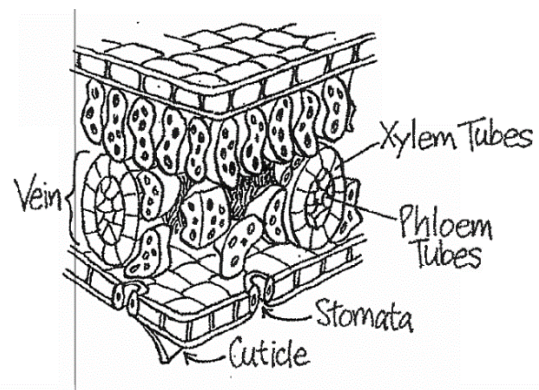
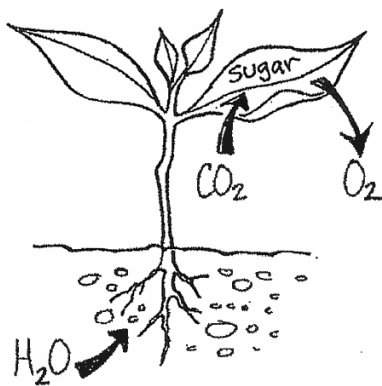


## Photosynthesis Reading

Of all the living things in our natural world, green plants are the only things that can make their own food. This process is called photosynthesis. Synthesis means “putting together or making something.” The prefix “photo” means light. Therefore, the word photosynthesis means “to make something with light.”

In order for photosynthesis to happen, four elements must be present. They are chlorophyll, carbon dioxide, water and solar energy. All plants contain chlorophyll. This is a green pigment (color) found mainly in the leaves. Chlorophyll is what gives a plant its color. Carbon dioxide is a gas in the air. It enters the leaves through very tiny openings called stomata. The stomata are mainly found on the underside of the leaves. Plants absorb water through their roots. The water is carried up to the leaves and other parts of the plant through special tubes, called xylem. The xylem tubes can be thought of as “up elevators” because they carry water and minerals up the plant. The solar energy comes from the sun.



There are many steps that take place during photosynthesis. The first is for the chlorophyll to trap the sun’s energy. Then, the carbon dioxide that enters the leaves is combined with the water. This makes a simple sugar and the extra oxygen is released from the plant. The simple sugar travels to all parts of the plant through special tubes called phloem. You can think of the phloem tubes as “down elevators” because their job is to carry food that is made in the leaves down to other parts of the plant, including the stem and roots. The phloem tubes and the xylem tubes are bundled together to form the veins in the plant.

The simple sugar actually helps to create some not-so-simple things. Some of the simple sugar that is made in the leaves provides energy for the plant to grow. Some of it is stored as starch. When an animal or a person eats these plant parts, they are also consuming the extra energy from the starch. For example, when you eat a salad, your body receives energy from the lettuce. The simple sugar can also be changed into fats. Proteins form when minerals that contain nitrogen compounds combine with the sugar. In this way, a green plant can make all of the chemical compounds that it needs to grow and stay healthy. Plants use proteins and fats to create cells for growth and support and to produce seeds and fruits.

The oxygen that plants give off is essential for us to have clean air to breathe. The stomata release oxygen the plant does not need, as well as excess water. Plants usually take in more water than they need. They return the extra water to the environment in the form of water vapor. Plants in tropical rain forests release large amounts of water vapor. This release is how a plant “sweats.” The process is called transpiration. Specialized cells, called guard cells, surround the stomata. The guard cells control the amount of water vapor that passes out of a plant’s leaves. The guard cells keep the stomata wide open, which allows water to freely leave the plant. When the plant does not have enough water, the guard cells close the stomata opening to slow down the evaporation of water.

We could not live without plants because they are the only natural organisms that can undergo their complex energy change known as photosynthesis. Through the process of photosynthesis, plants give us energy and food, replenish the earth’s freshwater supply, and promote clean air. Also, researchers have found that by simply adding a few plants to classrooms, offices and homes, people get sick less often.

#### Reading Questions

1. What does the word **photosynthesis** mean?
2. What are the four elements that must be present in order for photosynthesis to occur?
3. What is transpiration?
4. What are the “down elevators” and what do they do?
5. What role do the stomata play in photosynthesis?
6. How does photosynthesis affect all living things?
7. What would happen if one of the photosynthesis elements was not present?
8. What would happen if people cut down all of the rain forests in the world? How would that affect your life?