

NEW PLANTS

Second Grade – Rahr Memorial School Forest

ENDURING UNDERSTANDING

Like all living things, plants have certain requirements for survival. Plants and their seeds are made up of many different parts and each part has a specific function.

ASSESSMENT

Students will be able to demonstrate their understanding by drawing the different parts of a plant, describing different types of plants, identifying evergreen and deciduous trees, listing the parts of a seed and their functions, naming different ways that seeds travel, and discussing what plants need to survive.

WISCONSIN'S MODEL ACADEMIC STANDARDS

Math: D.4.1, D.4.3, E.4.3

Science: B.4.1, C.4.1, C.4.2, C.4.4, F.4.1, F.4.2

LESSON PLAN OUTLINE

- I. Set-up
- II. Sample schedule
- III. Introduction
- IV. Structures of plants
 - A. plant study
 - B. wildflowers
- V. Plant types
 - A. plants hike
 - B. look and find
 - C. leaf rubbing
- VI. Seed Study
 - A. seeds
 - B. little sprout – parts of a seed
 - C. seed scavenger hunt
- VII. Plant survival
 - A. what does it take?
 - B. every plant for itself game
- VIII. Conclusion
- IX. Clean-up

Safety

Optional/ Rainy Day Activities

Additional Information

Resources

School Forest map

MATERIALS

- | | | | |
|-----------------------------------|------------------------------------------|------------------------------|-----------------------------------------|
| • <u>The Lorax</u> storybook | Plant Types | • water bottle with straw | Plant survival |
| Structures of plants | • Look and Find cards | • seed parts labels | • paper |
| • clipboards | • crayons | • raincoat/ poncho | • crayons |
| • pencils | • clipboards | • hat | • poker chips (blue, yellow, and green) |
| • Plant Study sheets | • paper | • tape | • tree cross-sections |
| • hand shovels | • pencils | • clothes pins | • paper plates |
| • hand lenses | Seed Study | • Seed Scavenger hunt sheets | • pencils |
| • Wildflower identification books | • examples of seeds | • colored pencils or crayons | • graph poster |
| • Posters | • Posters – Fleshy Fruits and Dry Fruits | • clipboards | • wet-erase markers |
| • Hula hoops | • backpack | • pencils | • towel |
| • Colored pencils | • trail mix in a small bag | | |

CLASS PROCEDURES

I. Set-up

After reserving a date with the School Forest coordinator, teachers are responsible for turning in a field trip request form. Teachers should also schedule a time when the School Forest coordinator can meet with them at school to discuss the visit. Teachers will be asked to teach or co-teach one of the sections while the student groups rotate through the activities during the day. The School Forest coordinator can also teach at one of the stations during the day. Preparation time will be needed to review the activity.

All of the materials needed for the activities can be set-up at the School Forest. Teachers should let the School Forest Coordinator know if materials will be needed. Teachers should bring a few things from school: snack (apples?), first aid kits, emergency contact information, extra clothing, and any additional activities they feel necessary for the classes. Students will need to bring a bag lunch (with a drink and nothing that needs a microwave) and adequate clothing for the day.

II. Sample Schedule:

9:30 – 9:50	Welcome and Introduction
9:50 – 10:45	rotation 1
10:50 – 11:45	rotation 2
11:45- 12:20	Lunch
12:20- 1:15	rotation 3
1:20 – 2:10	rotation 4
2:10	Gather and clean up
2:15 – 2:25	Conclusion

III. Introduction

During this day at the School Forest, students will learn about topics that support the FOSS New Plants kit. Start by reviewing what the students already know about plants. What is a plant? What do plants need to live? List ways that plants help humans. Before the class divides into the small groups, eat an apple snack (or a different snack). If there is enough time, read The Lorax.

IV. Structures of plants

A. Plant study

Start by reviewing the parts of a plant. Use the posters to help in the discussion. Draw a plant on the chalkboard and label the parts. Now take the class away from the buildings to the south (past the flagpole).

You may want to do this activity in small groups with adults helping or you may wish to have each student work alone. Go into the open area south of the flagpole, near the shelter. Spread the students out in small groups, each with a hula-hoop on the ground. Give each student a clipboard, pencil, and worksheet. Ask them to sit and draw the area around them. Then ask them to draw the area within the hula-hoop.

Each student or group should find a small plant to study. After they have found one, gather together again and give instructions on how to dig up their plant. Use a shovel to carefully dig around the plant and slowly pull the roots with the dirt out of the ground. Shake off the dirt around the roots. Now we can study our plant using a hand lens and our eyes. Have the students go back to their plants and begin working

on the Plant Study sheet. Look for shapes that can be seen in the plants. Once the students have finished their sheets, they should carefully replant their plant.

B. Wildflowers

Head over to the wildflower garden (by the fire ring and the shelter) and walk with the group through it. Stop to examine life under the earth through the viewing window. Count colors. Discuss what animals may use this garden. Hand out the field guides to try and identify some of the wildflowers that you see.

V. Plant types

A. Plants hike

During this class, students will examine different types of plants. What is the first plant you think of when you are at the School Forest? Trees!!!! We have many different types of trees at the School Forest and they all have certain areas where they like to grow. What animals use trees? Discuss how people use trees.

Find an evergreen tree such as a pine, spruce, or hemlock and discuss why it is called an evergreen (because it is always green and does not lose its leaves in the fall). Now find a deciduous tree such as an oak, maple, aspen, or beech and discuss what a deciduous tree is. How is an evergreen different from a deciduous tree? You may want to use the tree identification books to help the students explore the names of the different trees.

Discuss other plants at the School Forest. Ask the students to name other plants they think may live here. Walk along a trail and stop at various plants to discuss what type of plant they are (you do not have to know the names). Find a bush such as a juniper bush and discuss how we know it is a bush. Juniper bushes are actually evergreen bushes, discuss why. A bush is a woody plant that grows off of the ground but not tall like a tree. How is a bush different from a wildflower? How are they similar?

B. Look and find

Pass out the “look and find” sheets and pencils to small groups of students (with a chaperone). Set the boundaries for the activity and then let the students explore the area to try to find all of the items on the list.

C. Leaf rubbing

If you have time, pass out paper and crayons to the students. Demonstrate how to do a leaf rubbing. Ask each student to find a leaf to use and do a leaf rubbing. Then ask the students to write a sentence about their leaf on the same piece of paper. Discuss what types of leaves the students found.

VI. Seed study

A. Seeds

Every type of plant has a different type of seed. Pine trees have pinecones, which are made up of scales that protect their seeds until dispersal. Maple trees have samaras that help the seed “fly” through the air; you may call them “whirly coppers”. Some seeds even float in water. There are many different types of seeds, but they all have certain components that help them to become a plant. During the next activity students will discover the parts of a seed and their function.

B. Little sprout (parts of a seed)

With the provided materials, dress a student up as a well-prepared hiker with backpack and *then* raincoat/ poncho. Introduce the individual to the class as “Sprout” and explain that she or he is a hiker and has come to help teach us about seeds. Explain that Sprout and seeds have many things in common. Ask the students if they see any similarities. Tell the students that you see the similarities, and will help them to recognize them.

Ask the students what a hiker wears to protect themselves from the wind, rain, and cold (a coat). Explain that seeds have coats for protection too. Attach the seed coat label to the student’s coat. Explain that when the conditions change, Sprout can take his or her coat off and enjoy the warm sunny weather. Just like how when the weather is right, a seed will absorb water, the seed coat cracks open, and the seed begins to sprout roots and leaves (or germinate). Have the volunteer remove the coat and hang it so that the class can see the seed coat label.

Ask the students what else a well-prepared hiker brings (a backpack with supplies). Take the trail mix snack out of the backpack. Explain that seeds also have a supply of stored food. Our hiker’s food is stored in a backpack. A seed stores its food in cotyledons. Attach a cotyledon label to the backpack. Cotyledons provide the plant with the initial energy to germinate and grow. Once the plant has established itself, the cotyledons fall off.

Sprout expends a lot of energy hiking and eventually will get thirsty. What else is important to bring along on a hiking trip? (Water bottle.) Have Sprout remove the water bottle from the backpack. Plants also need water and minerals to help them grow. How do the plants get water and minerals? (Roots.) Attach a root label to the straw of the water bottle.

Ask what other item is useful to have on a hiking trip, especially on bright sunny days. (A hat.) Have Sprout remove a hat from the backpack. Compare the hat to the first green leaves a seedling puts out to absorb sunlight. Attach the leaves label to the hat. The leaves use sunlight to make food for the plant. This process is called photosynthesis. Soon the cotyledons will fall off and the plant will be able to get energy from the sun. Have the volunteer remove the backpack and place it next to the seed coat.

Explain that the leaves and roots grew from a tiny plant inside the seed called the embryo. Place an embryo label around the volunteer’s neck showing the connection between these two parts. Review the various parts of the seed and their functions using the props.

Now that we know more about what is inside of a seed, we are going to go find different seeds on a seed scavenger hunt.

C. Seed scavenger hunt

Give each student a Seed Scavenger hunt sheet, a clipboard, and a pencil. You may also carry along a box of colored pencils or crayons for the students. Start this activity by discussing how plants spread their seeds. Plants may spread their seeds

by using the wind, rain, rivers, or animals. What does a maple tree use? The whirlicoppers from a maple tree use the breeze to find a new spot to grow. Now find an open area along a trail to let the students look for the items listed on the sheet. Give directions on how to measure and record the size of the seeds and review the different types of seeds. After a little bit of time, you may want to hike to a new spot to look for more seeds. The nearest fruit producing maple tree is up the trail to the northeast of the volleyball court. Try a few different areas and discuss why we find different seeds in different areas. (You may not find all of the types of seeds.)

Way the seed is dispersed:	Seed examples (and where to find them at the School Forest if applicable):
Water-borne (floaters)	coconuts, cranberries
Wind-borne (winged or parachutes)	maple samaras (up trail to the north east of volleyball court), ash samaras (along south edge of driveway near ELC), milkweed, dandelions (all over), birch (all over)
Animal carried (barbs)	burdock, bidens, acorns (all over)
Air-borne (fruit eaten by birds)	cherries, berries, grapes, juniper seeds (on bushes all over SF)
Propelled (“cannonballs”)	touch-me-nots/jewelweed (in swamp in fall)
Animal-consumed (yummy fruit)	apples, blueberries (in spots along Red Oak Trail), raspberries (in areas near lake)

Don't feel like you have to be completely correct with which box the seeds go in on the worksheet, make your best guess. If the students run out of room on their worksheet, they can use the white space along the edge.

VII. Plant survival

A. What does it take?

All plants need certain things to survive. They need water, nutrients, and sunlight. If a plant does not get the right amount of these items, it becomes weakened and could eventually die.

B. Every plant for itself game

During this activity each student will become a plant and gather the items needed to survive.

1. Pass out one piece of paper for each student. Ask them to draw a picture of a plant.
2. Now, go outside and ask the students to space themselves about 3 feet from each other, put their paper on the ground, and stand on it.
3. After the students are in their spots tell them that they may not move off of the paper and it must stay where it is during the entire round.
4. Equally distribute the poker chips on the ground around the students so the chips are about one to two feet apart.
5. Tell the students that they'll be playing a game called “Every Plant for Itself”. The students will be the “plants”. The object of the game is for plants to gather as many poker chips as they can. Explain that each color represents a plant requirement. Blue represents water, yellow represents sunlight, and green represent nutrients such as nitrogen, oxygen, and carbon dioxide.
6. Give a signal, to start the first round. The student plants should reach with their roots and branches (arms and legs) to gather their requirements. Tell the students that one foot (their tap root) must remain planted on their paper at all times.

7. Allow students to collect their requirements for one 30-second round. When the round is complete, discuss what the plants were able to collect.
 - How many requirements did each of the plants get?
 - Do any of the plants lack a certain requirement?
 - What might happen to a real plant that lacked one of its requirements? (It might grow slowly or eventually die.)
 - Is there such a thing as too much water, sunlight, or nutrients? (Yes, every species has optimum levels beyond which the plant becomes stressed.)
8. Use the graph poster and wet-erase marker to indicate the number of trees that would have survived that round. Be sure to write the situation for that round on the x-axis.
9. Have the students move their papers so they are standing in groups of three to five. Gather the poker chips and spread them around again. Play another round and discuss the results. Graph this situation next.
 - Compare the results of this round with those of the first. (In most cases, students will notice that each plant gathered fewer requirements.)
 - Relate these results to plants that grow in the open and spread out versus plants that grow close together. Why do seed packages always tell you to space out the seeds when you plant them?
10. Here are some other variations for the game:
 - Have all of the students stand closer together (competition for space)
 - Use fewer water chips (drought)
 - Use fewer sunlight chips (lack of sun)
 - Use fewer nutrient chips (poor soil quality)
11. After each round, discuss the outcomes and graph on the poster.

Discuss competition with the students. Plants have to compete for sunlight all of the time. Plants that are unable to get enough sunlight, water, or nutrients will not survive.

If you have time, pass out the tree cross-sections and examine the growth rings. Explain that every ring represents one year of growth for that tree. Sometimes the rings are thinner because the tree was unable to get all of the things it needed to survive. Maybe the tree did not get enough water because there was a drought or maybe the tree did not get much sunlight because a large tree grew above it and shaded it.

Pass out the paper plates and have the students make their own tree cross-section (or tree cookie) based on their own lives. They can put their birth date in the middle and label the rings with how old they were during that particular year. They may also want to add any special events that have happened during their lives.

VIII. Conclusion

Like all living things, plants have specific requirements that they need to survive. Ask the students to review what plants need to survive. Review all of the topics covered during this day at the School Forest. Imagine you are a seed: where would you want to be, how would you get there, what are you made up of, what would you need to start growing into a plant? What can humans do to help plants? List three ways you could help a plant.

IX. Clean-up

- Return supplies to building
- Take garbage out to dumpster
- Close windows, shut off all lights, shut off water, lock doors, shut driveway gate
- Give the School Forest coordinator feedback on how to make this trip better in the future.

Safety

While at the School Forest, teachers should carry first aid kits. You can bring these from your school or use the ones at the School Forest. The first aid stations can be found in the Ehlert Lodge office, the ELC, and the upstairs of the Krejcarek Building. Please report any safety issues to the School Forest coordinator.

Students should be supervised at all times. If you decide to go off of the trails, go in a clear area where branches cannot swing back and hit someone. Be aware of the plants you are traveling around, so as not to pass by thorn-covered plants or poison ivy.

Optional / Rainy Day Activities - These activities can be done if the weather is poor or if there is extra time. Please notify the School Forest coordinator if you plan to teach any of these activities. ***You may want to teach these at school after your School Forest trip as a follow-up.***

Leaf Study: Examine different types of leaves. How does a maple leaf look different from an oak leaf? Ask the students to create their own collection of leaves on a piece of paper and to label the different types of leaves. Discuss the difference between deciduous and evergreen leaves.

Look what I did with a leaf: Use the Look What I Did With a Leaf books to discuss the different art projects that the students could do. Go outside and collect leaves. Pass out paper and glue.

Lima bean dissection: Pass out a couple of presoaked lima beans to each student. Have them rub the bean between their fingers to remove the seed coat. Gently break the lima bean in half and discuss the different seed parts that are found inside. Relate this to the Little Sprout activity during the Seed Study class.

The Giving Tree activity from Project Seasons (see following pages).

Additional Information

See the following pages for additional information about plants, seeds, and forests.

Resources

Lingelbach, Jenepher and Lisa Purcell. Hands-On Nature. Vermont Institute of Natural Science, Woodstock, Vermont. 2000.

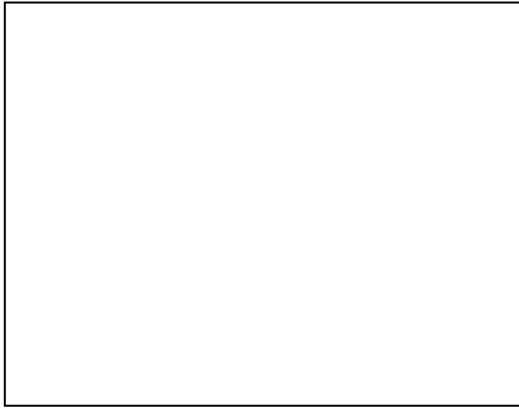
Parrella, Deborah. Project Seasons. Shelburne Farms, Shelburne, Vermont. 1995.

Sohi, Morteza. Look What I Did With a Leaf! Walker and Company, New York. 1993.

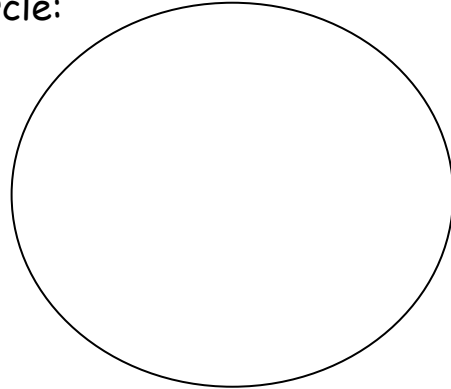
Botanist: _____

Plant Study

Draw the area around you:

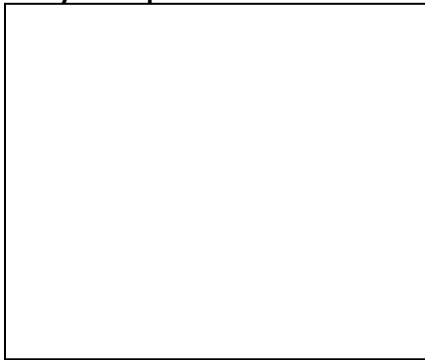


Draw the space within your circle:

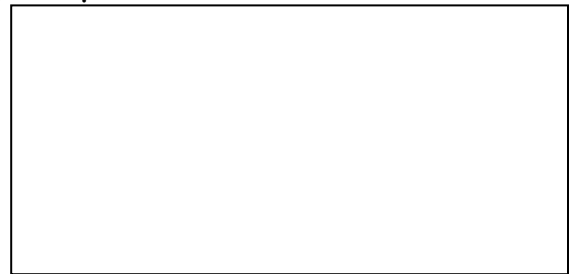


Pick a small plant to study. Dig it carefully out of the ground. Shake the soil from the roots.

Draw your plant.

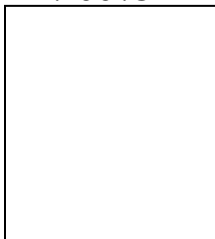


Draw the shapes you see in your plant.

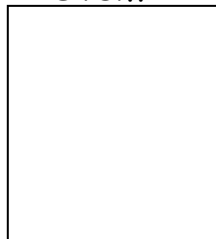


Use a hand lens and draw:

Roots



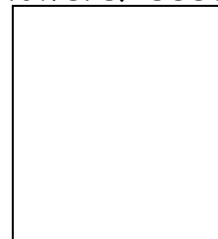
Stem



Leaves



Flowers/ seeds



Carefully replant your plant. Thank you.



Look and Find

Check off the items as you find them. Do not collect!

- The largest tree you can find. How many people does it take to reach around it? _____
- The oldest leaf you can find
- A dead tree with a mushroom on it
- Smooth bark
- Really rough bark
- Two or more different tree smells (crush or scratch leaves or twigs)
- The tallest tree you can see
- A tree that is smaller than you
- Your favorite tree

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Names _____



Seed Scavenger Hunt

How many forms of seed dispersal can you find?
Observe, sketch, and measure.

Water-borne (floats) Length <u> </u> cm Width <u> </u> cm	Wind-borne (winged, hairs, or parachutes) Length <u> </u> cm Width <u> </u> cm
Animal carried (barbs) Length <u> </u> cm Width <u> </u> cm	Air-borne (fruit eaten by a bird) Length <u> </u> cm Width <u> </u> cm
Propelled Length <u> </u> cm Width <u> </u> cm	Animal-consumed (fruit) Length <u> </u> cm Width <u> </u> cm

Use the ruler on the back of your clipboard
for measuring.