosphere and extends 50-80 km. This is where meteors burn.

**Thermosphere:** outermost layer of the atmosphere, between the mesosphere and outer space. Temperatures increase with altitude.

Remember ETSMT for layers of the atmosphere in order.

“Eat Total Sh\*t?, Me Too!”

(earth) (troposphere) (stratosphere) (mesosphere) (thermosphere)

**Ozone:** O<sub>3</sub>, created naturally in the stratosphere, when highly energetic solar radiation comes in contact with O<sub>2</sub>.

The ozone layer in the stratosphere tends to act as a shield, protecting against radiation, the sun!

The current depletion of the ozone is mainly because of **chlorofluorocarbons (CFC)**.

**Montreal Contract** deals with limiting the use of CFCs and other ozone depleting substances. The **EPA (environmental protection agency)** also puts in strong efforts trying to counteract ozone depletion.

**Greenhouse effect:** Due to the presence of **greenhouse gases** in the atmosphere, the atmosphere traps solar radiation, allowing sunlight to pass through, but absorbs heat radiated back from earth. Leads to a rise in temperature.

**Albedo:** the fraction of solar radiation that is reflected back into space.

**Weather:** Day to day changes in temperature, wind, rain, etc. mediated by the atmosphere in a given region.

**Climate:** Weather conditions that remain constant for a set amount of time, and are predictable.  
**Temperature and Precipitation.**

**Convection currents:** air currents caused by the vertical movement of air due to atmospheric heating and cooling

**Horizontal air flow:** surface winds are created from this; large masses of moist air rise and cool air moves into the area where the hot air was

**Rain- shadow effect:** the low-rainfall region that exists on the leeward (downwind) side of a mountain range. This rain shadow effect is the result of the mountain range's causing precipitation on the windward side.

Types of weather:

**Hurricane:** Severe tropical storm that travels north/ northeast/ northwest from its origin. Heavy rain and heavy wind.

**Monsoon:** a wind system that influences large climatic regions and reverses direction seasonally

**Typhoon:** hurricanes in the Pacific Ocean

**El-nino:** a climate variation that takes place in the tropical Pacific irregularly. Brings warm, nutrient poor water. Caused by **ENSO events**.

**La- nina:** a cooling of the ocean surface off the western coast of South America, occurring periodically every 4 to 12 years and affecting the Pacific and other weather patterns

**Southern Oscillation:** the atmospheric pressure conditions corresponding to the periodic warming of El Nino and cooling of La Nina

Multiple Choice Questions:

1. In what layer of the earth's atmosphere does weather take place?
  - a. magnetosphere
  - b. troposphere**
  - c. stratosphere
  - d. mesosphere
  - e. thermosphere
  
- 2) What would not be a consequence of excessive greenhouse gases in the atmosphere?
  - a. change in weather patterns or climate.
  - b. increased amount of energy on the earth surface.
  - c. Depletion of the ozone layer.
  - d. An increased amount of heat from the sun entering the earth's atmosphere.**
  - e. increased acidity of the earth's oceans.
  
- 3) In which of earth's atmosphere does the aurora borealis take place?
  - a. thermosphere**
  - b. stratosphere
  - c. mesosphere
  - d. hydrosphere
  - e. troposphere
  
- 4) 99% of the gases in the lower atmosphere, listed in descending order of volume are:
  - a. oxygen, nitrogen, Carbon dioxide, water
  - b. water, nitrogen, oxygen, carbon dioxide
  - c. oxygen, carbon dioxide, nitrogen, water
  - d. carbon dioxide, water, oxygen, nitrogen
  - e. nitrogen, oxygen, water, carbon dioxide**
  
- 5) regional climate are most affected by
  - a. latitude and altitude**
  - b. prevailing winds and latitude
  - c. altitude and longitude
  - d. longitude and latitude
  - e. Coriolis effect and Tradewinds

Free Response Question: (from college board)

**(a) The atmosphere is one important carbon reservoir.**

- (i) Describe a biological process by which carbon is removed from the atmosphere and converted to organic molecules.
- (ii) Describe a biological process by which carbon is converted from organic molecules to a gas and returned to the atmosphere.

**(b) Oceans and terrestrial systems are also important carbon reservoirs.**

- (i) Explain how atmospheric carbon is incorporated into two oceanic sinks.
- (ii) Identify one terrestrial sink, other than fossil fuels, that stores carbon for thousands to millions of years.

**(c) The burning of fossil fuels has been shown to increase the concentration of carbon in the atmosphere. Discuss TWO other human activities that increase the concentration of carbon in the atmosphere.**

**(d) Identify an environmental problem that results from elevated atmospheric carbon concentrations. Discuss one consequence of the problem you identified.**

**(e) Phosphorus is another element important to all organisms.**

- (i) Describe one major way in which the phosphorus cycle differs from the carbon cycle.
- (ii) Identify one reason that phosphorus is necessary for organisms .