

REINFORCEMENT 4.2: Overview of Photosynthesis

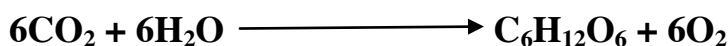
KEY CONCEPT The overall process of photosynthesis produces sugars that store chemical energy.

Some organisms, called producers, make their own carbon-based molecules, such as carbohydrates, that are broken down to make ATP. The process that many producers, including plants, use to make their own source of food is called photosynthesis. **Photosynthesis** is a process that captures energy from sunlight to make sugars that store chemical energy.

In plants, photosynthesis takes place in organelles called chloroplasts. Chloroplasts contain molecules, such as **chlorophyll**, that absorb energy from light. Most of a plant's chloroplasts are in leaf cells specialized for photosynthesis. Chloroplasts have two main parts used for photosynthesis: the grana, which contain disk-shaped structures called **thylakoids**, and the stroma, which is the fluid that surrounds the grana. Photosynthesis takes place in two main stages.

- The first stage is called the light-dependent reactions. In the **light-dependent reactions** chlorophyll absorbs energy from sunlight and water molecules are broken down. Energy is transferred to molecules such as ATP. Oxygen is released as a waste product.
- The second stage is called the light-independent reactions. In the **light-independent reactions** energy from the light-dependent reactions is used to build sugar molecules from carbon dioxide.

The overall, simplified chemical equation for the photosynthesis process is:



1. What is photosynthesis?

2. Where does photosynthesis take place in plants?

3. What happens during the light-dependent reactions?

4. What happens during the light-independent reactions?

5. What are the reactants and the products of photosynthesis?

Section Quiz 4.2: Overview of Photosynthesis

Choose the letter of the best answer.

- _____ 1. Which of the following statements best describes the process of photosynthesis?
- Plants use oxygen to make simple sugars.
 - Chlorophyll builds sugars in the thylakoid membrane.
 - Light breaks down water molecules and releases carbon dioxide.
 - Chloroplasts absorb sunlight and store chemical energy.
- _____ 2. What is the term for an organism that makes its own source of chemical energy?
- decomposer
 - producer
 - chloroplast
 - protist
- _____ 3. The main light-absorbing molecules found in plant leaves are called
- chloroplasts.
 - thylakoids.
 - chlorophyll.
 - grana.
- _____ 4. The function of the light-dependent reactions is to
- build sugars.
 - capture and transfer energy.
 - release carbon dioxide.
 - form water molecules.
- _____ 5. The light-independent reactions of photosynthesis need
- carbon dioxide.
 - oxygen.
 - water.
 - cellulose.