

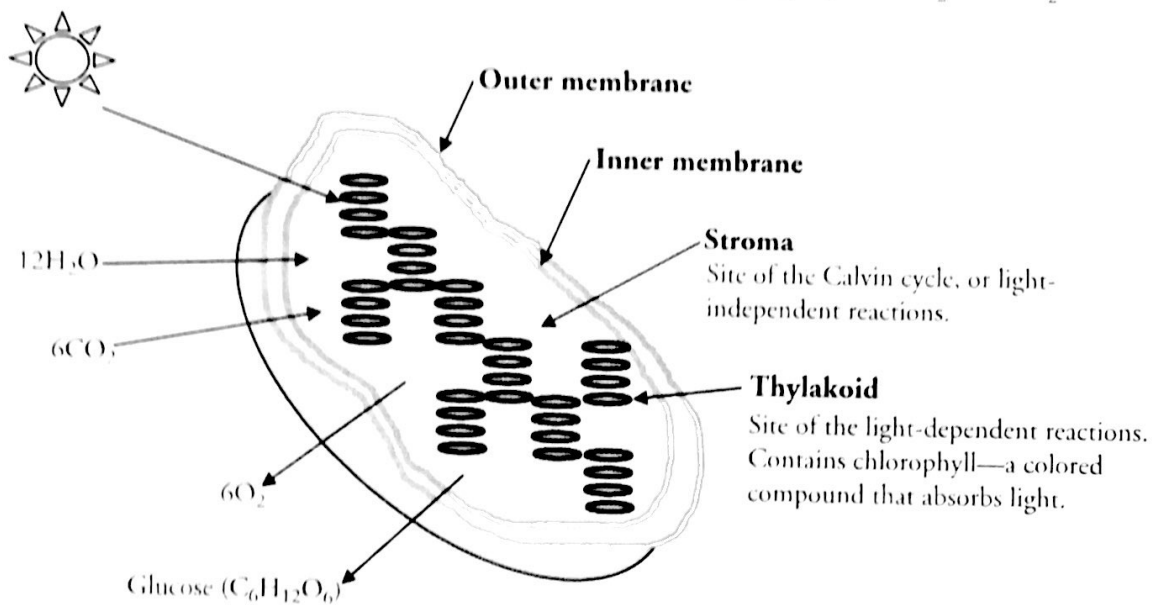
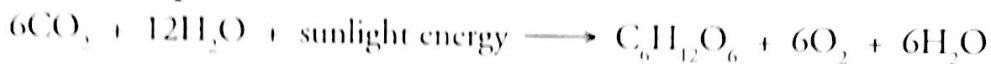
# Photosynthesis

How do light-dependent and light-independent reactions provide food for a plant?

## Why?

Plants are the original solar panels. Through photosynthesis a plant is able to convert electromagnetic (light) energy into chemical energy. This energy is used not only to keep the plant alive, but also to sustain all creatures that rely on the plant for food and shelter. Plants and photosynthetic algae are also the source of all oxygen on Earth, allowing the inhabitants of Earth to benefit from our most plentiful renewable energy resource.

## Model 1 – Chloroplast



1. Consider the organelle illustrated in Model 1.
  - a. What is the name of this organelle?
  - b. Is this organelle more likely to be found in animal cells or plant cells?
2. The structures inside the organelle in Model 1 are called thylakoids. What compound necessary for photosynthesis is contained in the thylakoids?

3. Consider the chemical reaction in Model 1. This represents photosynthesis.
  - a. What substances are the reactants in photosynthesis? Include the name and chemical formula of each substance in your answer.
  - b. Where in the organelle are these molecules stored before they are used in photosynthesis?
  - c. Is photosynthesis an endergonic or exergonic reaction? Support your answer with evidence from Model 1.
  - d. What is the energy source for photosynthesis?
4. Photosynthesis occurs in two parts—the **light-dependent reactions** and the **light-independent reactions**.
  - a. What is another name for the light-independent reactions?
  - b. In what part of the chloroplast do the light-dependent reactions occur?
  - c. In what part of the chloroplast do the light-independent reactions occur?
5. Considering your answers to Question 4, what compound is best able to absorb the light energy from the Sun and convert it into chemical energy?
6. What substances are produced during photosynthesis? Include the name and chemical formula of each substance in your answer.
7. Why is it necessary to have six  $\text{CO}_2$  entering the chloroplast?

