

Photosynthesis and the Carbon Cycle

by Sophia



WHAT'S COVERED

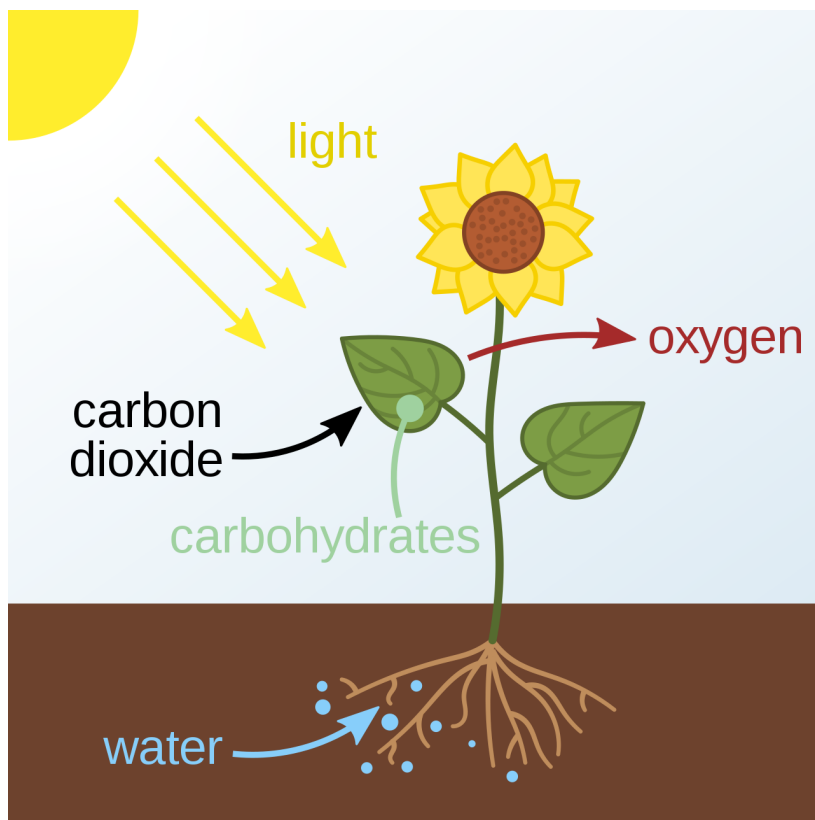
In this lesson, we will cover the topic of photosynthesis and the carbon cycle. We will discuss an overview of the process of photosynthesis. We will explore the flow of carbon between Sun, plants, animals, humans, and the atmosphere, including the carbon cycle, which maps out this flow on Earth. Finally, we will cover the impact of humans on the carbon cycle. Specifically, this lesson will cover the following:

1. [Photosynthesis](#)
2. [Carbon Cycle](#)
3. [Human Impact on the Carbon Cycle](#)

1. Photosynthesis

Photosynthesis is the foundational process that provides energy for all life on Earth. It captures and converts solar energy into energy that all life eventually consumes through various pathways. Carbon is vital to the process of photosynthesis. All living things on Earth are made of carbon and carbon that has been recycled.

During photosynthesis, carbon dioxide combines with water and light to yield glucose and oxygen.

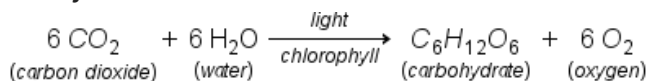


The following equation represents the process of photosynthesis.



FORMULA TO KNOW

Photosynthesis



2. Carbon Cycle

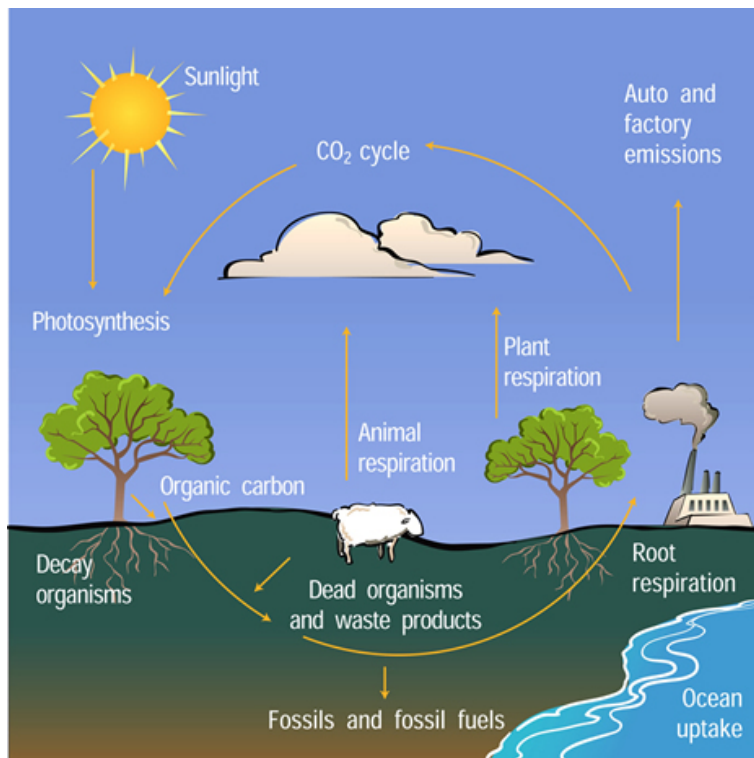
Carbon flows between plants, animals, humans, and the atmosphere. Living things, including plants, can perform the process of cellular respiration, in which sugars are oxidized to produce energy, carbon dioxide, and water. This creates a reciprocal process in which plants absorb carbon dioxide and produce oxygen while many other living things reverse the process.

The following are some important ideas to note about the carbon cycle.

- Volcanic activity releases large quantities of carbon dioxide into the atmosphere.
- Photosynthesis is a light-dependent reaction that captures energy from the sun.
- Photosynthesis also has carbon-dependent reactions in which carbon dioxide is fixed into sugars.
- Cellular respiration is the breakdown of sugars, a process that uses oxygen to produce carbon dioxide and energy. That carbon dioxide is then released through breath.

- Most carbon on the planet is contained in or came from living organisms. When organisms die, a majority of them are recycled by decomposers in the soil, though sometimes they also form fossil fuels.

⇒ **EXAMPLE** Dead plant matter is sometimes compressed over millions of years underground to form oil. The carbon cycle, shown below, is the map of how carbon flows and cycles on Earth. All living things on Earth are made up of carbon that originated as CO_2 in our atmosphere.



STEP BY STEP

- Step 1: As mentioned before, in order to grow, plants use carbon in the form of carbon dioxide, combined with water and sunlight, to create sugars and oxygen.
- Step 2: Animals then eat plants and absorb the carbon as sugars and other compounds.
- Step 3: Animals perform cellular respiration, releasing the carbon as carbon dioxide into the atmosphere through their breath.
- Step 4: Completing the cycle, plants then absorb the carbon dioxide from the atmosphere once again during photosynthesis.

The carbon cycle can occur in long-term intervals. An example of this is dead organisms getting compressed over millions of years to form fossil fuels, which are then extracted and burned by humans, thereby releasing the stored carbon back into the atmosphere as carbon dioxide.

It also occurs in short-term intervals. An example of this is plants storing carbon during photosynthesis, getting eaten by consumers that are in turn eaten by higher consumers, which then release carbon dioxide during respiration, before eventually dying and being broken down by decomposers, such as fungi and bacteria, that cycle the carbon back into the system through decomposition.

3. Human Impact on the Carbon Cycle

Humans have also impacted the carbon cycle by releasing increased amounts of carbon dioxide gas into the atmosphere, which traps heat and water vapor.

In turn, the increased heat has caused ice caps and glaciers to melt, which has changed the temperature and salinity of oceans, raised sea levels, and affected climate and weather patterns.

In addition, deforestation and land development have reduced the total amount of carbon stored in vegetative life, resulting in increased levels of carbon dioxide in the atmosphere, which has affected Earth's carbon cycle.



SUMMARY

In this lesson, we learned about **photosynthesis**, the foundational process that provides energy for all life on Earth. We also learned about the **carbon cycle** and how carbon flows and cycles on Earth. Lastly, we learned about the **human impact on the carbon cycle**.

Source: THIS TUTORIAL WAS AUTHORED BY JENSEN MORGAN FOR SOPHIA LEARNING. PLEASE SEE OUR [TERMS OF USE](#).



ATTRIBUTIONS

- [Photosynthesis](#) | Author: At09kg | License: Creative Commons Attribution-Share Alike 3.0 Unported
- [Carbon cycle](#) | Author: Mrs. McComas | License: Creative Commons Attribution-Share Alike 4.0 International



FORMULAS TO KNOW

Photosynthesis

