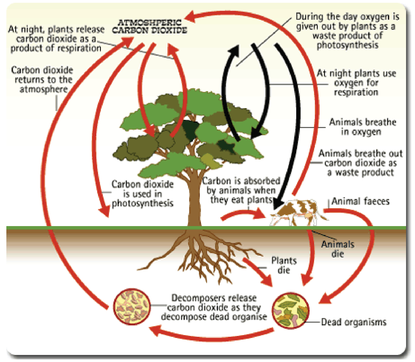
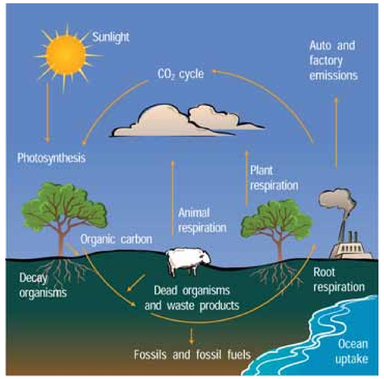
The Carbon Cycle





THE CARBON CYCLE

Carbon is the fourth most abundant element in the universe, and is absolutely essential to life on earth. In fact, carbon constitutes the very definition of life, as its presence or absence helps define whether a molecule is considered to be organic or inorganic. Every organism on earth needs carbon either for structure, energy, or, as in the case of humans, for both. Discounting water, you are about half carbon. Additionally, carbon is found in forms as diverse as the gas carbon dioxide (CO_2), and in solids like limestone ($CaCO_3$), wood, plastic, diamonds and graphite.

The carbon cycle is the biogeochemical[1] cycle by which carbon is exchanged between the earth and its atmosphere. It is one of the most important cycles of the earth and allows for the most abundant element to be recycled and reused throughout the biosphere and all of its organisms. The earth recycles carbon constantly and this carbon is sometimes called **modern carbon**. The amount of carbon in the atmosphere has been increasing since the mid 19th century, and this is thought to be due to the release of ancient fossil carbon from burning fossil fuels for energy.

Trees and grasses convert carbon dioxide into carbohydrates during photosynthesis, releasing oxygen in the process. This process is most prolific in relatively new forests where tree growth is still rapid, and is strongest in deciduous forests during spring leafing out. Northern hemisphere spring predominates, as there is far more land in temperate latitudes in that hemisphere than in the southern. Forests store 86% of the planet's above-ground carbon and 73% of the planet's soil carbon.

The carbon cycle consists of storage pools (or reservoirs) of carbon and the processes by which the various pools exchange carbon. If more carbon enters a pool than leaves it, that pool is considered a *net carbon sink*. If more carbon leaves a pool than enters it, that pool is considered *net carbon source*.

The annual movements of carbon, i.e., the carbon exchanges between pools, occur because of various chemical, physical, geological and biological processes. The ocean contains the largest active pool of carbon near the surface of the earth, but the deep ocean part of this pool does not rapidly exchange with the atmosphere.

The **global carbon budget** is the balance of the exchanges (incomes and losses) of carbon between the carbon pools or between one specific loop (e.g., atmosphere ↔ biosphere) of the carbon cycle. An examination of the carbon budget of a pool or reservoir can provide information about whether the pool or reservoir is functioning as a source or sink for carbon dioxide.

[1] **Biogeochemical**: of or relating to the partitioning and cycling of chemical elements and compounds between the living and nonliving parts of an ecosystem. -- *Wikipedia*

SOURCES:

The Carbon Cycle - What Goes Around Comes Around, *by John Arthur Harrison, Ph.D.*

Wikipedia

Did you know?

Biomass is an extremely valuable carbon cycle-friendly renewable resource because its combustion releases only relatively recent carbon, the energy harvested can be used to replace fossil carbon forms of energy, it can be harvested in a sustainable fashion and a small amount of fossil energy is used to transform or transport it.