


Photosynthesis,  «FOH tuh SIHN thuh sihs or FOH toh SIHN thuh sihs», is a food-making process that occurs in green plants. Photosynthesis is the chief function of leaves. The word *photosynthesis* means *putting together with light*.

Green plants use energy from light to combine carbon dioxide and water to make food. All our food comes from this important energy-converting activity of green plants. Light energy is converted to chemical energy and is stored in the food that is made by green plants. Animals eat the plants, and we eat animal products as well as plants.

The light used in photosynthesis is absorbed by a green pigment called *chlorophyll*. Each food-making cell in a plant leaf contains chlorophyll in small bodies called *chloroplasts*. In chloroplasts, light energy causes water drawn from the soil to split into molecules of hydrogen and oxygen. In a series of complicated steps, the hydrogen combines with carbon dioxide from the air, forming a simple sugar. Oxygen from the water molecules is given off in the process. From sugar—together with nitrogen, sulfur, and phosphorus from the soil—green plants can make starch, fat, protein, vitamins, and other complex compounds essential for life. Photosynthesis provides the chemical energy needed to produce these compounds.

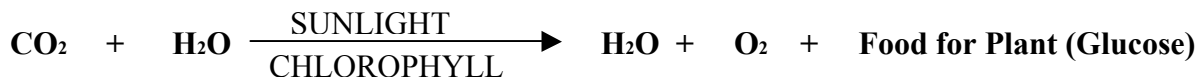
Certain bacteria and algae can also capture light energy and use it to make food. For example, *photosynthetic bacteria* contain chlorophyll in tiny bodies called *chromatophores*. In chromatophores, compounds other than water are combined with carbon dioxide to form sugar. No oxygen is released.

Green plants convert carbon dioxide and water into food and oxygen. Plants and animals, in turn, "burn" the food by combining it with oxygen to release energy for growth and other activities of life. This process, which is called *respiration*, is the reverse of photosynthesis. Oxygen is used up and carbon dioxide and water are given off. Plants then use the carbon dioxide and water to produce more food and oxygen. The cycle of photosynthesis and respiration maintains the earth's natural balance of carbon dioxide and oxygen.

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Cellular Respiration

Respiration in cells involves a series of chemical reactions that occur in the presence of oxygen. These reactions release energy from food substances and make it available so that the cells can function.

Cells can obtain some energy without oxygen by a chemical process called *glycolysis*. Glycolysis converts molecules of *glucose* (a simple sugar) into smaller molecules called *pyruvic acid*. This action releases energy, which is captured in a compound known as *adenosine triphosphate (ATP)*. ATP is very important because it supplies energy to all cells. However, glycolysis produces only a small amount of ATP.

Cells require oxygen to obtain large amounts of ATP. When oxygen is present in a cell, pyruvic acid enters a series of chemical reactions called the *Krebs cycle*. During the cycle, energy is captured and passed on to a series of reactions called the *electron transport chain*. As a result of these reactions, carbon dioxide and water are formed and a great deal of energy is stored as ATP.

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