Why Do Plants Need Sunlight?

Plants are an essential part of most ecosystems on Earth. As producers, they are the base of most food chains. Countless insects, animals, and people rely on green plants as a food source. When we consume green plants, or animals that have eaten green plants, we take in the energy stored in those plants so that we can use it ourselves.

So the question is, where do green plants get the energy they store in their tissues—the same energy that is passed on to other organisms that eat the plants? Plants don't have mouths to eat food. They can't chase prey like a wolf or a lion can. They are literally rooted to the ground.

The solution is simple. Plants get their energy from the Sun. Like so many simple solutions, however, this one involves a more complex explanation. In this case, the process begins inside a tiny plant cell and grows from there.

Chlorophyll, which gives plant leaves their green color, absorbs energy from the Sun.

Inside many plant cells, especially those in a plant's leaves, is a substance known as **chlorophyll**. Chlorophyll is green, and it is responsible for giving plants their color. Chlorophyll is stored inside organelles called **chloroplasts**. When radiant energy from the Sun hits the surface of a plant's leaves, the chlorophyll absorbs some of the energy and converts it into a type of chemical energy in the form of sugar. This process is called ***photosynthesis***.

Through chemical reactions, photosynthesis uses the Sun's radiant energy to convert water and carbon dioxide into oxygen and glucose. Glucose is a type of simple sugar that living things use as food. Plants take in water and carbon dioxide from their environments. For example, a plant growing in a prairie will obtain carbon dioxide from the air around it. The plant will then obtain water from rainfall, whether the rain water soaks into the soil and is absorbed by roots or is caught on the plant's leaves. A variety of factors can impact a plant's functions.

The chemical reactions that make up photosynthesis are divided into two phases. Light is necessary for the first phase of

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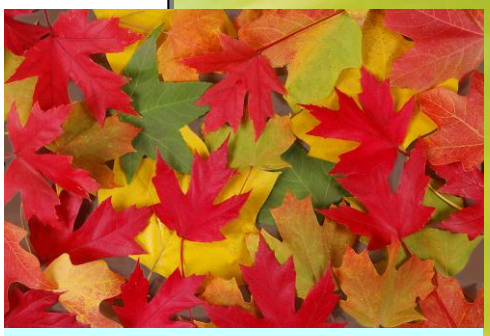
photosynthesis, which is simply referred to as the *light-dependent reaction* or *light reaction*. This is when sunlight is absorbed and used to make adenosine triphosphate (ATP), a chemical compound that stores energy. This reaction releases oxygen into the air that people and animals need to live.

The next part of photosynthesis does not need light, and takes place in a part of the chloroplast called the stroma. The *light-independent reaction* or *dark reaction* is when the chloroplast uses carbon dioxide and the ATP that was made during the light reaction to produce glucose.

Plants need very basic things to perform photosynthesis—light, water, carbon dioxide, and small amounts of other substances, such as phosphorus. What happens to a plant if one of these is not available? You might have noticed that when it doesn't rain for a long time, the grass and other plants in people's yards become yellow. That is because, without water, photosynthesis cannot take place.



When temperatures drop and less light is available, the green leaves of trees turn orange, yellow, and red.

The same thing is true of light. Without light, plants cannot perform photosynthesis, and their green color fades. If you have ever put a plant into a dark place, you might have observed this effect.

It is interesting to note that in places with four seasons, leaves change color as the days become shorter in autumn. With less sunlight available, the chlorophyll stops performing photosynthesis. The leaves begin to lose their green color. Yellow and orange carotenoids (the same chemicals that make carrots orange) that are already in the leaves begin to show through. Some trees may also begin to produce a red substance called anthocyanin (which gives the red color to strawberries and cranberries) as temperatures drop, adding to the variety of fall colors.