Lesson Two

# How Do Green Cells Make Food?

## Exploring Science

**Farming the Sea.** Did you know that one kind of algae is used in ice cream? Other algae are dried and eaten. Some can be ground up into flour. And some algae can be used to make a fuel gas to burn. Some day you may use this gas to heat your house.

Algae are plant-like organisms that live and grow in ponds, lakes, and streams. Algae are the green organisms you see growing in a fish tank. Fish eat algae. Many other sea animals do too. Algae, as you have just read, are even eaten by people as food.

Algae cover the corals in a tank at the Smithsonian Museum in Washington, D.C. You can get a close-up view. So can scientists. They study the life of the algae and the rest of a coral reef community. It is the first such community ever set up away from the sea. What kinds of things are scientists finding out?

Scientist Susan Brawley has studied the way algae grow. She watched fish eat the tops of algae. Then she observed how long it takes for the algae to grow back. They grew back very fast. Huge amounts of algae can be grown quickly.

Scientists are studying algae to find a fast way to grow certain kinds of food. Some scientists have been "farming" algae. They have been growing algae in a special way in the sea.

● Explain why scientists might want to take algae along with them as a food source on a trip into space.

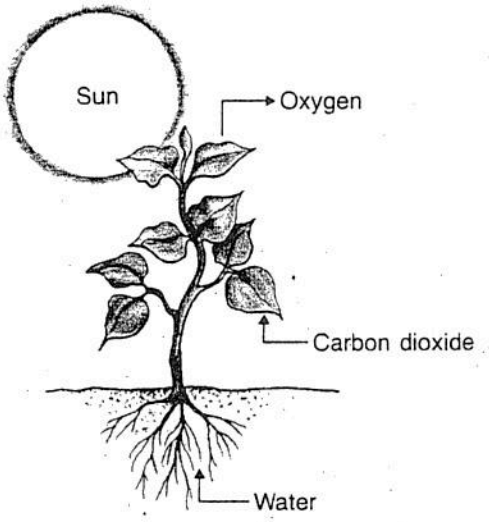
## How Green Cells Make Food

Algae can make their own food. So can plants and other green organisms. How can they do this? To find out, you must look inside the cells of green organisms.

A cell of a green organism is different from the cell of an animal. A green cell has a green compound, called **chlorophyll** (KLOHR-uh-fil), inside it. Chlorophyll makes it possible for cells to make food. Structures called **chloroplasts** (KLOHR-uh-plasts) contain the chlorophyll.

A green cell needs more than chlorophyll to make food. It also needs two materials. One material is carbon dioxide from the air. Another material is water.

Chlorophyll traps light from the sun. It uses light energy to change carbon dioxide and water into food. The light energy is changed into energy that is stored in a simple sugar. This is the food that the green cell makes.




Green plants need three things to make food: light, water, and carbon dioxide. The "waste product" is oxygen.

Changing carbon dioxide and water into sugar in the presence of sunlight is called **photosynthesis** (foh-tuh-SIN-thih-sus). *Photo* means "light." In photosynthesis, the light is from the sun. *Synthesis* means "putting together." In photosynthesis, carbon dioxide and water are put together by light.

We can show this process by using an **equation** (ih-KWAY-zhun). The first equation below uses words to tell the story. The second uses symbols. See if you can follow both equations. The arrows in the equations mean "makes" or "gives." Notice the numbers in front of the formula for some compounds. These numbers tell how much of each compound is used.

Carbon dioxide + Water + Light energy $\xrightarrow{\text{with chlorophyll}}$ Sugar (with stored energy) + Oxygen

$6\,CO_2 + 6\,H_2O$ + Light energy $\xrightarrow{\text{with chlorophyll}}$ $C_6H_{12}O_6 + 6\,O_2$

## Review

I. Choose from this list the word that fits best.

**energy** **chlorophyll** **photosynthesis** **chloroplasts** **oxygen** **sugar** **light** **carbon dioxide**

The green substance in a plant cell is _____. A food that a plant makes is _____. The plant makes food by the process of _____. To make food, a plant needs carbon dioxide, water, and _____. Chlorophyll in a green organism can be found in _____. Animals eat green plants and other green organisms to get _____.

II. Choose the answer that best completes each sentence. Write the letter of the answer in the blank.

**A.** Chlorophyll uses light energy to change carbon dioxide and water into

(a) nitrogen (b) food (c) chloroplasts _____

**B.** Plants and other green organisms store energy

in (a) sunlight (b) sugar (c) carbon dioxide _____

III. Explain why some animals need to eat green plants.

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