BIO 2150- Chapter 25 Notes

I. Carbon

A. Life on Earth is carbon based.

1. Carbon based molecules store and transport energy.

2. Carbon forms basic structures of all major biological molecules.

II. Acquiring Carbon

A. Photosynthetic organisms use solar energy to fix CO2 into sugars.

1. $6CO2 + 6H2O = C6H12O6 + 6O2$

B. Heterotrophic organisms acquire carbon in the form of organic molecules

1. Heterotrophic animals eat other organisms.

III. Short Term Carbon Cycle

A. Carbon Cycles by means of the complementary processes of photosynthesis and respiration

B. Photosynthesis rates peak in the northern summer

C. Respiration stays the same

D. Respiration releases the most CO2 every year.

IV. The Carbon Cycle

A. CO2 is added to the atmosphere by:

1. Biological imputes

2. Volcanoes, mid-ocean ridges

3. Human Activities

B. CO2 is removed from the atmosphere by:

1. Geological removal (chemical weathering)

2. Biological processes (Photosynthesis)

C. Most of Earth's carbon is found in sedimentary rocks.

V. How Does Carbon Cycle in and out of Rocks

A. Weathering: sedimentary rocks= ocean rocks

B. Carbonate precipitation: ocean water= marine sediments

C. Organic matter burial: biomass= sediments

D. Volcanism: sedimentary rocks= atmosphere

E. Seduction: ocean sediments= magma

VI. The Long Term Carbon Cycle

A. The amount of atmospheric CO2 has changed

1. It has dropped 10-20 fold or more since the Cambrian Period

2. Cyclically fluctuated over the past 400,000 years.

3. Increased 25% in the past 50 years.

B. Carbon isotope studies show that the source of increased carbon is human activity.

C. Cycles of CO2 levels correlate with glaciation events.

D. Atmospheric O2 levels tend to move opposite of CO2 levels due to photosynthesis and respiration balance.

VII. Food Web

A. Carbon enters the food web through primary producers

B. Carbon passed through the food web from primary producers to consumers to decomposers to the environment.

C. Some CO2 is lost at each level.

D. Energy cycles through the food web from primary producers to consumers to decomposers

E. Some energy is lost at each level as heat.

F. Trophic pyramids show what happens to energy or carbon from level to level.

G. Biological activity has a major impact on the carbon cycle.

1. Evolution of Photosynthesis
2. Organisms increased the rates of weathering and formation of soils.
3. Bio- mineralization (shell formation)
4. Evolution of decomposition of resistant woody plants resulted in increased carbon into the biomass and drop in CO2 levels.