



*Dedicated
to Reducing
Pesticides*

Unit 4 Lesson 1: Let the Sun Shine In

Focus Areas: Plant Lifestyles; Science, Language Arts

Focus Skills: recognizing cause and effect, making observations, recording observations, comparing and contrasting, making inferences, drawing conclusions

Objectives

- To understand that plants need sunlight to produce chlorophyll
- To understand that green plants need chlorophyll to survive
- To recognize the importance of green plants to all other forms of life

Essential Questions

- Do plants need sunlight?
- What happens if plants don't get sunlight?
- Why are all other living things dependent on green plants?

Essential Understandings

- If plants do not get light, water, and nutrients, they will die.
- Chlorophyll, needed to keep green plants alive, is made only in light.
- Because green plants are the only living organisms capable of producing their own food, all other living organisms depend on them either directly or indirectly for survival.

Background

Green plants are the only living organisms that produce their own food. Light provides the energy to create a chemical reaction within specialized cells, known as chloroplasts, in the leaves. Chlorophyll present in the chloroplasts stores solar energy as chemical energy. The plants use this chemical energy during the process of photosynthesis to



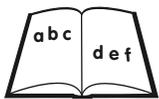
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produce simple sugars from water and carbon dioxide. These sugars are transported to other parts of the plant where they are either used as energy, formed into building blocks for growth, or stored. When animals (including us) eat green plants, we gain the benefits of these products within the plant.

In addition to the energy we gain from eating green plants (**primary consumption**) or animals that have eaten them as part of their diet (**secondary consumption**), we need plants to breathe! Oxygen is given off by green plants in the process of photosynthesis. Green plants are the lungs of the earth! All animals inhale oxygen and exhale carbon dioxide. Plants take in carbon dioxide and give off oxygen as they make food.



Vocabulary

chlorophyll	a green substance in the leaves of most plants that absorbs energy from light and stores it as chemical energy
photosynthesis	the process by which plants store energy to produce food
primary consumption	eating green plants
secondary consumption	eating an animal or product from an animal that eats green plants



Logistics

Time: two 20-minute sessions and time to check experiment during **Follow Up**

Group Size: 18 to 36

Space: comfortable seating, an open area to allow movement



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Materials

Izzy puppet *
Handout 1 "Plants for Breakfast" *
house plants
black construction paper
scissors
paper clips
science journals

* single copy provided

Preparation

1. Gather materials.
2. Make copies of Handout 1, "Plants for Breakfast."

Activity

Introduction

1. Place Izzy and a green plant side by side.
2. Izzy calls attention to the green plant and asks the children what he and the plant have in common. (Both need water, food, protection, can make more like themselves, breathe, are green!)
Note: Izzy can lead children to these facts.
3. Print the list on the board or chart paper.
 - a. Print the word **Chlorophyll** on the board.
 - b. Izzy explains that Chlorophyll is what makes the plant green and also helps the plant make food to grow.
 - c. Izzy points out that only green plants can make their own food.
 - d. Izzy asks why all animals depend on green plants to live.
[Animals eat plants (primary consumption) or they eat other animals that have eaten green plants (secondary consumption) as part of their diet.]





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4. a. Distribute Handout 1, “Plants for Breakfast,” and discuss how each breakfast food is related to green plants.
- b. Children indicate whether food comes from green plants directly or indirectly.
5. Izzy asks a volunteer to explain why green plants are the first link in the food chain. (All living things depend on green plants for food either directly or indirectly.)

Involvement

1. Izzy reviews why the ability of green plants to make their own food is very important to all other living things. (Either directly or indirectly, all living things depend on green plants for food.)
2. Izzy poses the question, “How does lack of light affect food production in green plants?”
3. Izzy tells the children that scientists keep journals when they conduct experiments to help them remember what happened. Distribute science journals to each child.
4. a. Print the word **Chlorophyll** on the board.
- b. Izzy explains that Chlorophyll is what makes the plant green, and that they are going to conduct an experiment to discover why Chlorophyll is important to green plants.
5. Give a plant to each team of students. (3 or 4 individuals)
 - a. Children cover $\frac{1}{2}$ of the green plant’s leaves (both upper surface and lower surface) with black construction paper and secure them so light can’t enter.
 - b. Place plant in a sunny spot and supply water as needed.
 - c. After a week, remove construction paper and observe results.
 - i. Compare the covered to the non-covered leaves.
 - ii. Discuss what effect lack of light had on the leaves.



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6. Children record results in their journals.
 - a. Hypothesize what effect this lack of sunlight had on the life of the plant.
 - b. Speculate on:
 - i. What will happen if some of the test plants are denied all light?
 - ii. What will happen if some of the test plants are given full light?
7. Children write their speculations in a science journal.

Follow Up

1. Divide the test plants into two groups.
2. Put $\frac{1}{2}$ the plants in a dark place and the other $\frac{1}{2}$ in a sunny spot.
3. Water both groups.
4. Check on the health of the plants every other day.
5. Children record results in their journals.
6. After two weeks, discuss the results.
 - a. Was water enough to keep plants healthy?
 - b. What else do plants need to stay healthy?
7. In their journals, the students write conclusions on the importance of sunlight to green plants.
8. Print the word **Photosynthesis** on the board, and tell the students that:
 - a. Photosynthesis is the process that green plants use to produce food.
 - b. Chlorophyll is needed for Photosynthesis.
 - c. Ask what is needed by plants to make Chlorophyll. (light)



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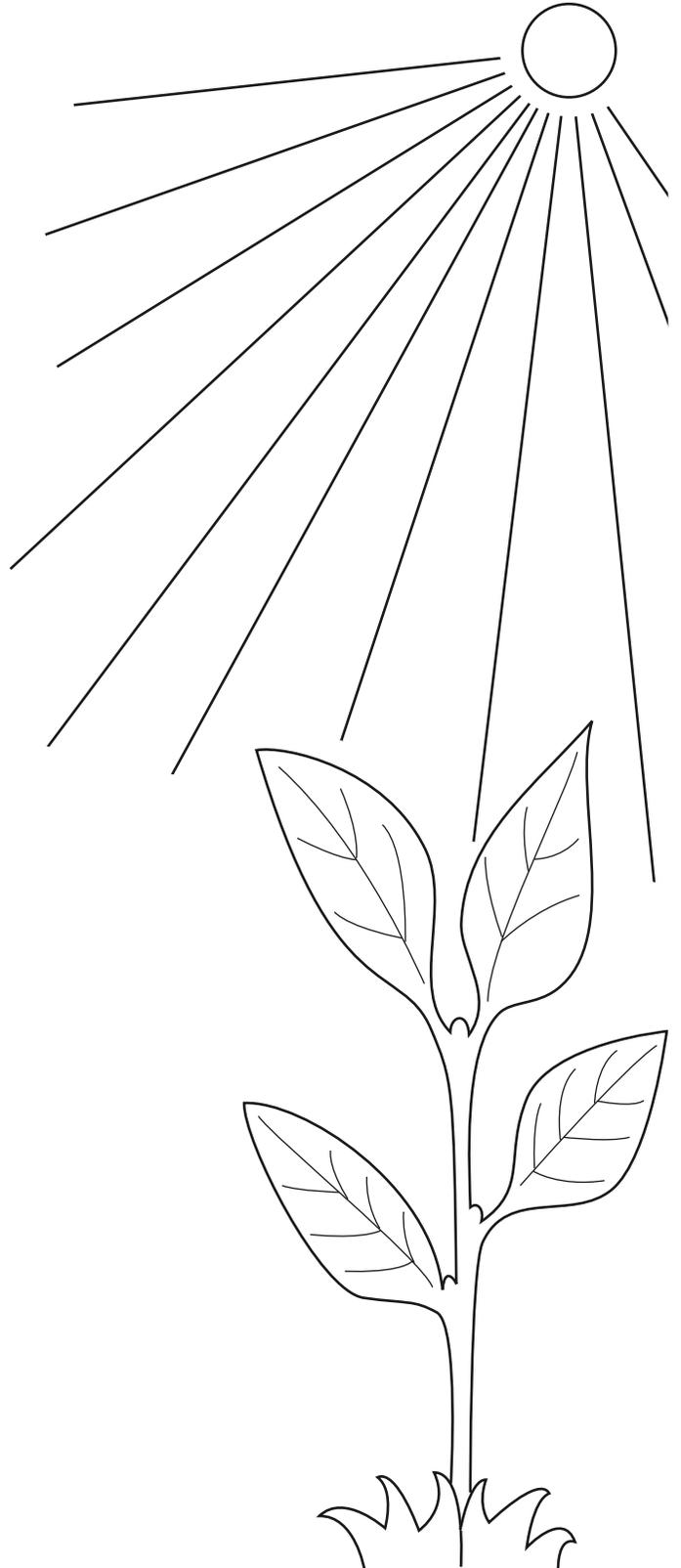
9. Sing the following to the tune of “*You Are My Sunshine.*”

Green plants love sunshine, green plants need sunshine
Without the sunshine, plants can't survive!
When they have sunshine, plants have Chlorophyll
Plants need this to pho-to-syn-the-size!



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Notes





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