Hillermann's Kids' Club

How do plants make their food?

PHOTOSYNTHESIS:

Learn why plants are green and how water is transported in plants.

- What happens inside plants when the sun is shining or when it is raining?
- How do plants in the desert survive?
- How important are plants to our environment?

Of all the organisms in the natural world, green plants are the only ones that manufacture their own food. This process is called **photosynthesis** and begins when light strikes the plant's leaves (both sunlight and artificial light can help this process). Cells in the plant's leaves, called **chloroplasts,** contain a green pigment called **chlorophyll**, which interacts with sunlight to split the water in the plant into its basic components.

Carbon dioxide enters the leaf through holes called **stomata** and combines with the stored energy in the chloroplasts through a chemical reaction to produce a simple sugar. The sugar is then transported through tubes in the leaf to the roots, stems and fruits of the plants. Some of the sugar is used immediately by the plant for energy; some is stored as starch; and some is built into a more complex substance, like plant tissue or cellulose.

Fortunately for us, plants often produce more food than they need, which they store in stems, roots, seeds or fruit. We can obtain this energy directly by eating the plant itself or its products, like carrots, rice or potatoes. Photosynthesis is the first step in the food chain, which connects all living things. Every creature on earth depends to some degree on green plants. The oxygen that is released by the process of photosynthesis is an essential exchange for all living things. Forests have been called the "lungs of the earth" because animals inhale oxygen and exhale carbon dioxide in the process of breathing, and plants take in carbon dioxide and give off oxygen in the process of photosynthesis.

- **Chlorophyll**--A green substance that gives leaves their color. Chlorophyll absorbs energy from sunlight, which a plant uses to make food.
- **Chloroplast**--A plastid that contains chlorophyll and is the site where photosynthesis and starch formation occur.
- **Photosynthesis**--The formation of carbohydrates in the chlorophyll-containing tissues of plants exposed to light.
- **Stomata**--A very small hole in the surface of a leaf. Oxygen and carbon dioxide from the air enter through the stomata; oxygen, carbon dioxide and water vapor leave through the stomata.

Try the cool activity on the back of this page!

Photosynthesis Activity

LIGHTS OUT!

Discover what happens if you change the patterns of a plant's light source. Without enough sunlight, plants cannot use the process of photosynthesis to produce food.

Materials:
- **Small shrub, tree or house plant**
- **Cardboard or aluminum foil**
- **Scissors**
- **Paper clips**

1. Pick a shrub, tree or houseplant that you can use for an experiment.
2. Using the cardboard or aluminum foil, cut out some geometrical shapes like a circle, square or triangle. Make sure your shapes are big enough to make a patch that will cover nearly half of the plant leaf.
3. Paperclip each shape on a different leaf.
4. If you use a houseplant, place it near a south, west or east window were it will get plenty of sunlight. Make notes about the weather each day and add them to your observations.
5. After four days, remove the shapes from the leaves and observe each of the leaves that had a shape covering it.
6. Compare the areas on the leaf that were covered with the shape to other parts of the leaf.

Questions
1. What has happened to the leaves? Describe the effects that the lack of sunshine has on leaves. What has or hasn't happened in the different parts of the leaf?
2. What is the best environment for a houseplant? Why?
3. Where have you seen effects like these in nature?
4. Where would you expect to find fewer plants outside because of a lack of sunlight?

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