



Science Unit: *Ecologists Grow a Garden*

Lesson 5: *UBC Farm and Forest Field Trip*

School Year: 2012/2013

Developed for: David Lloyd George Elementary School, Vancouver School District

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Grade level: Presented to grades 4 and 5; appropriate for grades 2 – 7 with age appropriate modifications

Duration of lesson: 4 hours (2 hours for the lesson below and 2 hours for the UBC Farm Tour)

Notes: This lesson builds on vocabulary introduced in The Scientist in Residence Program science unit: Ecologists Grow a Garden, Lessons 1-4. In Lesson 6 some of the activities in this lesson are repeated at the school garden.

Ideally have three adults available for the forest lesson to allow for smaller group observation.

The Scientist in Residence science unit: Growing Plants - Lesson 5: Contrasting Landscapes includes a number of other great activities to explore at the UBC Farm Forest. <http://scientistinresidence.ca/science-lesson-plans/growing-plants/>

Invertebrate traps need to be set out the day before.

Objectives

1. Observe a temperate rainforest closely.
2. Explore invertebrate diversity.

Background Information

At school we have fostered a garden ecosystem. The garden provides a chance to concretely explore concepts such as: ecosystem, habitat, community, resources and adaptation. Today we will use our background learning to see these same concepts in a forest. Two activities will focus our attention on details in a forest ecosystem: sensory and forest scavenger hunts. We will also compare invertebrate diversity between the forest and our garden (Lesson 6 in this science unit, Ecologists Grow a Garden). In the invertebrate diversity experiment, pit traps are installed to catch forest floor invertebrates. Many of these animals are most active at dawn, dusk and/or at night. Therefore, the traps are installed in the afternoon and checked the next day.

The forest floor is a rich ecosystem we rarely explore. It is full of organisms we cannot see, such as bacteria, yeasts and molds and many more we can easily see, such as beetles, worms, centipedes, millipedes, spiders, slugs, snails and sow bugs. These organisms interact in food webs similar to the interactions in the landscape above the forest floor.

In a garden, soil is regularly disturbed, exposed to the sun, disconnected from neighbouring natural areas and there are no leaves, branches nor logs laying on the soil. In contrast, forest soils are relatively undisturbed, full of leaf litter and woody debris, shaded and set in a natural setting. These differences mean our samples may differ in the type and diversity of species.



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Some of the invertebrates we may see include:

Ground Beetles: Ground beetles are usually longer than wide, have long legs, run fast, are nocturnal, solitary and predatory. They are found throughout the world and are common in forests. There are more than 26,000 species worldwide.

Earthworms: There are thousands of earthworm species worldwide. They live in moist soil and help to decompose dead plant material.

Centipedes: Centipedes have 1 leg per body segment, flat bodies, and scurry away if disturbed. They are predators.

Millipedes: Millipedes typically have two legs per body segment, rounded bodies, curl into a ball if disturbed and most are decomposers (eat dead organic matter, such as leaves).

Spiders: Spiders have two body sections and eight legs. There are more than 40,000 known species of spiders in the world. They are solitary and predatory.

Slugs: Snails and slugs are both gastropods. There are approximately 100 species of terrestrial slugs and snails in British Columbia. In coastal British Columbia gardens the introduced Great Grey Slug and European Black Slug are common, voracious herbivores. However, in our forest the native Banana Slug is more common. Banana slugs are excellent decomposers.

Sow Bugs: Sow bugs, also know as pill bugs or roly-polies, are terrestrial crustaceans. They roll into a ball when threatened and are mostly decomposers.

Vocabulary

<u>Species Richness:</u>	The number of species present in our invertebrate samples. Species richness is a subset of species diversity, which is a subset of biodiversity.
<u>Species Diversity:</u>	A measure of the number of species and the abundance of individuals in each species.
<u>Biodiversity:</u>	Biological diversity or biodiversity is a measure of the genetic diversity within species, the variety of species in an area and the variety of habitats within a landscape.
<u>Invertebrate:</u>	An animal without a backbone, such as a slug, spider, beetle, worm or centipede.

Materials

- 3 portable plastic tubs with high sides
- 12 drink cups or tin cans
- waterproof worksheets
- waterproof cushions
- trowel
- clipboards, pencils
- jam

Introductory Discussion

Share the story: [The Mouse, Douglas Fir and the Great Forest Fire](#). Show students a Douglas fir cone and tree. Discuss forest activities and type of ecosystem we will visit.

1. Science experiment/activity: We will sample invertebrates found on the forest floor, look closely at the forest and explore four of our senses in the forest. Our invertebrate sampling requires us to formulate a prediction/hypothesis and record results. Our scavenger hunts will hone our observation skills - a key scientist attribute.



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2. Safety guidelines:
 - Stay with your group
 - Respectful observation and animal handling

Science Activity/Experiment

Experiment Title: Invertebrate Observation Experiment

Purpose of Experiment: To compare invertebrate diversity in the forest and our garden

Prediction or Hypothesis: Will we find a larger diversity of invertebrates in the forest or in our garden?

Methods and Instructions:

Set-up prior to experiment: Find 12 drink cups or tin cans, trowels and jam.

1. Place 12 pit traps, a tin can or drink cup, along a forest trail **the day before**. Dig a small hole. Place a trap with the rim at soil level. Apply a layer of jam to the inside rim of each trap. Place a bit of leaf litter in the bottom of the trap.
2. Check pit traps. Provide a plastic tub with high sides to gently place any invertebrates in.
3. Carefully record the number of different types of invertebrates found.
4. Release all insects back to the forest floor.

Activity Title: Forest Scavenger Hunt

Purpose of Activity: To observe a forest more closely

Methods and Instructions:

Set-up prior to experiment: Copy forest scavenger hunt worksheets. Provide clipboards and pencils.

1. Provide a copy of the forest scavenger hunt worksheet for each student.
2. Walk slowly down a forest trail.
3. Encourage students to look at all forest layers. To observe closely. Note how an ecosystem can be within an ecosystem: the forest is an ecosystem, a nurse log is an ecosystem and soil is an ecosystem. Look at the community of organisms and the habitat they live in.

Activity Title: Sensory Scavenger Hunt

Purpose of Activity: To experience and describe a forest with each sense.

Set-up prior to experiment: Copy sensory worksheets. Provide clipboards and pencils.

Methods and Instructions:

1. Provide a sensory worksheet.
2. Each student must find a quiet place to sit on their own.
3. Instruct students to write examples of things they see, hear, lightly touch and smell in the forest. Encourage them to use descriptive words.
4. Come back together to discuss what they found.

Closure Discussion

What did you see, hear, smell and lightly touch in the forest? Did you see any evidence of humans using the forest as a resource? How is the forest similar and different than our school ground?

References

Biokids. Kids' Inquiry of Diverse Species. <http://www.biokids.umich.edu/critters>. Accessed June 5, 2013.

Bohan, Heidi (adapted by). 2006. Starflower Foundation. The Mouse, Douglas Fir and the Great Forest Fire. http://www.wnps.org/education/resources/documents/K-5_Q&E/2nd_grade/2-2b.pdf



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E-Fauna. Electronic Atlas of the Wildlife of British Columbia. University of British Columbia.
<http://www.geog.ubc.ca/biodiversity/efauna/> Accessed June 14, 2013.

Freeman, Jennifer. 2007. Science 101: Ecology. Smithsonian.



Name: _____

Date: _____

UBC Forest Scavenger Hunt

Record what you find on our forest walk.

Douglas Fir Tree	Douglas Fir Cone	Western Red Cedar Tree	Big Leaf Maple	Fern
New Plant Growth	Lichen	Moss	Nurse Log or Stump	Pollen and Nectar Source
Bracket Fungus	Decomposing Wood	Leaf Litter	Evidence of Forestry	Evidence of a Forest Fire
Evidence of Insects (i.e. holes in wood)	Insect	Bird	Bird Call	Slug



Sensory Worksheet

Name: _____

Date: _____

Record examples of things you see, hear, lightly touched, and smell. Use descriptive words to describe the items.

Items	Sight (What does it look like?)
Items	Smell What does it smell like?
Items	Hearing What does it sound like?
Items	Touch What does it feel like?



Invertebrate Diversity Experiment

Hypothesis: _____

Location	Date	Weather	Time	Pit Trap #	Record how many of each type of invertebrate are caught in each trap (Snail, Slug, Beetle, Worm, Spider, Centipede, Millipede or Other)
UBC Forest					
Our Garden					