

Topic Page: [Carbon cycle](#)

Definition: **carbon cycle** from *Cambridge Dictionary of Human Biology and Evolution*

Recurrent binding of carbon dioxide during carbon assimilation into organic compounds, its movement through the food chain, and its release as inorganic carbon dioxide into the atmosphere by respiration and/or decomposition.



Image from:

[Elemental carbon is in constant flux.](#)

[Gaseous... in Philip's Encyclopedia](#)

Summary Article: **carbon cycle**

From *The Columbia Encyclopedia*

in biology, the exchange of carbon between living organisms and the nonliving environment. Inorganic carbon dioxide in the atmosphere is converted by plants into simple carbohydrates, which are then used to produce more complex substances. Animals eat the plants and are then eaten by other animals. When these life forms die, they decay, breaking down into, among many other things, carbon dioxide, which returns to the atmosphere. Plants and animals also release carbon dioxide during respiration. Animals and some microorganisms require the carbon-containing substances from plants in order to produce energy and as a source of materials for many of their own biochemical reactions; this cycle is vital to them. The process of incorporating carbon dioxide into the molecules of living matter is called fixation. Nearly all carbon dioxide fixation is accomplished by means of photosynthesis, in which green plants form carbohydrates from carbon dioxide and water, using the energy of sunlight to drive the chemical reactions involved. Green plants use carbohydrates to build the other organic molecules that make up their cells, such as cellulose, fats, proteins, and nucleic acids. Some of these compounds require the incorporation of nitrogen (see nitrogen cycle). When carbohydrates are oxidized in cells they release the energy stored in their chemical bonds, and some of that energy is also used by the cell to drive other reactions. In the process of oxidation, or respiration, oxygen from the atmosphere (or from water) is combined with portions of the carbohydrate molecule, producing carbon dioxide and water, the compounds from which the carbohydrates were originally formed. However, not all of the carbon atoms incorporated by the plant can be returned to the atmosphere by its own respiration; some remain fixed in the organic materials that make up its cells. When the plant dies, its tissues are consumed by bacteria and other microorganisms, a process called decay. These microorganisms break down the organic molecules of the plant and use them for their own cell-building and energy needs; by their respiration more of the carbon is returned to the atmosphere. The carbon-containing molecules that an animal derives from consuming other organisms are reorganized to build its own cells or oxidized for energy by respiration, releasing carbon dioxide and water. When the animal dies it too is decayed by microorganisms, resulting in the return of more carbon to the atmosphere. Carbon-containing molecules in wood (or other dry, slow-decaying organic materials) may be oxidized by burning, or combustion, also producing carbon dioxide and water. Under conditions prevailing on earth at certain times, green plants have decayed only partially and have been transformed into fossil fuels—coal, peat, and oil. These materials are made of organic compounds formed by the plants; when burned, they too restore carbon dioxide to the atmosphere.

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