

# PHOTOSYNTHESIS

**Photosynthesis**, the process by which green plants and certain other organisms transform light energy into chemical energy. During **photosynthesis** in green plants, light energy is captured and used to convert water, carbon dioxide, and minerals into oxygen and energy-rich organic compounds.

There are two types of photosynthetic processes: oxygenic photosynthesis and anoxygenic photosynthesis. The general principles of anoxygenic and oxygenic photosynthesis are very similar, but oxygenic photosynthesis is the most common and is seen in plants, algae and cyanobacteria

During oxygenic photosynthesis, light energy transfers electrons from water (H<sub>2</sub>O) to carbon dioxide (CO<sub>2</sub>), to produce **carbohydrates**. In this transfer, the CO<sub>2</sub> is "reduced," or receives electrons, and the water becomes "oxidized," or loses electrons.

Ultimately, oxygen is produced along with carbohydrates.

Oxygenic photosynthesis functions as a counterbalance to respiration by taking in the carbon dioxide produced by all breathing organisms and reintroducing oxygen to the atmosphere.

On the other hand, anoxygenic photosynthesis uses electron donors other than water. The process typically occurs in bacteria such as **purple bacteria** and **green sulfur bacteria**, which are primarily found in various aquatic habitats.

"Anoxygenic photosynthesis does not produce oxygen — hence the name," said **David Baum**, professor of botany at the University of Wisconsin-Madison. "What is produced depends on the electron donor. For example, many bacteria use the bad-eggs-smelling gas hydrogen sulfide, producing solid sulfur as a byproduct." Though both types of photosynthesis are complex, multistep affairs, the overall process can be neatly summarized as a chemical equation.

Oxygenic photosynthesis is written as follows:



Similarly, the various anoxygenic photosynthesis reactions can be represented as a single generalized formula:

