Unit 3 Section 2 Lesson 1: Earth: Planet of Plants

Focus Areas: Plant Biology, Science, Language Arts, Geography
Focus Skills: reading for information, summarizing, critical thinking, cooperative learning, expository writing, oral presentation

Objectives

- To understand the interdependency of plants and animals
- To identify the ways that plants survive in diverse environments

Essential Questions

- Where are plants found in the world?
- How are plants used by humans and other animals?
- Why are plants vital to life on the Earth?
- How do plants adapt to various ecosystems?

Essential Understandings

- Plants grow on every continent.
- Plants are used by people for building materials, drugs, clothing, and form the basis of the food chain of the planet.
- Animals use plants for food and shelter.
- Plants are the basis of life on Earth because green plants produce their own food and provide food for all other living things.
- Plant size, leaves/needles, root systems, protective adaptations, and method of seed production and dispersal are all adaptations to the ecosystem in which they are found.

Background

There are millions of different kinds of plants that have adapted to live all over the Earth. In fact, there are more species of plants on the planet than any other living thing, except insects. Fossil evidence has revealed that plants first appeared on the Earth about 433 million years ago. Unlike

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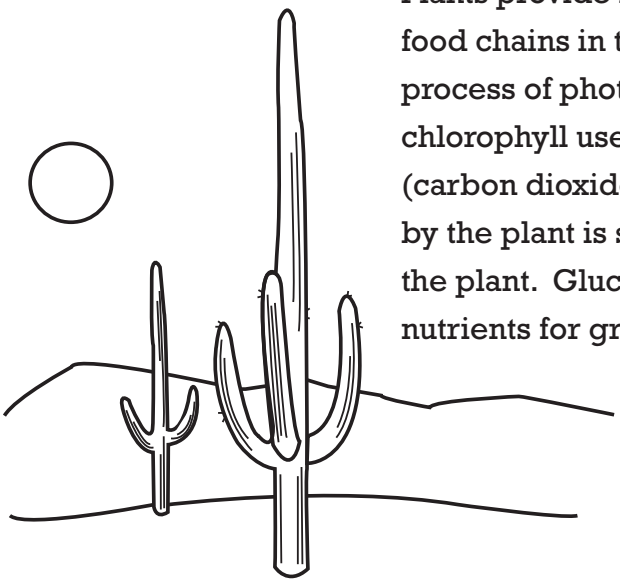
humans and other animals, plants continue to grow for their entire lives. Flowering plants grow in practically all land habitats, near the seashore, on mountaintops, and from the tropics to the deserts. To survive in so many diverse habitats, plants develop special adaptations. Some grow tall to collect sunlight, others have cup-shaped leaves to store water, some have spines to protect them from animal pests, while others grow close to the ground to protect themselves from fierce winds.

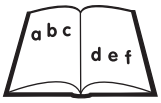
People around the world depend on plants for food, clothing, housing materials, medicines, and many other needs. Animals also depend on plants for food and shelter. Paper is made from papyrus, a reed plant that grows in Egypt. Spices, such as cinnamon and nutmeg grow in tropical regions. Vanilla, chocolate, and coffee are derived from plants that grow in South America. All of these things make our diet of plants more delectable.

Most of the time a plant is easily distinguished from an animal. However, some organisms such as algae look like plants but aren't. In order to be classified as a plant, an organism must have a cell wall. In addition, plants do not possess the power of locomotion. Many plants are capable of producing their own food through a process called photosynthesis.

Plants provide food for all of the people of the world and form the basis of food chains in the sea and on the land. In addition, through the complex process of photosynthesis, the green parts of the plant that contain chlorophyll use energy from sunlight, along with raw materials from air (carbon dioxide or CO_2) and water to make glucose. Some glucose made by the plant is stored for later use while the rest is transported throughout the plant. Glucose is used for energy to help the plant convert soil nutrients for growth.



Plants use less oxygen during respiration than they produce during photosynthesis. The excess oxygen is released into the air where humans and other animals use it for respiration. This oxygen is the plant's contribution to the global oxygen-carbon dioxide cycle that sustains life on the planet.



Vocabulary

adaptation	special features of a plant or animal that allow it to live in a particular environment
angiosperms	a plant whose seeds are held in fruits
chlorophyll	green pigment in plants that captures the sun's energy for photosynthesis
dominant	most obvious, strongest
ecosystem	the plants and animals that interact, adapt, and operate as a unit within a particular physical environment
germinate	to begin to sprout and break out of the seed coat
gymnosperm	a plant whose seeds are held in cones
habitat	the physical environment in which a specific plant or animal lives
non-vascular plant	a plant that lacks specialized organs and tissues for the transport of nutrients and liquids

nutrient	a substance needed by an organism to live and grow
photosynthesis	the process by which plants use energy from sunlight and raw materials from air and water to make glucose to obtain energy
pistil	the female reproductive part of the flower
plant	an organism with a cell wall that is incapable of locomotion
pollen	dust-like particles that are the protective cases for the sperm cells of gymnosperms
resistant plant	a plant that can survive adverse environmental conditions
vascular plant	a plant with specialized tissues and organs such as roots, stems, and leaves
stamen	the male reproductive part of the flower
stigma	the part of a flower's pistil that collects pollen
tolerance	the ability of a plant to grow despite adversity

Logistics

Time: **Introduction:** 30 minutes
Involvement: 3 x 30 to 40 minute periods
Follow Up: 2 x 30 to 40 minute periods; additional time for outdoor work

Group size: 5 to 30

Space: an area with comfortable seating and an area to create display

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Materials

Handout 1 "The Power of Plants" *
Handout 2 "Plants and Ecosystems" *
The Giving Tree by Shel Silverstein *
Unusual Plants Picture Card Set *
Poster "How a Plant Grows" *
Video/DVD *
computers with Internet access
print materials on various ecosystems
(see **Involvement**)
Class set: Wisconsin Fast Plants (optional; order from Carolina Biological: www.carolina.com)
Assessment for a Brochure/Poster/Display *

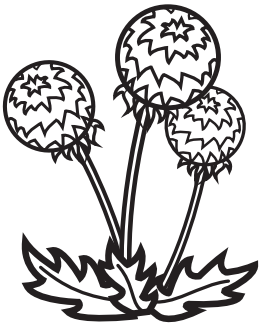
*single copy provided

Preparation

1. Gather kit materials and print sources as listed in the **Materials** section.
2. Read **Background** material.
3. Preview the video/DVD and *The Giving Tree* by Shel Silverstein.
4. Make copies of Handout 1, "The Power of Plants" and Handout 2, "Plants and Ecosystems."

Activity

Challenge: Examine plant adaptations.
(Display for group viewing)



Introduction

1. Distribute Handout 1, "The Power of Plants."
Directions: Brainstorm the varied ways that plants are used by the people and animals on Earth. Have each child work individually

and then have the children combine their lists and give examples. (Examples: food, homes, medicine, clothes, furniture, oxygen, shelter for animals)

2. Read *The Giving Tree* by Shel Silverstein.

Involvement

1. Show the Video/DVD.
2. Examine the Unusual Plants Picture Cards and speculate in which ecosystem each would be found, giving reasons for choices.
3. Divide the group into teams of four or five and assign each team an ecosystem to research:
    a. hardwood forest
    b. wetland/swamp
    c. grassland
    d. tundra
    e. rain forest
    f. desert
    g. ocean/marine
4. Distribute Handout 2, "Plants and Ecosystems" and allow time for the participants to complete the handout using print and Internet materials.

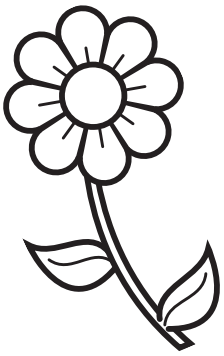
Follow Up

1. Have each group create a visual display accompanied by a verbal explanation of the information gathered.
2. Have members of each group share their information with the other participants in an oral presentation.

Follow Through

- Have children make terrariums out of 2 liter soda bottles. Directions can be found in numerous books such as *Bottle Biology*.

- Go to the website: iitc.tamu.edu/lessons/lesson31.html to find directions for "Let's Create an Ecosystem." This activity has children create and identify components of an ecosystem. They observe and describe how organisms, including producers, consumers, and decomposers live together in an environment and use existing resources to survive.
- If possible, grow "Wisconsin Fast Plants." These plants complete a growth cycle from seed to flower in only 30 days.



Assessment: Plants in My Life

Have the children keep a diary of a typical day's events, from getting out of bed in the morning to "hitting the hay" at night. Have them make a list of all of the plants they depend upon during one day of their existence on the Earth. For example, if their bed is on a wooden platform or has a headboard, the wood came from a tree, a kind of plant. Even if it is made from reprocessed wood called particleboard, plants were used to produce the materials. The oxygen they breathe, the food they eat, and the clothing they wear all would demonstrate that they understand the multiple ways that humans depend on plants.

Rubric for assessment: The Ways Plants Impact Daily Life

10-15	excellent
8-9	very well done
5-7	acceptable
Less than 5	you can do better

OR: Evaluate group displays using the Assessment for a Brochure/ Poster/Display rubric.

Resources

The Great Plant Escape
www.urbanext.uiuc.edu/gpe/gpe.html
An award-winning site, lots of plant mysteries to solve, activities, facts, excellent graphics

The Seedy Side of Plants
www.pbs.org/wnet/nature/plants/
A fun site with many interactive videos and puzzles

Kids Gardening
www.kidsgardening.com/Dig/dig.asp?act=t
An excellent site with a wealth of information for teachers with grade-level appropriate activities indicated

DVD: *Plant and Animal Interdependency*, #N6767 from Schlessinger Media www.libraryvideo.com/ss/plant_life_in_action.asp