

Website 'Photosynthesis Education'

<http://photosynthesiseducation.com/photosynthesis-for-kids/>

## What is Photosynthesis?

The word photosynthesis can be separated to make two smaller words:

“photo” which means light

“synthesis” which means putting together

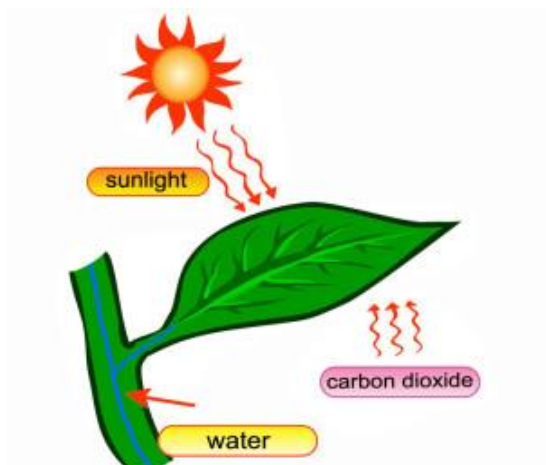
Plants need food but they do not have to wait on people or animals to provide for them. Most plants are able to make their own food whenever they need it. This is done using light and the process is called photosynthesis.

**Photosynthesis is the process by which plants make their own food.** We will add more details to this definition after making a few things clear as you will see below.

## To make food plants need:

- carbon dioxide
- water
- sunlight

Let's take a look at how these are collected by plants.



- Carbon dioxide from the air passes through small pores (holes) in the leaves. These pores are called stomata.
- Water is absorbed by the roots and passes through vessels in the stem on its way to the leaves.
- Sunlight is absorbed by a green chemical in the leaves.

# The Process of Photosynthesis

Photosynthesis takes place in the leaves of plants. The leaves are made up of very small cells. Inside these cells are tiny structures called **chloroplasts**. Each chloroplast contains a green chemical called **chlorophyll** which gives leaves their green color.

- Chlorophyll absorbs the sun's energy.
- It is this energy that is used to [split water molecules into hydrogen and oxygen](#).
- Oxygen is released from the leaves into the atmosphere.
- Hydrogen and carbon dioxide are used to form glucose or food for plants.

Some of the glucose is used to provide energy for the growth and development of plants while the rest is stored in leaves, roots or fruits for later use by plants.

Here is the process in greater detail:

Photosynthesis occurs in two stages commonly known as Light dependent Reactions and the Calvin Cycle.

## Light dependent Reactions

Light dependent reactions occur in the thylakoid membrane of the chloroplasts and take place only when light is available. During these reactions light energy is converted to chemical energy.

- Chlorophyll and other pigments absorb energy from sunlight. This energy is transferred to the [photosystems responsible for photosynthesis](#).
- Water is used to provide electrons and hydrogen ions but also produces oxygen. Do you remember what happens to the oxygen?
- The electrons and hydrogen ions are used to create ATP and NADPH. ATP is an energy storage molecule. NADPH is an electron carrier/donor molecule. Both ATP and NADPH will be used in the next stage of photosynthesis.

## The Calvin Cycle

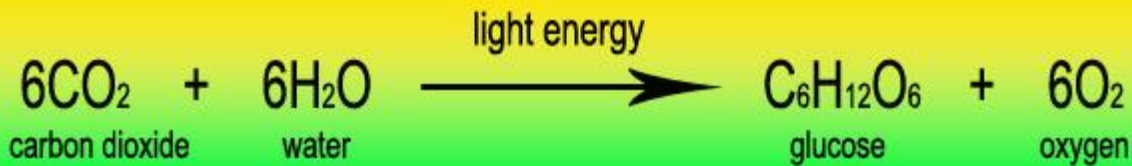
The Calvin Cycle reactions occur in the stroma of the chloroplasts. Although these reactions can take place without light, the process requires ATP and NADPH which were created using light in the first stage. Carbon dioxide and energy from ATP along with NADPH are used to form glucose.

## What have you learned so far?

You already know that plants need carbon dioxide, water and sunlight to make their food. You also know that the food they make is called glucose. In addition to glucose, plants also produce oxygen. This information can be written in a word equation as shown below.



The equation below is the same as the one above but it shows the chemical formula for carbon dioxide, water, glucose and oxygen.



**Now back to the definition...** Earlier you learned that photosynthesis is the process by which plants make their own food. Now that we know what plants need to make food, we can add that information as shown below.

**Photosynthesis is the process by which plants make their own food using carbon dioxide, water and sunlight.**

## Why is Photosynthesis Important?

Photosynthesis is important because it provides two main things:

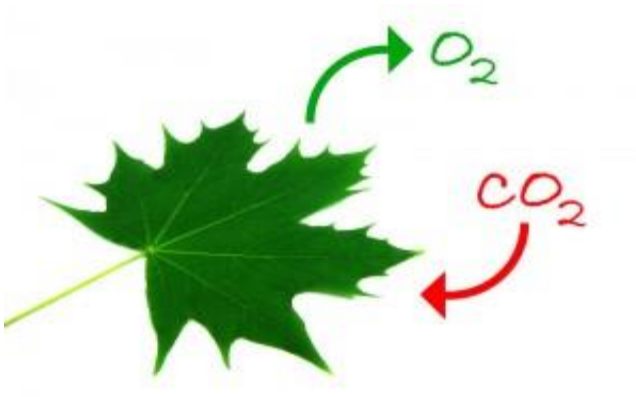
- food
- oxygen

Some of the glucose that plants produce during photosynthesis is stored in fruits and roots. This is why we are able to eat carrots, potatoes, apples, water melons and all the others. These foods provide energy for humans and animals.

Oxygen that is produced during photosynthesis is released into the atmosphere. This oxygen is what we breathe and we cannot live without it.

While it is important that photosynthesis provides food and oxygen, its impact on our daily lives is far more extensive. Photosynthesis is so essential to life on earth that most living organisms, including humans, cannot survive without it.

All of our energy for growth, development and physical activity comes from eating food from plants and animals. Animals obtain energy from eating plants. Plants obtain energy from glucose made during photosynthesis.



Our major sources of energy such as natural gas, coal and oil were made millions of years ago from the remains of dead plants and animals which we already know got their energy from photosynthesis.

Photosynthesis is also responsible for balancing oxygen and carbon dioxide levels in the atmosphere. Plants absorb carbon dioxide from the air and release oxygen during the process of photosynthesis.