



Science Unit: *Plants*

Lesson 4: *Forest Ecosystem Field Trip*

School year:	2004/2005
Developed for:	Queen Alexandra Elementary School, Vancouver School District
Developed by:	Paige Axelrood (scientist) and Janet Vesterback (teacher)
Grade level:	Presented to grade 3; appropriate for grades 2 – 6 with age appropriate modifications.
Duration of lesson:	3 hours (1.5 – 2 hours in the forest); lesson requires extension by teacher
Notes:	<p>Pacific Spirit Park, Council trail (access from Wesbrook Mall); Obtain permission from the GVRD Pacific Spirit Park to collect a small number of non-poisonous mushrooms for students to make spore prints; Bathrooms are not available.</p> <p>Recommend 5:1 ratio for students to adults plus Terry Taylor (mushroom expert).</p> <p>Special thanks to Terry Taylor for leading the forest walk and sharing his knowledge about mushrooms and the forest ecosystem.</p>

Objectives

1. Students will learn about the forest ecosystem and different types of organisms that live in the forest.
2. Students will use their senses (sight, smell, hearing, and touch) to experience a very slow walk through the forest.
3. Students will use their observational skills to discover and examine trees, plants, lichen, moss, mushrooms, and insects in the forest using a magnifying glass.
4. Students will be introduced to the variety of mushrooms that grow in the forest, learn about the parts of a mushroom and why they are important to the forest ecosystem.

Background Information

A forest is a dense growth of trees growing in soil and covering a large area of land. It is also comprised of smaller plants and shrubs, and many diverse organisms that live in the soil, on the ground, and in the forest canopy. The types of trees and plants that grow in the forest are dependent upon climate. The forests in British Columbia are temperate. Many of these forests are dominated by evergreen conifer tree species. Conifers have needle- or scale-like leaves that stay on the trees for several years and produce their seeds in cones. Deciduous trees are also present in temperate forests; their leaves are generally wide and flat, falling from the trees each autumn.

Trees are the largest plants on earth. Some trees live for hundreds of years. The vertical zones in the forest include soil (below the ground), the forest floor, the shrub layer (smaller plants and shrubs), the understory (young tree layer), and the canopy (tops of big trees). The trees and plants in a forest provide food and shelter, both above and below ground, for many living organisms and complex communities. The forest is home to large animals (such as deer, bears, coyotes, and foxes), small animals (such as birds, bats, squirrels, chipmunks, skunks and worms), insects (such as flies, mosquitoes, butterflies, beetles, and ants), spiders and mites, and microorganisms (such as bacteria and fungi).

Forests help our environment by absorbing moisture in the form of rain and melting snow, by reducing soil erosion, and by cycling nutrients such as carbon and nitrogen. Trees and plants in the forest absorb carbon dioxide and produce oxygen.



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Vocabulary

<u>Forest:</u>	Dense growth of trees, growing in soil and covering a large area of land, plus complex communities of plants, animals, insects, and microorganisms.
<u>Ecosystem:</u>	Communities of living organisms and the environments with which they interact.
<u>Conifer tree:</u>	Have needle or scale-like leaves often with a waxy outer layer; leaves remain on tree for several years (evergreen); produce seeds in cones.
<u>Deciduous tree:</u>	Have wide and flat leaves that fall to the ground each autumn.
<u>Moss:</u>	Plants that produce spores to reproduce and live in damp shady environments.
<u>Lichen:</u>	Fungi and algae live together in symbiosis (each helping the other) to form lichen; the algae produce food from photosynthesis for both algae and fungus, and the fungus gathers up nutrients and water for both the fungus and algae.
<u>Mushroom:</u>	The fruiting body of some fungi; spores are produced by mushrooms for fungal reproduction.

Materials

- 2 plastic tubs lined with moist paper towels to collect non-poisonous mushrooms for spore prints (label tubs: dark colored spores and light colored spores)
 - ziplock sandwich bag necklaces labeled with the name of each student and each containing a magnifying glass, a pencil, and the scavenger hunt list
 - digital camera
 - examples of spore prints on paper
 - whistle
 - glass jars
 - glass microscope slides and cover slips
 - light microscope
 - dark and light colored paper (for making spore prints)
- Bring the following to the classroom for discussion purposes:
- conifer cones and needles, deciduous tree leaves
 - moss, lichen, and mushrooms

In the Classroom

Introductory Discussion

1. Bring the following to the classroom to show students and launch a discussion about the forest and related vocabulary words: conifer cones and needles, deciduous tree leaves, moss, lichen, and mushrooms.
2. Briefly brainstorm about different types of trees, plants, animals, insects, and microorganisms that live in the forest and continue the discussion on the field trip.
3. Safety: Don't eat any plants or mushrooms; don't touch mushrooms. Wash hands when you return to the classroom.
4. Respect plants, insects and other living creatures in the forest.
5. Use quiet voices on the forest field trip.

Science Activity/Experiment

6. Students will each wear a ziplock bag necklace. Have everyone stand in a circle near the forest and talk briefly about the forest and what we will be looking for while walking through the forest (the items on the scavenger hunt list).



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7. Show students spore prints and launch a brief discussion about mushrooms, highlighting their diversity and that mushrooms are the fruiting bodies of some fungi (mushrooms contain spores; these can be thought of as microscopic seeds).
8. Encourage students to use their senses (eyes, nose, ears and hands) while walking and exploring in the forest. Remind them to use quiet voices, respect all living things in the forest, and not to harm anything.
9. Review safety rules:
 - do not eat anything
 - do not touch mushrooms
 - stand like a statue if a dog passes by
 - step to the side of the trail if someone is riding a bike on the trail
 - stay with your group
10. Divide students into two main groups and have subgroups of 4-5 students per adult for each of the two groups.
 - Group 1: One main group will walk ahead on the trail for approximately 5 minutes and then begin a slow walk exploring the forest, looking for items on the scavenger list (see below), and learning about the forest ecosystem, the different layers of the forest, and the names of some of the trees and plants that grow in the forest.
Scavenger List:
 - Douglas-fir tree
 - Maple tree
 - Cedar tree
 - Cone
 - Sword fern
 - Mushrooms on wood
 - Moss
 - Nurse stump
 - Logging stump (these are huge)
 - Nurse log
 - Mushrooms on the forest floor
 - Lichen
 - Slug
 - Bird in a tree
 - Group 2: The second main group will be led by a mushroom expert and students will explore and learn about the diversity of mushrooms, their importance to the forest, beneficial fungi that live in the soil, and related information.
 - After approximately 30-40 minutes Group 1 will turn around and walk until they find the other group. The students will change groups and continue with the field trip so that each student has time to explore for mushrooms and to look for items on the scavenger hunt list.
11. The person leading the mushroom segment of the field trip will pick non-poisonous mushrooms with light and dark colored spores and place them into plastic containers labeled with the correct spore color.
12. Digital photos will be taken on the field trip of students engaged in exploration and of forest organisms (mushrooms, lichen, moss, plants, etc.).

In the Classroom after the Field Trip

13. Cut stems off mushrooms and place mushrooms with gills facing downward on top of either light paper (for dark colored spores), dark paper (for light colored spores), or glass microscope slides (dark colored spores). Cover each mushroom cap with a glass jar until the next morning.
 - The next morning, remove the mushrooms and dispose of them in a compost bin or in a sealed plastic bag in the garbage.



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- Spore prints on paper can be sprayed with a sealant to preserve them.
 - Spores on glass microscope slides can be viewed under a light microscope.
 - Note: mushrooms decompose quickly at room temperature. Therefore, make sure to remove the mushrooms from the paper and glass slides within 24 hours.
14. Mount individual photos taken on the field trip on a larger piece of paper that has a place for a drawing and a few lines for writing.
- Give each student a mounted photo taken on the field trip. Ask him or her to write their name, a few sentences about what is shown in the photo or what was discovered on the field trip, and draw a memory from the field trip.
15. Place mounted photos on the classroom wall. Mounted photos can be given to students later.

Closure Discussion

Reinforce student knowledge about the forest ecosystem, the organisms that live in the forest, and why forests are important to preserve by discussing what was discovered during the forest field trip.

1. What did you discover on the field trip? What surprised you?
2. What plants and animals did you see? What foods do these animals eat? Where do the animals sleep?
3. What would happen if the trees in the forest were cut down? Why is it important to preserve our forests?

References

16. Brooks, Felicity. 1991. Usborne Conservation Guides, Protecting Trees and Forests. EDC Publishing, Tulsa, Oklahoma, USA.
17. Little, Elbert L. 1987. The Audubon Society Field Guide to North American Trees. Random House of Canada Ltd., Toronto, Ontario, Canada.
18. Laessoe, Thomas and Lincoff, Gary. 2002. Smithsonian Handbooks, Mushrooms. Dorling Kindersley Limited, London, England.
19. Thomson, Ruth. 1980. Usborne First Nature, Trees. EDC Publishing, Tulsa, Oklahoma, USA.
20. <http://wrc.iewatershed.com/education-forest.php>
<http://wrc.iewatershed.com/index.php?pagename=ForestsMatter> StormCenter Communications, Inc., [Forests Matter - information about the importance of forests].

Teacher Assessment of Learning

21. Observation of students during field trip:
- How engaged were students in the experience of the forest walk?
 - Were students able to complete the scavenger hunt sheet?
22. Ask students to do one or more of the follow-up activities noted below. How comprehensive and/or detailed were their expressions of their memories and how observant were the students as reflected in the following post trip activities?
- have the children share their experiences orally in a small or large group;
 - produce a group mural;
 - write a thank you letter to the mushroom expert (leader of the walk);



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- create a drawing of/ write-up about their walk.

Extension of Lesson Plan

Welcome to Forest Fun, Series 1 and 2. A series of forest-related activities for children aged 5 – 10. Written by Bill Schwartz, Richard Banner and Bruce Horn. Developed and published by the BC Forestry Association. Publication date is unknown.

Forest Field Trip Scavenger Hunt

Name of Scientist _____

What Can You Find in the Forest?

Douglas-fir tree

Maple tree

Cedar tree

Cone

Sword fern

Nurse log

Nurse stump

Fire damage on stump

Mushroom on wood

Mushroom on the forest floor

Moss

Lichen

Bird in a tree

Squirrel

Spider

Spider web

Snail

Ant

Beetle

My Discoveries:
