Carbon is transferred between the ocean, atmosphere, **soil**, and living things over time scales of hours to centuries. For example, **photosynthesizing** plants on land remove carbon dioxide directly from the atmosphere, and those carbon atoms become part of the structure of the plants. As plants are eaten by herbivores and herbivores are eaten by carnivores, carbon moves up the food web. Meanwhile, the **respiration** of plants, animals, and microbes returns carbon to the atmosphere as carbon dioxide (CO_2). When organisms die and decay carbon also returns to the atmosphere or is integrated into the **soil** along with some of their waste. The combustion of **biomass** during **wildfires** also releases large amounts of carbon stored in plants back into the atmosphere.

On longer timescales, significant amounts of carbon are transferred between **rocks** and the ocean and atmosphere, typically over thousands to millions of years. For example, the **weathering** of rocks removes carbon dioxide from the atmosphere. The resulting **sediments,** along with organic material, can be transported (**eroded**) from the land to enter the ocean where they sink to the bottom. This carbon from land as well as carbon atoms in CO_2 absorbed by the ocean from the atmosphere, can become incorporated into calcium carbonate ($CaCO_3$) shells made by algae, plants, and animals. These shells become buried. As the successive layers of sediment are compressed and cemented they are turned into limestone **rock**. Over millions of years, these carbon-bearing rocks can be exposed to sufficient **heat** and pressure to melt, causing them to release their carbon back into the atmosphere as carbon dioxide via **volcanism**. Some of these rocks will also be exposed at the surface of the Earth through mountain building and weathering, and the cycling begins again. Carbon from the mantle (see **plate tectonics**) is also released into the atmosphere as carbon dioxide through volcanic activity.

Carbon is also transferred to rocks from the biosphere, via the formation of **fossil fuels**, which form over millions of years. Fossil fuels are derived from the burial of **photosynthetic** organisms, including plants on land (which primarily forms coal) and plankton in the oceans (which primarily forms oil and natural gas). While buried, this carbon is removed from the **carbon cycle** for millions of years to hundreds of millions of years.