

A Peek at Plants



In a Nutshell

Students will review the plant life cycle focusing on naming and explaining the functions of roots, stems, leaves, flowers and seeds. Students will discover that all life depends on plants during a refuge exploration hike and scavenger hunt.

Grade	K-1
Season	Fall & Spring
Location	Rapids Lake Education Center & Bloomington Visitor Center

Learning Objectives:

- Name the parts of a plant, and their functions
- Name similarities and differences between plants and animals
- Recognize the significant role plants play in animal and human lives

Literature Connections

- *Plants: An Eyewitness Book* by David Burne
- *The Gift of the Tree* by Alvin Tresselt

Pre-Activities

Sprouting Seeds

Students grow a plant from seed (a quick growing and easy to sprout seed (like a bean) is recommended) about 4-6 weeks before the fieldtrip to Minnesota Valley National Wildlife Refuge. Provide each student with a cup/container, a seed, and potting soil. Place the plants in a sunny area or under a grow lamp in the classroom. Students should observe and record data about their plant growth. As each student's plant begins to sprout, observe and record observations each day up to the fieldtrip. Student observations may include the length of time it takes for their plant to: grow one inch, grow three inches, grow a leaf, grow a flower, etc.

Project Learning Tree activity *Picture This!* (PreK-5)

Students use pictures to discover the diversity of plant life on Earth. Using these pictures they identify many ways to categorize plants.

On-site Activities

Students will review the plant life cycle and identify many ways plants provide food and shelter for animals and people. During the refuge exploration hike, students will draw plants they find the most interesting. Students will label the



Minnesota Valley National Wildlife Refuge

plant parts and identify the lifecycle stage for each plant they draw. Students may assemble a classroom collection of plant items (seeds, leaves, fruits) to sort in a future activity.

Classroom Connections

Build a Plant Field Guide

Explore a local park, garden, or the area around your school. Provide students with paper, crayons, and pencils. Ask students to draw and label the plants they discover. Combine these drawings with those from the refuge visit into a local plant “field guide”.

Teacher Resources

- ***Peterson First Guide to Wildflowers*** by Roger Tory Peterson
- ***Peterson First Guide to Trees*** by Roger Tory Peterson



Sprouting Seeds Pre-Activity

Materials

- Paper Cups (one per student)
- Seeds (assortment fast growing variety such as beans or sunflower)
- Potting soil

Activity

(30 min)

To introduce the Peek at Plants topic, ask students to plant native Minnesota seeds in cups or other small containers about four weeks before visiting the refuge. Each student should place soil in the cup/container and plant a seed, then continue to water and monitor the plant's growth. Place the plants in a sunny area or under grow lamps in the classroom. When the plants begin to sprout, engage students in taking notice of the tiny leaves and stem. When the sprouting has completed, ask students to record the length of time it takes for each plant to grow new leaves, to flower, and how much water is needed to grow the plants. In addition, ask students to monitor whether the plants grow better in sun or shade.

- A version of this activity using plastic bottles can be found here:
<http://www.nwf.org/activity-finder/crafts/terrarium.aspx>

Wrap-Up

Discuss the upcoming refuge fieldtrip with the class. Remind students to wear long pants and close-toed shoes (no sandals) as they will be hiking through the refuge investigating plants.

Picture This! Pre-Activity

Materials

- Felt or Dry Erase Board
- Felt Plant Parts
- Laminated pictures of the plant life cycle
- Variety of seeds- milkweed, burdock, samara, prairie grass
- Raccoon scat replica
- Samples of plant parts: roots, leaves, stems, branches, flowers, etc.

Introduction

(50 min)

What is a plant? Are plants alive? How can you tell? What do they need to stay alive? How do they grow? Ask students to name the different parts of a plant allowing students to closely examine a live plant while placing plant parts on the felt or dry erase board as they name them. Discuss the function of each part and how it helps the plant to survive.

Parts of a Plant

- **Roots**- Serve as anchors and hold the plant in the soil. Roots help feed a plant by absorbing water and nutrients from the soil (nutrients are chemicals and minerals that help a plant make food).
- **Stem**- Smaller plants have a soft and bendable stem. Large plants have a woody and hard to bend trunk. The stem supports the plant as it grows. The stem is also used to send food and water up and down the plant.
- **Branches**- Branches hold the leaves that absorb sunlight for photosynthesis.
- **Leaves**- Leaves absorb sunlight and carbon dioxide. They use these along with water to make food for the plant through a process called photosynthesis.
- **Flowers**- Flowers make seeds that allow new plants to grow.

Using the laminated pictures and felt board, review how plants grow: seed to roots, stem, leaves, flowers (or cones, nuts) and back to seeds to make new plants.

Life Cycle of a Plant

- **Seed**- Under proper conditions (sun, moisture, ground and air temperature) a seed will germinate. First the seed sends down roots. Next, the seed sends up cotyledon(s). The plant will use water and nutrients from the soil and sunlight to make its own food. It will continue to grow into a mature plant.

Minnesota Valley National Wildlife Refuge

- **Pollination**- When a plant matures, it can be pollinated by insects, with pollen from other plants, or itself. After pollination, the plant will produce seeds. Seeds are found in many different shapes, sizes, and colors.
- **Dispersal**- Seeds can disperse in many ways, such as blowing away in the wind, sticking to animal fur, being eaten and scattered through scat, and floating through water. The cycle will re-start when a new seed germinates. Show students examples of seeds from the collection. Blow milkweed seeds in the air, stick burdock seeds on a child's t-shirt, throw scat (which contains seeds) on the floor.

Wrap-Up

(5 min)

Discuss the upcoming refuge fieldtrip with the class. Remind students to wear long pants and close-toed shoes (no sandals) as they will be hiking through the refuge investigating plants.

A Peek at Plants On-site Activities

Materials

- One plant specimen from each habitat
 - Forest- Tree leaves, vines, nuts
 - Prairie- grasses and flowers with roots
 - Wetland- Cattail, arrowhead, duckweed in a Petri dish
- Plant Journals: 1 per student
- Clipboards: 1 per student
- Pencils: 1 per student
- Mounts or pictures of poison ivy, stinging nettle, thistle

Optional Extras

- Mystery Box items: collected ahead of time
- Hula Hoops (6)

Introduction

(20 min)

Review what students learned in the classroom pre-activity. Ask them to explain what a plant is and what it needs to live. Have student's explain the needs of plants: sunlight to produce food, water to grow, soil for nutrients, water and support.

How much sun and water a plant needs varies; plants are adapted to live in different habitats, much like wildlife. On the board, write down the three Refuge habitats in columns (forest, prairie, and wetland). Have the students list the main plant(s) that live in each habitat.

- ✓ Forest- Trees
- ✓ Prairie- Grasses and flowers
- ✓ Wetland- Cattails

Forest

What habitat would you most likely find shade on a hot summer day? Forest is the shadiest thanks to the trees. The forest is cooler due to the trees that block out sunlight and the high amount of rain the forest receives annually. Trees and the other plants that are adapted for the forest do not need a lot of sun, can tolerate cooler temperatures, and require moist conditions (water).

Prairie

In contrast, prairie grasses and flowers prefer it dry and hot. They need a lot of sunlight to produce food and grow. They like hot temperatures which makes it dry. Prairie plants have adapted to live here by having very deep roots that can collect moisture and nutrients deep in the soil. They also have flexible stems that can bend in the strong winds without breaking. Hairs and a waxy coating of the surface of their leaves help them to hold onto the moisture in their cells.

Minnesota Valley National Wildlife Refuge

Wetland

The wetlands are a completely different type of habitat. The main difference is the amount of water. Plants that live in a wetland require a large amount of water, some are even submerged (never growing above water) like coontail. Many wetland plants take advantage of the water for support. They might have large leaves that float on top of the water's surface. Duckweed, a common wetland plant, has no stem at all. This plant floats on top of the water with its root hanging down collecting nutrients and water.

Hike

(45-60 min)

Students will record their plant observations for the habitats they explore using a journal. To help students focus on searching for plants as they hike the trail, use either of the following techniques.

“Mystery Box” (works for all habitats)

Pass out a clipboard, Plant Journal and pencil to each pair of students. Using the “mystery box”, pull out an object as it relates to what you notice as you hike along the trail. Encourage each student to feel and look at the “mystery” object. Then ask students to try and find it in nature and then record their observations in their plant journal.

Hula Hoop Scavenger Hunt (designed for prairie habitat)

Pass out one clipboard, journal pages and pencil to each pair of students. Encourage students to look, touch and sniff (watching out for stinging insects) for the items on the Prairie Plant Scavenger Hunt section of their journal pages. Instruct students not to place a check in the box until the entire group has seen the scavenger hunt item together. Place a hula hoop around a total of 6 plants as you work through the scavenger hunt that students vote to visit again at the end of the hike. Leave about 20 minutes at the end to allow students to move from hoop to hoop to record their observations into their plant journal.

- Pull up an invasive plant (thistle [with gloves], leafy spurge, dandelion) and encourage students to touch the parts, especially the roots.
- Look for plants at all stages of their lifecycle: seedlings, flowers, seed heads. How is each stage different from the other stages?



A NOTE ABOUT PLANTS

Stinging nettle, thistle, and poison ivy may be present close to the trails. Pictures and specimen collections are available at the refuge to introduce these plants to your students. Please point these plants out to your students if you encounter them along the trail.

Minnesota Valley National Wildlife Refuge

Wrap-Up/Management Connection

Protecting Plant Communities

Collect all field supplies. Review why plants are important and allow students to share their plant discoveries. Explain to students that Minnesota Valley National Wildlife Refuge manages all the plant communities in each habitat for the animals that live on the refuge (large and small). Today, the refuge plant communities provide many animals with the food and shelter they need to survive. Ask students to think about how the Minnesota River Valley would look like today if a concerned group of citizens had not worked so hard 20 years ago to set aside the land and established the Minnesota Valley National Wildlife Refuge?

A Peek at Plants Rainy Day Hike Alternatives

A Look at Leaves

(Adapted from Project Learning Tree)

Materials

- Paper
- Crayons
- Pressed leaves from each habitat
- Leaf / Tree field guides
- Dry erase board and markers

Activity

In the classroom, pass out freshly pressed leaves from the refuge collection to students. Ask students to take a close look at the shape of the leaf, the petiole (stem), veins, and outer edges. To broaden student vocabulary, ask them to describe the leaf. Here are some example questions:

- Is the leaf curvy or straight?
- Does the leaf have teeth or sharp points around the edge?
- What colors or patterns are noticeable on the leaf?

Pass out paper and crayons to students and ask them to complete a leaf rubbing. Students may use field guides to aid them in identifying the tree their leaf came from.

Repeat this with plants from the prairie and wetland.

The Plant and Animal Connection

Materials

- Dry erase board and markers

Activity

Help students identify the important relationship between plants and animals. Use questions like the following to guide the discussion. Write a list of student responses on the board or add them to a VENN diagram.

- What are some similarities between plants and animals?
(both are alive, may live, and grow in the same habitat)
- What are some differences?
(plants generally cannot move, animals can move; plants absorb carbon dioxide and give off oxygen, animals breath oxygen and give off carbon dioxide; new plants grow from seed, animals are born)

Minnesota Valley National Wildlife Refuge

- How can a plant meet its basic needs?
(long roots reach water, leaves soak up sunlight, growing stem brings leaves toward sunlight, bark protects against insects and disease, thorns and/or a bad taste reduces animal and insect damage)
- How do plants help animals and people meet their basic survival needs?
(provide food, used to build shelter, used to make clothing, convert the carbon dioxide people and animals cannot use into the breathable oxygen animals and people need to live)
- How do animals help plants meet their basic survival needs?
(spread seed, dead bodies nourish the soil during decomposition, borrowing animals help add oxygen to the soil)

The Parts Equal the Whole

Students closely observe each part of a plant in order to understand plant anatomy and function.

Materials

Collect plant samples described below prior to class. A dried seed collection should be available in the equipment room.

- Pressed or fresh leaves from trees, grasses, and flowers
- Dried seed collection and/or fresh seeds
- Roots, either dried or freshly pulled small buckthorn
- Stems of plants such as grasses or small bushes
- Magnifying glasses
- Plain white paper
- Pencils, colored pencils, and/or crayons

Activity

1. Pass out paper, pencils, crayons, and a magnifying glass to each student. Since a plant always starts with a seed, begin by passing out piles of seeds for students to share. Discuss with students the function of a seed. Ask students to pick a seed they find interesting to examine under a magnifying glass. Instruct them to draw a realistic picture of the seed. Older students should also write a description of their seed.



For example: The seed is brown, smooth, and has a bumpy top.

Language Arts Connection

Start a vocabulary list on the white board with adjectives that describe each plant part category:

- Seed
- Leaf
- Root
- Stem

Allow students to observe, draw and write descriptions for as many seeds as time allows.

2. Collect the seeds and move on to observing leaves. Pass out piles of leaves, while discussing with students the function of leaves. The function of a leaf is to collect sunlight, photosynthesize, and make food for the plant. Ask students to pick a leaf they find interesting to examine under a magnifying glass. Instruct them to draw a realistic picture of the leaf. Older students should also write a description of their leaf.

For example: The leaf is green, long, and has bumps around its edge. It also has veins.



Students may not know the technical terms like veins; however, as you walk around the classroom introduce new vocabulary words so they can label the parts. Start a new vocabulary list on the board.

3. Collect the leaves and move on to observing roots. The function of a root is to draw water and nutrients out of the soil. Roots also stabilize the plant. Pass out a root to each student and ask them to examine the root under a magnifying glass. If the roots are fresh, encourage students to smell their roots. Freshly pulled roots usually have a strong earthy odor. Instruct students to draw a realistic picture of the root. Older students should write a description of their root on their drawing.

For example: The root is white, bumpy and long. It smells like soil.



4. Collect the roots and move on to observing stems. Pass out bunches of stems while discussing the function of the stem with the class. The function of a stem is to hold the plant upright and to move nutrients and water through the plant tissues (xylem and phloem) from the roots to the leaves and back again. Xylem and phloem are like veins in animals. They are round and carry fluids. Students should use a magnifying glass to observe the stem and draw a realistic picture of the stem. Older students should write a description of the stem on their drawing.

For example: The stem is green, straight, smooth, and squishy.



Wrap-up

Ask students to draw their own plant. The only requirement is to include all four plant parts: a stem, leaves, roots, and seeds (or flowers). Ask older students to write an explanation of where their plant would grow and what and how animals would use the plant. Ask younger students to draw a picture of an animal that depends on their plant to survive.