



SCIENTIST IN RESIDENCE PROGRAM™

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Science Unit: *Local Habitats*
Lesson 14: *Introduction to Forest Habitats Specimen Study*

Summary: This lesson introduces students to the plants and animals that they may see on a forest fieldtrip to Pacific Spirit Park and the Greenheart Canopy Walkway. Students will study a variety of **plant specimens** (collected) and **animal specimens** (borrowed from the Beaty Biodiversity Museum).

School Year: 2013/2014

Developed for: Sir William Osler Elementary School, Vancouver School District

Developed by: Linda Herbert (scientist); Jessica Rosenblatt and Carol Tam (teachers)

Grade level: Presented to grade 2/3/4; appropriate for grades 1 – 7 with age appropriate modifications

Duration of lesson: 1 hour and 20 minutes

Notes: It is helpful to have one adult to assist with each station. The scientist will need to remain with the animal station to ensure the specimens are handled appropriately. Pictures of plant specimens can be used or live specimens can be collected if the scientist or teachers have access to them in a private yard or garden. Plants should not be collected from parks, not only does it have the potential to cause ecological harm, in most cities there are also bylaws prohibiting this type of activity. Tree samples should include examples of bark and wood if possible. Pictures of animal specimens can be used or animal specimens can be borrowed from a local college/university/museum if available. For this lesson the animal specimens were borrowed from the Beaty Biodiversity Museum, one of the Scientist in Residence Program partners. The museum is currently in the process of developing educational kits that schools will be able to borrow. Contact <http://www.beatymuseum.ubc.ca/> or info@beatymuseum.ubc.ca.

Objectives **Students will:**

1. Learn what lives in our local forests.
2. Practice making observations of forest plants and animals.

Background Information

The purpose of this lesson is to introduce students to the organisms that they may encounter or observe on their fieldtrip to Pacific Spirit Park and the Greenheart Canopy walkway (Lesson 7). Students will be exposed to a variety of shrubs, trees, birds, and animals present in Pacific Spirit Park. Students previously conducted a similar lesson on pond organisms (Lesson 2) in which their observations were guided by the worksheet such that students were introduced to some of the characteristics biologists use to identify these organisms. This lesson builds on the previous lesson as the students will now be asked to take more initiative in deciding which observations to make and record when describing the organisms. Each station will have a list of questions to help prompt students to make appropriate observations. Students are also encouraged to come up with their own questions/observations and record these at the station for other students to consider. In the next lesson students will take their observation skills further and learn to identify common needle leaf trees using a dichotomous key.



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Vocabulary

<u>Forest floor:</u>	Lowest, above-ground layer of the forest, where we walk (includes leaf litter layer).
<u>Leaf litter:</u>	Layer of undecomposed organic material including fallen leaves, twigs, branches and dead animals on forest floor.
<u>Herb layer:</u>	Ferns, mosses and small herbaceous plants are located in the herb layer. This layer can be thought to extend approximately 1m above the forest floor.
<u>Shrub layer</u>	Includes small bushes and trees (from the herb layer to ~10 m).
<u>Understory:</u>	Layer under the canopy, consisting of medium sized trees and shrubs.
<u>Canopy:</u>	Uppermost continuous layer of leaves and branches and tallest trees
<u>Broad leaf tree:</u>	A tree that produces broad/wide leaves.
<u>Needle leaf tree:</u>	A tree that possesses narrow, modified leaves known as needles and produces seeds in cones. Also known as a conifer.

Materials

- Worksheets & pencils
- Station handouts – leaf shape pictures and animal pictures
- Plastic sheet to cover table for plant station
- Forest plant specimens (see below) or pictures
- Example question lists
- Bucket with dechlorinated water to store plant specimens as needed
- Forest animal specimens (see below) or pictures
- Temperate rainforest pictures/slideshow
- Bark & wood samples (see below)
- Cloth or plastic sheet to cover table for animal station

In the Classroom

Introductory Discussion

1. Introduce the start of the forest habitat lessons. Brainstorm – What is a forest?
 - Has anyone been in a forest? What makes a forest different from your backyard or the schoolyard?
 - Briefly brainstorm about what forests feel like (e.g., shady, cool, damp, dark, quiet, peaceful) and what type of forests exist (tropical, temperate, evergreen, deciduous)
 - What do forests look like in BC? In the Vancouver/coastal region? (show pictures/slides)
 - What plants and animals might we find there? – brainstorm on board (students can record their ideas on worksheet)
 - The coastal rain forest can be divided up into 5 distinct layers. Show diagram of forest layers and describe each (students can label their worksheet diagram as each layer is discussed):
 - Forest floor: Lowest, above-ground layer of the forest, where we walk (includes leaf litter layer). Leaf litter: Layer of undecomposed organic material including fallen leaves, twigs, branches and dead animals on forest floor.



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- Herb layer: Ferns, mosses and small herbaceous plants are located in the herb layer (waist height or lower for young students).
 - Shrub layer: include small bushes and trees. (a bit taller than a tall adult).
 - Understory: Layer under the canopy, consisting of medium sized trees and shrubs.
 - Canopy: Uppermost continuous layer of leaves and branches and tallest trees.
- Pick a few example organisms from the brainstorm and have students suggest what layer(s) they might inhabit. Can extend discussion to include microhabitats as well as time allows.
 - Introduce activity: Today we are going to have a chance to explore some forest plants and animals that we might see on our fieldtrip to Pacific Spirit Park (Lesson 7).
2. Short description of other items to discuss or review.
 - If any students have plant allergies they can use pictures to study the organisms or work with a partner and only the partner will touch the plants. Remind students to be respectful of others who may have allergies and not wave the plants around or stick them in other's faces, etc.
 - Review safe handling of museum specimens (depends on rules for specific specimens borrowed). In general, if students are allowed to touch specimens remind them how fragile the specimens are and that only the scientist will pick up and move the specimens. Students should only touch specimens lightly, with their pinky finger and if they want to stroke the fur or feathers it should be done lightly (with their pinky finger) and only in the direction that the fur/feathers grow, never in the opposite direction. Remind students not to pull or poke the legs, wings or tails. The wings, beak or claws cannot be opened.
 3. Briefly describe science experiment/activity.
 - Students will spend time at two different stations set up around the classroom: Forest Plants and Forest Animals.
 - At each station students will take 5 minutes to explore the organisms and discuss them with their group members. Students will then have 15 minutes to observe and compare two similar organisms. Students will take the lead in deciding which feature to observe and compare but example questions at each station will help guide their observations as needed. Students are also encouraged to use their own questions and record them for other students to use.
 4. Briefly describe the processes of science that the students will focus on: Students will focus on making and recording observations.
 5. Briefly describe safety guidelines.
 - Review safe handling of museum specimens (as above)
 - Review appropriate behaviour to be respectful of individuals with allergies.
 - Remind students that they should wash their hands before touching their face and prior to going for recess. Depending on the plants and animals used it may be appropriate for students to wash their hands in between stations too.
 - Suggest that anyone with sensitive skin avoid touching the cedar tree foliage.



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Science Activity

Activity Title: What lives in a forest?

Purpose of Activity: Students will be introduced to a variety of forest plants and animals focusing on those that they are likely to see on the fieldtrip to Pacific Spirit Park (Lesson 7).

Methods and Instructions:

Set-up prior to experiment:

- This lesson plan assumes that the scientist/teacher has access to a private yard or garden to collect specimens. If live specimens cannot be collected or purchased, photos of plants can be used.
- Prior to the lesson the scientist should collect a variety of shrubs, herbs and ferns as well as foliage, bark and wood from a wide selection of local trees.
- If Lesson 7 is to be conducted at a future date, the trees used in that lesson should be included in the current lesson.

Plant collection

- To obtain samples of tree trunks (i.e. wood and bark): one suggestion is to talk to local landscapers and suppliers of firewood.
- The plants used when the lesson was originally conducted included: salal, dwarf rose, scotch broom, Indian plum, horsetail, salmonberry, trailing blackberry, sword fern, lady fern, bracken fern, maidenhair fern, licorice fern, western red cedar, shore pine, grand fir, Douglas fir, western hemlock, Sitka spruce, red alder, big leaf maple, paper birch, bitter cherry, and vine maple.
- For the tree species: samples of bark, wood, and cones were also included as appropriate.
- Ferns and leafy plants: should be collected as close to the lesson as possible and kept in a bucket of water.
- (Handout provided at the station to help students describe the plants is included below.)

Animal specimens

- For this lesson the following animal specimens were borrowed from Beaty Biodiversity Museum: peregrine falcon, red-tailed hawk, Coopers hawk, short-eared owl, common raven, northwestern crow, eastern grey squirrel, Douglas squirrel and raccoon.
- As much as possible specimens (or pictures) should be tailored to the specific area used for the fieldtrip.
- Pictures showing specific features of the animals can augment the museum specimens.
- Museum loan should be arranged well in advance.
- Brief description of how students will work in groups or pairs: students will work in pairs or small groups to examine the specimens but will complete their worksheets individually.



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Methods and Instructions:

1. See detailed instructions on worksheet.
2. Describe plant station
 - a. Show examples of the different types of plants (Needle leaf trees, broad leaf trees, shrubs, ferns)
 - b. Discuss the questions we can use to describe plants – ask for suggestions and let students know that there will also be example questions at the stations. Encourage students to form their own questions and record them at the station.
 - c. Use one plant as an example to go through the questions
3. Describe animal station
 - a. Remind students to be respectful of specimens and to handle them with care.
 - b. Discuss the questions we can use to describe animals – ask for suggestions and let students know that there will also be example questions at the stations. Encourage students to form their own questions and record them at the station.
 - c. Use one animal as an example to go through the questions
4. For younger students the scientist should group the specimens into appropriate comparisons ahead of time. E.g. maple and alder, paper birch and bitter cherry, any two ferns, any two needle leaf trees, raven and crow, eastern grey squirrel and Douglas squirrel, etc.
5. Ideally each station will have an adult helper to assist the students with their observations. This may not be necessary for older students.
6. The scientist will remain at the animal station to ensure proper handling of the museum specimens.
7. At each station students will take 5-7 minutes to explore the objects and discuss them with their group members. The adult at each station can lead the discussion as appropriate. A brief overview should be given of the organisms present at the station.
8. Students will then have ~15 minutes to describe and compare two similar organisms as indicated on their worksheet.

Closure Discussion

- What did you like about this lesson? What was the hardest part [discuss how some organisms are very similar]
- Ask about similarities and difference between different pairs of specimens? Ask students what characteristics they could use to tell specific pairs apart from one another.
- What new describing questions did you come up with?
- Listen to bird calls from local forest birds and discuss these in combination with physical characteristics than could be used for identification.
- Introduce next lesson – using a dichotomous key to identify needle leaf trees.



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References

1. Campbell, Wayne et al. 2005. British Columbia Birds. Lone Pine Publishing.
2. Eder, Tamara and Don Pattie. Mammals of British Columbia. Lone Pine Publishing.
3. McCloskey, Erin and Gregory Kennedy. British Columbia Nature Guide. Lone Pine Publishing.
4. <<http://www.allaboutbirds.org>> The Cornell Lab of Ornithology. All About Birds. [Excellent resource for bird pictures, identification guides and bird calls.] Accessed June 1, 2014.
5. Pojar, Jim and Andy MacKinnon. Plants of the Pacific Northwest Coast. Lone Pine Publishing.

Extension of Lesson Plan

- Bark, leaf or other plant texture rubbings.
- Each student or group of students can select one organism or group of related organisms to research further.
- If “tree cookies” have been used in the lesson tree rings can be counted and tree ages can be discussed. See Temperate Forest Lesson 9: Tree Birthdays (SRP 0040).



DESCRIBING FOREST PLANTS

Questions about the whole plant

- What kind of plant is it? (tree, shrub, fern, herb, moss, etc.)
- What size is it?
- If you can see the entire plant, what shape is it?
- What does the plant smell like?
- Does the plant have flowers, fruits or cones? What do they look like?

Questions about the leaves

- What kind of leaves does it have? Broad leaves or needle leaves?
- Are there many leaves or few leaves?
- What size are the leaves?
- What shape are the leaves?
- Do the leaves have smooth edges, lobes or teeth?
- What colour are the leaves? Is the colour solid or is there a pattern? Are the same on both sides?
- Are the leaves shiny or dull?
- What pattern are the leaf veins?
- How would you describe the texture of the leaves?
- How are the leaves arranged on the stem?

Questions about the stems or bark

- What does the bark or stem look like?
- What colour is it?
- What does it feel like? Describe the texture.
- Is it thick or thin?

Final questions to ask

- What other interesting features does the plant have?
- Where in the habitat do you think you might find it? What kind of microhabitat would it prefer?

Other ideas?



DESCRIBING FOREST ANIMALS

Questions about the whole animal

- What kind of animals is it? (bird, mammal, reptile, insect, amphibian, etc.)
- What size is it?
- What does its mouth look like? Does it have a beak? Teeth? Pointy teeth? Big or small teeth?

Questions about the animal's skin or coat

- What kind of skin or coat does it have? (fur, feathers, scales, etc.). Describe it.
- What colour(s) is the skin or coat? Is the color solid or is there a pattern?
- What does the coat feel like?
- Is it shiny or dull?

Questions about the legs, feet and claws

- Does it have legs? How many?
- Does it have feet? What do they look like?
- Does it have claws? What do they look like?

Questions about tails, wings, antennae and other appendages

- Does it have a tail?
 - Is the tail made of feathers, fur, hair, flesh, etc?
 - What does the tail look like? (colour, shape, size, etc.)
- Does it have wings?
 - Are the wings made of feathers, skin, etc?
 - What do the wings look like? (colour, shape, size, etc.)
- Does it have antennae? What do they look like?
- Does it have any other appendages? Describe them.

Final questions to ask

- What other interesting features does the animal have?
- Where in the habitat do you think you might find it? What kind of microhabitat would it prefer?

Other ideas?