

# 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 right from the sun. They do so 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. It is naturally found in the air. It is also produced by burning fuels such as coal or gasoline for energy.

## Atoms In The Mix

Atoms are the smallest building blocks of matter. Molecules are groups of atoms. Water molecules are shown as  $H_2O$ . That is because water contains two hydrogen atoms and one oxygen atom. Carbon dioxide is a molecule that contains one carbon and two oxygen atoms. It is shown as  $CO_2$ .

Scientists use equations. They show what happens to molecules when a process happens. Photosynthesis is a process that changes molecules. The equation for photosynthesis looks like this:



It might look confusing. The number before each molecule is the number of molecules used. What it means is that six carbon dioxide molecules and six water molecules are used up. Glucose, which is  $\text{C}_6\text{H}_{12}\text{O}_6$ , and six oxygen molecules, which are  $6\text{O}_2$ , are made.

### Photosynthesis Makes Plants Green

In plants, photosynthesis happens in the leaves.

Plants have a chemical called chlorophyll. It takes in the energy from sunlight. Chlorophyll is also what makes plants green.

Water and carbon dioxide make their way to the leaves, too. Leaves can take in carbon dioxide from the air through tiny holes. These holes are called stomata. Water is taken up through the plants' roots.

### Stages Of Photosynthesis

Photosynthesis happens in two stages. By the light reactions and the dark reactions.

Light reactions need sunlight. Two important molecules are made. They are called ATP and NADPH. These molecules store and move energy.

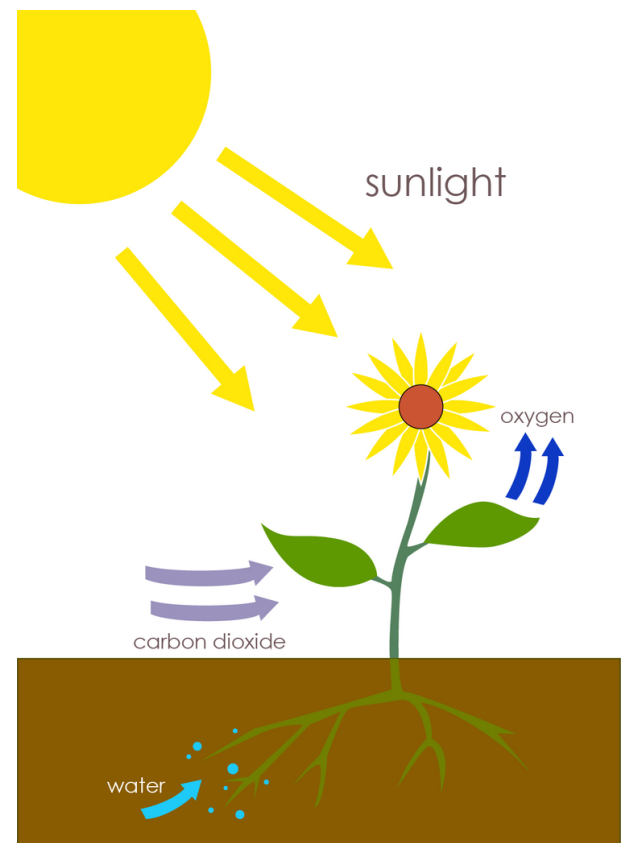
ATP and NADPH are then used to start the dark reactions. The dark reactions do not need sunlight. They can happen any time of day. These reactions make sugar. The reactions can be repeated again and again.

### Photosynthesis Summary

Photosynthesis is how plants use the sun's energy. The process turns that energy into sugar. Sugar is fuel for plants. It 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. 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. It is energy from the sun. It was captured by photosynthesis.



## Quiz

1 Read the selection from the section "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.*

Which word could replace "energy" WITHOUT changing the meaning of the sentence?

- (A) weakness
- (B) food
- (C) process
- (D) power

2 Read the selection from the section "Atoms In The Mix."

*Atoms are the smallest building blocks of matter. Molecules are groups of atoms. Water molecules are shown as H<sub>2</sub>O. That is because water contains two hydrogen atoms and one oxygen atom.*

Fill in the blank. A "molecule" is a \_\_\_\_\_.

- (A) part of an atom
- (B) way to write the names of atoms
- (C) group of water atoms
- (D) collection of connected atoms

3 Read the section "Photosynthesis Equation."

How does the diagram help the reader understand the process of photosynthesis?

- (A) By showing what is used and created in photosynthesis.
- (B) By contrasting how photosynthesis differs in many types of plants.
- (C) By expanding the photosynthesis equation.
- (D) By listing the steps in photosynthesis.

4 Read section "Photosynthesis Makes Plants Green."

What does the photograph at the top of the article in that section show about photosynthesis?

- (A) It explains what stomata are in plants.
- (B) It indicates where most photosynthesis takes place in plant cells.
- (C) It provides a closer look at chlorophyll in plants.
- (D) It demonstrates how water and carbon dioxide are used in photosynthesis.