

Learn the photosynthesis formula

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Image 1. In plants, photosynthesis occurs mainly within the leaves. Photo from the public domain

All living things need energy. Humans get energy from food. Plants, algae and some types of bacteria can take in energy straight from the sun. They do this through a process called photosynthesis.

Photosynthesis Equation

Photosynthesis takes energy from sunlight and turns it into chemical fuel. The fuel is stored as molecules such as glucose, a kind of sugar.

Plants need three ingredients for photosynthesis. They are carbon dioxide, water and sunlight. Carbon dioxide is a gas that is naturally found in the air. It is also produced by burning fossil fuels such as coal or gasoline for energy.

Molecules are groups of atoms. Water molecules are represented as H_2O because water contains two hydrogen atoms and one oxygen atom. CO_2 represents carbon dioxide, a molecule that contains one carbon and two oxygen atoms. Scientists use equations to show what happens to molecules during chemical processes. The chemical equation for photosynthesis looks like this:

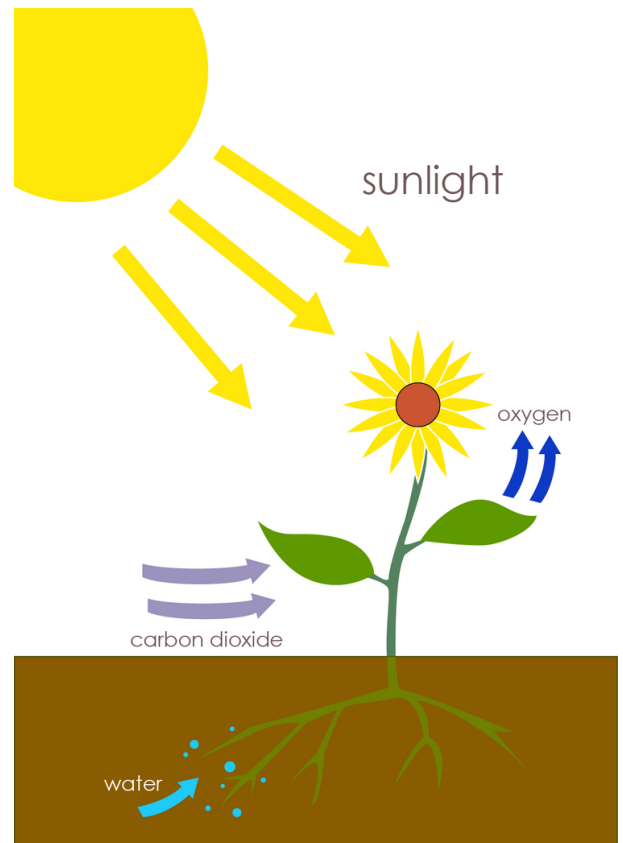
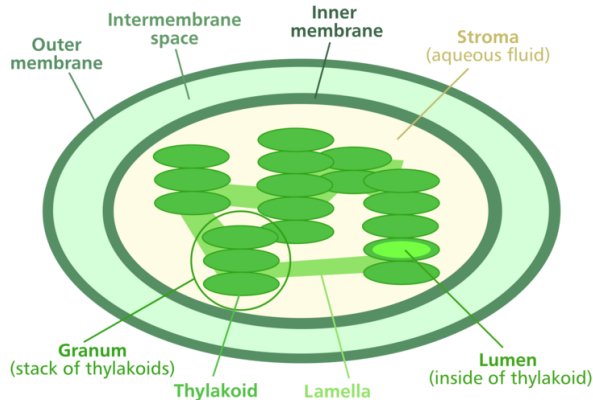


The number before each molecule is the number of molecules used in the reaction. What it means is that six carbon dioxide molecules (6CO_2) and six water molecules ($6\text{H}_2\text{O}$) are used up. Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) and six oxygen molecules (6O_2) are left over.

Photosynthesis In Plants

In plants, photosynthesis happens in the chloroplasts. Chloroplasts are mostly found on leaves.

A



chloroplast is made of several parts. The key is a chemical called chlorophyll. It takes in the energy from sunlight and is also what gives plants their green color.

Water and carbon dioxide make their way to the leaves, too. Leaves can take in carbon dioxide from the air through tiny holes called stomata and water is taken up by a plant through its roots.

Stages Of Photosynthesis

Photosynthesis happens in two stages, which are the light reactions and the dark reactions.

Light reactions are set off by sunlight. Two important molecules, ATP and NADPH, are created and both of these molecules store energy.

ATP and NADPH are then used to start the dark reactions. These reactions make sugar.

The reactions can be repeated again and again.

Photosynthesis Summary

Photosynthesis is how plants use the sun's energy. The process turns that energy into sugar. Sugar is the fuel that gives plants energy to grow.

There are two main stages to the process – light reactions and the dark reactions. The light reactions turn light into energy (ATP and NADHP) and the dark reactions use the energy and carbon dioxide to make sugar.

This energy can spread to us, too. The next time you eat a piece of fruit, notice how you get a boost of energy afterward. It is energy from the sun, captured by photosynthesis.

Quiz

1 Read the selection from the section "Stages Of Photosynthesis."

Light reactions are set off by sunlight. Two important molecules, ATP and NADPH, are created and both of these molecules store energy.

What is the meaning of the word "reaction" as it is used in the selection above?

- (A) A response to something bad happening.
- (B) A cycle of changes that result in a new plant.
- (C) A process that changes molecules into something different.
- (D) A system plants use to survive when they do not have enough food.

2 Read the paragraph from the section "Photosynthesis Summary."

Photosynthesis is how plants use the sun's energy. The process turns that energy into sugar. Sugar is the fuel that gives plants energy to grow.

What is the meaning of the word "process" as it is used in the paragraph above?

- (A) A formal legal procedure that requires certain steps.
- (B) The result of the passing of time.
- (C) A group of passages that allow things in and out of a plant cell.
- (D) A series of events that transforms one thing into something else.

3 Use the three images and information from the article to select the TRUE statement below.

- (A) Both types of photosynthesis reactions require sunlight.
- (B) Plants need water, oxygen and sunlight to complete photosynthesis.
- (C) The stomata inside of leaves are what give plants their green color.
- (D) Photosynthesis produces oxygen as a byproduct.

4 Examine the image in the section "Photosynthesis In Plants" and read the selection below.

A chloroplast is made of several parts. The key is a chemical called chlorophyll. It takes in the energy from sunlight and is also what gives plants their green color.

How does the image support the information in the selection above?

- (A) It shows the numerous parts of a chloroplast.
- (B) It shows how carbon dioxide is absorbed through leaves.
- (C) It shows the ingredients needed for photosynthesis.
- (D) It shows the number of chloroplasts in a plant cell.