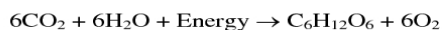


Biogeochemical Cycles Reading & Project

References Holt Biology: p 90-93; PH Biology p 74-80

The Carbon Dioxide Oxygen Cycle (carbon cycle for short!):

The following two equations summarize important exchanges that take place in the carbon cycle between *living things, using the earth's air, water and soil as locations for storage for the raw materials involved:*



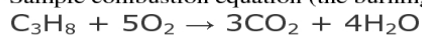
The first equation summarizes the reactions involved in **PHOTOSYNTHESIS**. We can begin the story of the cycling of carbon with **Carbon dioxide** from the air or dissolved in the water being taken in by autotrophic organisms like algae or grasses. **Water** is taken in by these photosynthetic organisms from moisture contained in the air, water or soil. Electromagnetic Energy from the sun is absorbed by chlorophyll contained in the chloroplasts of autotrophic cells. Chloroplasts convert this electromagnetic energy to chemical energy through electron carriers like NADPH and ATP and ultimately to chemical bonds found in **Glucose** ($\text{C}_6\text{H}_{12}\text{O}_6$) molecules. When water molecules are split, waste **oxygen gas** (O_2) is produced and released back to the environment.

The second equation is called cellular **RESPIRATION**. It is the inverse of photosynthesis in that energy is released from, instead of stored in, the chemical bonds of glucose. The **energy** released will be made available for organisms' cell processes. Glucose is broken apart piece by piece, producing **carbon dioxide** molecules and waste **water**. Carbon dioxide and water produced is released into the environment of the cells and recycled in the carbon cycle. The energy released is stored in ATP molecules until it is needed by a cell process.

All organisms-decomposers, producers, carnivores, omnivores, and herbivores complete respiration reactions to release energy from glucose molecules to fuel cell processes, releasing Carbon dioxide back to the air or water they live in as part of the process. Only producers complete the reactions of photosynthesis.

One other way that carbon dioxide is released into the environment from the cells of living things is **COMBUSTION**. When **fossils fuels** are burned by humans or a forest fire occurs, previously living material (like coal or propane) or currently living material like trees are chemically changed as oxygen combines with the carbon compounds, releasing carbon dioxide.

Sample combustion equation (the burning of propane gas):



Geologic processes are also involved in the carbon cycle. **Deposition** of carbon compounds from living things can be **compacted** and **cemented**, and sometimes **metamorphosed**, forming