

**Urbana Park District  
Anita Purves Nature Center**

NATURALIST IN THE CLASSROOM: **POWERFUL PLANTS**

**TEACHER'S GUIDE**

Grades: **2<sup>nd</sup>-5<sup>th</sup>**

Program Length: **1 hour**

**Focus Concept:** *Plants are a vital part of the ecosystem, converting solar energy to food and fulfilling other important roles.*

**Introduction**

Through the process of photosynthesis, plants use energy from the sun to make food and provide this food to animals. During this program, students will review the structure and function of plants, how they make food, and their importance in food chains and food webs.

**OBJECTIVES:** Students will

1. Name the parts of a plant
2. Describe the functions of the main parts of a plant
3. List factors needed for plant growth
4. Describe how plants make food
5. Describe a simple food chain

**Common Core Standards Correlated**

Area	Strand	Standard	Standard Numbers
English Language Arts	Speaking/Listening	Comprehension/Collaboration	2.SL 1,3, 6 3.SL 1, 3, 6 4.SL 1 5.SL 1
English Language Arts	Language	Conventions of Standard English	2.L 1 3.L 1 4.L 1 5.L 1

**Next Generation Science Standards Correlated**

Physical Science	Life Science	Earth & Space Science
	2-LS2-1, 2-LS2-2 3-LS1-1, 4-LS1-1, 5-LS1-1	

**Illinois Learning Standards Correlated**

Learning Area	Goal	Standard	Benchmark
Science	12	A	2a
	12	B	2a

**PROGRAM NOTES:**

- During the program the leader will need to use either the chalkboard or a dry erase board.
- Several of the activities will also require a cleared area of the classroom that is large enough for students to move in. It will be satisfactory if desks can be moved after the introductory activities, or

they can be arranged in a large circle around the perimeter of the room prior to the naturalist's visit. If the weather is good, these activities could also be done outside.

## OUTLINE OF ACTIVITIES

Plant Structure & Function

Life Cycle Activities

Photosynthesis Theater

Energy Transfer Activities

## SUPPLEMENTAL ACTIVITIES

1. If you are just starting a plant unit, ask students to solve this riddle (from *Keepers of Life*) as an attention getter. "What group of living things":
  - Often stay in one place for life but may send their children on journeys of thousands of miles?
  - Can be as small as the smallest living thing on Earth, yet are also the largest?
  - Give new life when they die?
  - May be soft as mush or harder than some rocks.
  - Feed nearly every animal on Earth.
  - Can survive in the ocean, Arctic, or desert?
  - Move, but appear to be still?
  - Are usually green, but can be any color of the rainbow.If no one guesses plants right away, offer additional hints until someone guesses correctly. Point out what a diverse group plants are.
2. If the students are just beginning their unit on plants, ask them to tell you some things they already know about plants. Then take a walk around the school grounds or in the neighborhood around the school, looking at plants. Try to identify some younger and older plants of the same species, for example, a maple tree and a maple seedling. Point out and name each part of the plant. Have students describe things that are the same about the two plants. Have them describe things that are different. Does the plant have any flowers or seeds? What do they look like? Also look to see if there is any evidence that animals have been visiting the plant (spider web, bee gathering pollen, chewed leaves, holes in tree bark, a squirrel eating a nut, etc.). Remind students that plants and animals need each other in order to survive.
3. After reviewing the parts of plants, use this activity to show students what parts of plants humans eat. You will need a selection of fresh produce. Suggestions include whole carrots, celery, radishes, broccoli, potatoes, green onions, beets, lettuce, parsley, etc. For older students, you may wish to include plant fruits, such as tomatoes, or seeds, such as peas and beans. Hold each item up and ask students to describe it and classify the item as to leaf, stem, or root. (If desired, you could include edible flowers.)
4. Students can dissect flowers to learn about the reproductive parts of the flowers. You will need large, easy to dissect flowers such as day lilies, tulips, or gladiola, enough for students to work in pairs or small groups. Hand lenses are also useful, if available. Start by removing the sepals, then the petals. Look on the inside of the petals for pollen. Observe and remove the stamens. Note any pollen on the anthers. Identify the pistil and feel its tip (stigma) for stickiness to hold the pollen when pollination occurs. Help students cut open the ovary to find the ovule. Have students draw pictures of the flower parts in their science journals.
5. Create flower mobiles to show students the great variety in flower shape and color. Have them cut out pictures of flowers from magazines and gardening catalogs. Glue the pictures to construction paper. Cut around the flowers and punch a hole in the top. Use string or yarn to attach them to hangers and hang around the classroom.

6. Demonstrate the pigments in leaves with this chromatography experiment. You will need glass jars not taller than 6 inches, a coffee filter cut into 2x6 inch strips, tape, rubbing alcohol, pencils, and green leaves (spinach leaves can be used if the trees do not have green leaves when you are planning the activity), and clean paper towels. Tear the leaves into tiny pieces and place them in the jar. Carefully add enough alcohol to cover the pieces in the jar. Tape a filter strip to a pencil and lay the pencil across the top of the jar. Adjust it so the end of the strip just touches the alcohol. When the alcohol has moved about half way up the strip, remove it and place it on the paper towel to dry. Observe the bands of green, yellow, and orange pigments. Point out that the green is chlorophyll, which is needed for photosynthesis, the process by which plants make food. If desired, repeat the experiment using fall leaves that have changed color. Compare the amounts of the different pigments. What do the students think happened to the chlorophyll? (As the days got shorter, it was broken down and lost from the leaf. The other colors were always in the leaf, they were just hidden by the green.)
  
7. The Nature Center has a "Plants and Seeds" educational loan kit available for educators. There is also a loan kit on "Trees and Forests". Call the Nature Center at 384-4062 for information or to reserve a box.

**VOCABULARY**

Stem	Pollen/pollinate	Soil
Roots	Seed	Food web/Food chain
Leaf/leaves	Photosynthesis	Producer
Flower	Chlorophyll	Consumer
Petal	Oxygen	Decomposer
Sepal	Carbon dioxide	Herbivore
Stamen	Seedling	Carnivore
Pistil	Nutrients	Omnivore

**RESOURCES**

CHILDREN'S BOOKS

- Anthony, Joseph. *In a Nutshell*. Dawn Publications. 1999.
- Burns, Diane L. *Berries, Nuts and Seeds*. NorthWord Press. 1996
- Carle, Eric. *The Tiny Seed*. Simon and Schuster. 1991
- Cole, Joanna. *The Magic School Bus Plants Seeds*. Scholastic, Inc. 1995.
- Ehlert, Lois. *Planting a Rainbow*.
- Gibbons, Gale. *From Seed to Plant*. Holiday House, Inc. 1993
- Heller, Ruth. *The Reason for a Flower*. Putnam Juvenile. 1999
- Kalman, Bobbie. *How a Plant Grows*. Crabtree Publishing Co. 1997
- Kalman, Bobbie & Langille, J. *What are Food Chains and Webs?* Crabtree Publishing Co. 1998

Rosenberry, Vera. *The Growing-up Tree*. Holiday House. 2003

OTHER BOOKS

American Forest Foundation. *Project Learning Tree*. 2002

Caduto, Michael J. & Joseph Bruchac. *Keepers of Life*. Fulcrum Publishing. 1998

Cornell, Joseph. *Sharing Nature With Children*. Dawn Publications. 1979

Council for Environmental Education. *Project Wild*. 2001

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**Powerful Plants – Student Review Sheet**

Teachers: If desired, make copies of this review sheet for your students.

Name \_\_\_\_\_

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**Fill in the blank.**

1. Name the 4 main parts of a plant.

\_\_\_\_\_

\_\_\_\_\_

2. The \_\_\_\_\_ is the part of the plant that makes seeds.

3. The \_\_\_\_\_ is the part of the plant where photosynthesis happens.

4. The roots soak up \_\_\_\_\_ and \_\_\_\_\_ from the soil.

5. What makes leaves the color green? \_\_\_\_\_

6. Animals that eat plants are called \_\_\_\_\_.

7. Plants make \_\_\_\_\_ for people to breathe.

8. Plants grow from \_\_\_\_\_.

9. \_\_\_\_\_ are animals that eat other animals.

Turn the paper over and draw a picture of a plant. Be sure to include all the parts of the plant.