

UNIT 6: FOOD AND NUTRITION

ACTIVITY 6-1: How Plants Make Food

FACTS AND IDEAS

You have already learned that green plants use the energy of sunlight to make **glucose**, a kind of sugar, in their leaves. In this lesson you will find out how they do it.

Most of the cells in a leaf have green specks called chloroplasts, which contain **chlorophyll**. Chlorophyll can absorb the energy of light and become charged up or energized like a rechargeable battery. One of the things that the energized chlorophyll can do is to split water molecules (H_2O) into hydrogen and oxygen. Some of the energy is then used to combine hydrogen (H) and carbon dioxide (CO_2) into a molecule of glucose ($C_6H_{12}O_6$). The process of making glucose with the energy of light is called **photosynthesis**.

The water for photosynthesis comes from the soil. It is absorbed by the roots and travels up the xylem of the stem and into the veins of the leaf. Carbon dioxide for photosynthesis comes from the air. It enters the leaf through its stomates, the small openings in the epidermis. When the water is split by the energized chlorophyll, only the hydrogen is used in making glucose. The oxygen escapes to the air through the stomates.

Some of the glucose made in the leaves is carried by phloem tissue to all the other parts of the plant. During the day, the leaves usually make more glucose than the plant needs. The extra glucose molecules are joined together in the plant cells to make large molecules called **starch**. The starch is stored in the leaves, stems, and roots until it is needed.

During photosynthesis, the energy of light becomes stored as **chemical energy** in glucose. When a cell needs energy for its life functions, it gets it from glucose. The glucose is broken down into carbon dioxide and hydrogen. The hydrogen then combines with oxygen from the air to form water. This process is called **cellular respiration**. Can you see that it is the opposite of photosynthesis? In photosynthesis, water and carbon dioxide are used to produce glucose and oxygen. Energy is stored in the glucose. In respiration, glucose and oxygen are used to produce water and carbon dioxide. Energy is taken from the glucose.

QUESTIONS

Fill in each blank with the word or phrase that will make the sentence true. Use the words and phrases below.

battery starch chloroplasts glucose photosynthesis
water cellular respiration energized

- The green specks in food-making cells of plants are _____.
- Chlorophyll can be compared to a _____.
- Chlorophyll is _____ by the energy of sunlight.
- The energy of chlorophyll splits _____ molecules into hydrogen and oxygen.
- Certain plant cells combine glucose molecules and store them as _____.
- A process that takes oxygen from the air is _____.
- A process that adds oxygen to the air is _____.
- During cellular respiration, the chemical energy of _____ is released for life activities.

WORD ACTIVITY

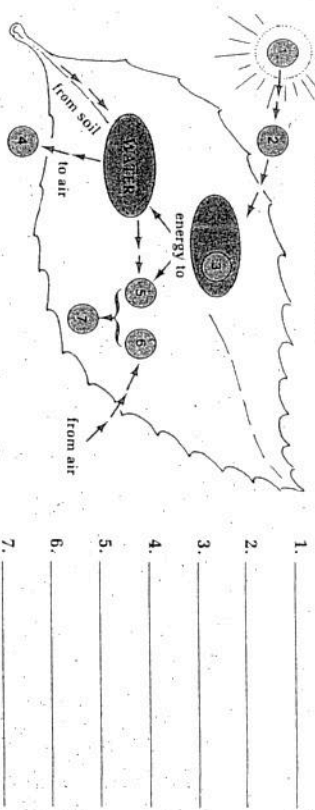
Unscramble the letters to form science words used in this lesson and write the words on the lines. Then write the number of each word on the line next to its clue or definition.

- ucgseeol _____ a. gives up oxygen to the air during photosynthesis
- rawte _____ b. enters the stomates
- racno xidetiiv _____ c. green material that can become energized
- glunsih _____ d. large molecules made from glucose
- phyllchlorol _____ e. sugar that stores chemical energy
- charstl _____ f. source of energy

DIAGRAM STUDIES

A. For each numbered part of the photosynthesis diagram, select the correct term from the following list. Write the term on the line that has the same number as the part in the diagram.
 carbon dioxide chlorophyll glucose hydrogen light energy oxygen sun

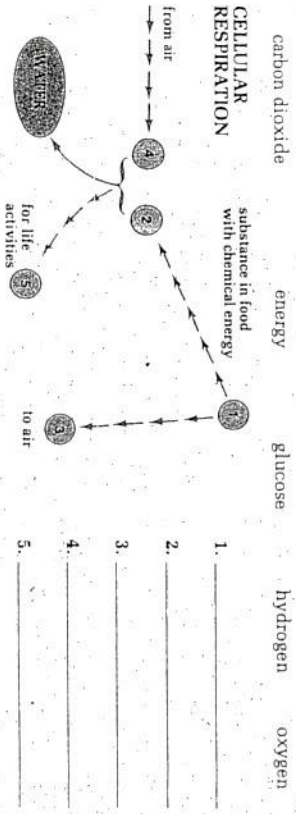
PHOTOSYNTHESIS



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

B. For each numbered part of the cellular respiration diagram, select the correct term from the following list. Write that term on the line that has the same number as the part in the diagram.

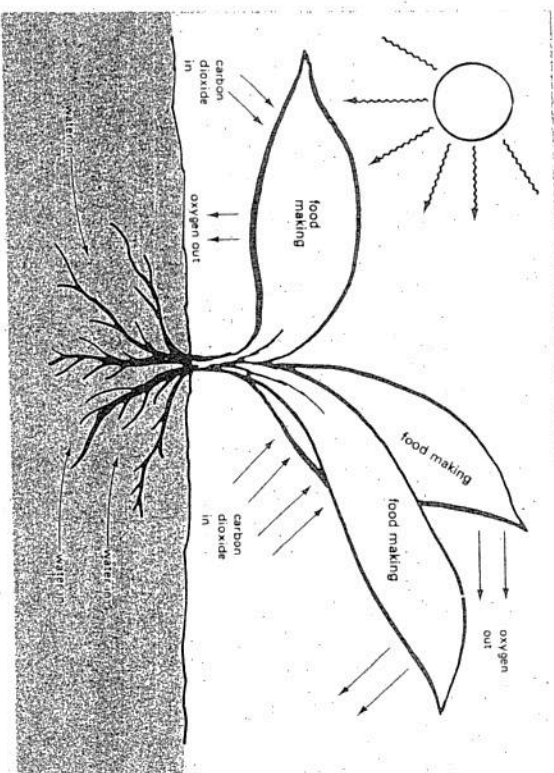
CELLULAR RESPIRATION



- carbon dioxide energy glucose hydrogen oxygen
1. _____
 2. _____
 3. _____
 4. _____
 5. _____

ABOUT PHOTOSYNTHESIS

This picture shows photosynthesis taking place. Photosynthesis takes place in green plants only. When green plants are in sunlight, this is what happens:
 water plus carbon dioxide makes plant food (glucose) and waste gas (oxygen).
 Look at the picture and then answer the following questions about photosynthesis.



1. Does photosynthesis take place in the leaves or in the roots? _____
2. What two materials are needed for photosynthesis? _____
3. What else is needed for photosynthesis? _____
4. Where does the carbon dioxide gas come from? _____
5. What are the two things that photosynthesis makes? _____
6. What does a plant make as food? _____
7. What does a plant make as waste gas? _____
8. What living things use the waste gas? _____