Fontenelle Forest Nature Center
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Welcome to the natural world of Fontenelle Forest and Neale Woods Nature Centers! Below is a guide to pre and post field trip activities that you can do with your students either indoors or on your school grounds. These fun activities will greatly enhance your students' field trip experience. We look forward to your students' arrival and are excited to provide them with a fun and educational experience. If you have any questions, please call us at 731-3140.

Plant-Astic!

The following activities meet Nebraska state standards 4.2.1 and 4.4.1

Plant-Astic! Program Objectives:
Suggested Grade Level(s): 2nd-3rd

- Students will be able to relate the basic parts of a plant to the function(s) of each part in making a plant "work."
- Students will begin to understand the uniqueness of and the process behind photosynthesis, including the basic ingredients needed in the process.
- Students will be able to relate how animals (including humans) depend on plants in terms of food and shelter.
- Students will be able to relate the importance of flowers to future generations, including a basic understanding of pollination.

Pre- and Post-Trip Activities

1) Roots, Stems, Leaves, Bark, Flowers, Fruits and Seeds

Adapted from *The Growing Classroom*

Concept: By comparing a variety of plant foods, students will understand which parts of plants particular food items are from.
Suggested Timing: Post-Trip
Time: 45 minutes
Location: Indoors
Materials: Fruits, vegetables, spices, chalkboard and chalk, dip base (such as plain yogurt)

Procedure: Ask students to bring all types of fruits, vegetables and spices to class. Collect as many different varieties as possible. Review the parts of a plant with students and have students diagram a plant with its parts on the board. Discuss how plants make their own food, and food for us, using the sun's energy. Ask students to bring their plant foods to the front and begin making a list of these foods on the board. Place the names of the plants these foods come from next to the foods. Next to the list, create a chart on

the board with headings you see in the example chart below. Now have students categorize these foods into their proper categories in the chart.

Roots	Stems	Bark	Leaves	Flowers	Fruits	Seeds
Carrot	Celery	Cinnamon	Basil	Broccoli	Tomato	Pepper Corns
Onion	Kohlrabi		Parsley	Cauliflower	Eggplant	Dill
Radish	Rhubarb		Spinach		Apple	Caraway
Ginger			Lettuce		Banana	Chocolate
			Mint		Orange	Beans
					Strawberry	Rice
					Hot Peppers	Wheat

2) Bag a Plant!! Adapted From *The Growing Classroom*

Concept: Students will observe the process of transpiration first hand.
Suggested Timing: Pre-Trip
Time: 30 minutes
Location: Indoors
Materials: A well lighted window sill or grow light; plastic bags; rubber bands; 2 living house plants (same size and variety); one identical pot with soil only; celery stalk with leaves or a white carnation; jar of water; food coloring.

Procedure: Discuss how people get water and how our bodies lose water (perspiration, respiration). Have students breathe into their hands or on a window to see how water vapor in their breath condenses. Discuss how plants get water and how they lose water. Plants don't breathe the same way as humans, but they do lose lots of water vapor through their leaves. This is called transpiration. Set the three pots on a sunny windowsill and label the potted plants "A" and "B" and the plantless pot "C." Water all containers with equal amounts of water. Wrap pots A and C in clear plastic bags that cover the entire pot and plant (pot A) or just pot (pot C). Tie a plastic bag around plant B with an opening for the plant (the plastic bag goes around stem of the plant and covers the soil only).

Wait at least one hour. Examine the three containers. You should see condensation on the inside of all three bags. Which pot produced the most moisture? Why?

Water can evaporate both from the soil and from the plant, but the plant has the most surface area. Allowing water to evaporate from the leaves of a plant causes the roots below to suck up more water. This draws water and nutrients up from the soil and into the plant. As water heads back through the plant it takes sugar made in the leaves along with it.

Review where the water in the plant comes from. You should have a discussion about roots and how they absorb water. If you can, have students dig up a very small amount of grass to examine the roots. To demonstrate how water moves up a plant stem, cut the end of the celery stalk or the white carnation stem at a slant with a sharp knife, place the celery stalk or a white carnation in a jar of water that has been colored, and put it near a warm, bright windowsill. The next day you should see coloring in the celery stalk and leaves or the white carnation. This demonstrates how the water has moved up the stem of the plant as water evaporates out of the leaves.

3) Plants With Hands

Concept: Students will conduct an experiment with climbing peas to observe the plants' use of tendrils. They will explore the concept of adaptations.
Suggested Timing: Post-Trip
Time: 30 minutes to start the experiment and continuing observation
Location: Indoors
Materials: Sunny windowsill, climbing pea seeds, pots, sticks, potting soil, twine

Procedure: Have the students sprout two climbing pea plants. As soon as the plants have sprouted, move them to a sunny windowsill. Place a 12" stick in one of the pots and next to the plant. In time, this pea plant should grow around the stick. After the plant has grown around the stick, place a larger stick next to it. Tie a long piece of twine between the larger stick and a nail or window ledge. The pea plant should grow up the twine toward the windowsill. Have the students observe and draw pictures of the progress of both plants. As a concluding activity, ask the students how climbing tendrils may help pea plants survive in the wild.

What other types of plant adaptations can they think of? If possible, take students outside to search for unique plant adaptations.

4) Green Magic

Concept: Students will learn how chlorophyll helps make sugar for plant food and how, when chlorophyll is conserved in the fall, the hidden colors of leaves become visible.
Suggested Timing: Pre-Trip
Time: 30 minutes
Location: Indoors
Materials: Fresh spinach, large cup, coffee filter, fingernail polish remover, blender (optional)

Procedure: Ask the students how plants make food. Some of them may be able to answer that it is through the sun's energy. Explain that the reason plants are green is because they have a special pigment called chlorophyll. This pigment helps the plant absorb the sun's energy and put it to work making food. You will now separate the chlorophyll from a spinach plant's leaves.

Place a very small amount of water in the blender and grind a significant amount of spinach leaves to a nice pulp. Pour a small amount of this green pulp into a cup. Mix fingernail polish remover with this pulp and stir. Now ask the students what happens to leaves in the fall (the leaves change colors before falling off). The yellow leaf colors that you see are normally covered up by green chlorophyll. What do you think happens to that chlorophyll in the fall? Some of it is broken down, but much of it is absorbed into the stems of trees and bushes to use next spring. Chlorophyll is very difficult for plants to make, so they conserve it.

Cut a strip of coffee filter and place it in the fingernail polish/ spinach solution. Wait about thirty minutes. The solution will move up the coffee filter. As it is absorbed, the pigments in the spinach leaves will separate out. You will see a distinct green and a distinct yellow band, with some color bands in between. This yellow band is the yellow pigment that is always in leaves. The green band contains the chlorophyll.

As an extension, head outside during the spring and look for different shades of green in various types of plants. You may notice that the leaves of plants that are growing in bright sunlight, where they get lots of energy, are smaller and lighter in color than those that are growing in the deep shade. This means they have less chlorophyll. Leaves that grow in bright sunlight need less chlorophyll to survive because they get plenty of sunlight, but they must have other adaptations to keep them from drying out. See if you can find examples of many leaf shapes and shades.

5) 2-Liter Pop Bottle Terrariums

Suggested Timing: Post-Trip
Time: 30 minutes
Location: Indoors
Materials: Clean 2-liter plastic bottle, exact-o knife, sand, potting soil, seeds, masking tape, marker, water

Procedure:

- Cut off the bottom third of a clean 2-liter pop bottle.
- Put about an inch of gravel, charcoal or sand in the bottom for drainage.
- Fill the bottom with potting soil, leaving an inch of space at the top.
- Make three small holes in the soil and place 2 or 3 seeds into each hole.
- Cover the seeds with a little soil.
- Cut four 2-inch slits around the bottom edge of the top of the bottle. This will allow you to slip the top into the bottom (with the slits going between the soil and bottle bottom), forming a cover.
- Tape over the two halves of the bottle with masking tape.
- Add 2 –3 bottle caps full of water and put the cap back on the bottle.
- Place the bottles in good light but not direct sunlight through a window.
- Plants will get too warm if they are too close to the window.
- The bottle should fog up and will condense enough water to maintain it.

- If the bottle fogs up too much and the soil looks too wet, remove the cap for a day and then close it up again.
- If the seedlings 'lean' towards the window, turn the bottle around so the plant 'leans' away from the window and thus straightens out.
- When the plant is tall enough for the leaves to touch the sides of the terrarium, transplant the plant outdoors.

Sources for Teachers and Students

Appel, Gary, and Roberta Jaffe. The Growing Classroom: Garden-Based Science. New York: Addison-Wesley, 1982.

Cohen, Joy, and Eve Pranis. Grow Lab: Activities for Growing Minds. Burlington, VT: National Garden Association, 1990.

Tilgner, Linda. Let's Grow!: 72 Gardening Adventures with Children. Pownal, VT: Storey Publishing, 1988.

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