



Science Unit: *Ecologists Grow a Garden*

Lesson 3: *Habitat Garden*

School Year:	2012/2013
Developed for:	David Lloyd George Elementary School, Vancouver School District
Developed by:	Lea Elliott (scientist); Barb Hinson and Mai McHardy (teachers); Erika Wilson and Joyce Ycasas (student teachers)
Grade level:	Presented to grades 4 and 5; appropriate for grades 2 – 7 with age appropriate modifications
Duration of lesson:	1 hour and 20 minutes (This lesson is repeated during the fall and spring to complete all of the planting)
Notes:	<p>This lesson complements Lessons 1 and 4 in the Scientist in Residence Program unit: Ecologists Grow a Garden. The lesson relies on the planting plan: <i>Birds and Bees Landscape Plan</i> (please see the reference at the end of this lesson plan) . Keep a close eye on planting times. It is important to plant at the correct time of year for each type of plant, seed or bulb. All seeds, bulbs and plants are planted directly in the garden.</p> <p>Before this lesson: install a Black-capped Chickadee nest box by the end of January, prepare a garden bed to grow the plants in, buy plants, bulbs and seeds find an insect water dish and garden tools.</p>

Objectives

1. Discover what a habitat garden is and why we are growing a habitat garden.
2. Learn what resources are beneficial to garden organisms.

Background Information

The garden provides an opportunity for students to actively explore an ecosystem, to experience the interactions between organisms, to be immersed in nature and to contribute a beautiful, sustainable and beneficial landscape to the community. In this science unit we grow, explore and study a habitat garden.

A habitat garden provides resources and habitat for local organisms. Habitat gardens come in different forms, such as a native plant garden, butterfly garden or beneficial animal garden. The garden plants and features have to be appropriate for the ecosystem.

The garden in this science unit is designed to attract animals beneficial to food crops grown on British Columbia's Pacific coast. Many local animals, such as bees, hover flies, ladybugs and chickadees are very helpful in a food garden. These animals provide services such as eating pests and pollinating crops. We want to attract these beneficial animals to our garden. We will grow plants whose pollen and seeds provide food sources for these beneficial animals. Nest boxes for mason bees (lesson 4 in the Ecologist Grow a Garden unit) and chickadees and hibernation sites for ladybugs are provided.

This science unit is designed to work in an existing school garden. A raised bed filled with organic soil is needed. Ideally a water source and composter should be available. For the garden to be successful, the soil must be nourished with compost and cover crops. The compost and cover crops add nutrients and organic matter (helps hold moisture) to the soil. Cover crops also prevent soil erosion and nutrient leaching during heavy rains.



SCIENTIST IN RESIDENCE PROGRAM

The garden will need to be watered regularly, including in the summer. The garden will need to be weeded, seedlings thinned and crops harvested. Support for building and maintaining a school garden can be found in the Vancouver School Board Garden Policy, on Evergreen's website (a Canadian non-profit supporting school ground greening) and at Think Eat Green (a University of British Columbia program that supports sustainable school food systems). (Please see references at the end of this lesson plan.)

Often we study ecosystems as locations that are a distance and separate from cities. This lesson shows that ecosystems are everywhere, even in our backyards and schoolyards.

Vocabulary

<u>Adaptation:</u>	The way in which an organism is suited to its habitat.
<u>Ecology:</u>	The science of the relationship between organisms and between organisms and their non-living environment.
<u>Ecosystem:</u>	A system formed by the interactions of all the living and non-living things in an environment.
<u>Food Web:</u>	A system of interconnected feeding relationships in an ecosystem.
<u>Habitat:</u>	The home of an organism, such as a plant or animal.
<u>Hibernacula:</u>	A shelter used in the winter by a dormant animal.
<u>Hibernate:</u>	An adaptation where animals eat lots of food, find a safe location and then enter a resting state, similar to sleep, to survive the winter.
<u>Organism:</u>	A living animal, plant or fungus.
<u>Resources:</u>	Any living or non-living thing that animals (including humans) use to meet their needs.

Materials

- Seeds: crimson clover, coriander, annual alyssum, sunflowers, kale and dill
- Shovel and trowels
- Logs or larger rocks for hibernacula
- Bulbs: spring flowering crocuses
- Hot glue gun
- Chickadee nest box
- Plants: strawberry, perennial alyssum and winter heather plants
- Shallow water dishes with small rocks
- Small rocks
- Waterproof data sheets, pencils, clipboard and cushion

In the Classroom

Introductory Discussion

1. One ladybug (a.k.a. lady beetle) can eat up to 5000 aphids in its lifetime. To ensure any ladybugs in the garden stay here, we need to give them the resources they need to hibernate through the winter. They need pollen to build energy reserves, such as pollen from coriander, dill and alyssum. They need a safe location to hibernate. We're going to install a hibernacula for the ladybugs and other beetles to use. They often use the same site to hibernate year after year. They release a scent to attract other ladybeetles. Then they can huddle together to stay warmer.



SCIENTIST IN RESIDENCE PROGRAM

2. Illustrate the connection between ladybugs and other garden organisms, including: aphids, cilantro, alyssum, strawberries and parasitic wasps.
3. Science activity: Prepare soil: remove weeds and add compost. Plant seeds, bulbs and plants. Add habitat features: insect water dish and beetle hibernacula.
4. Safety guidelines:
 - Stay with your group
 - Stay on school property
 - Respectful observation

Science Activity/Experiment

Here are 5 activities for this lesson that are completed in the fall and spring. They involve preparing the soil, planting and adding habitat features. Additional visits can be made to the garden to remove weeds, thin seedlings, water, observe and harvest.

Activity 1: Late September/early October garden visit

Purpose of Activity: To plant and add a ladybug hibernacula

Methods and Instructions: Set-up prior to experiment: Buy bulbs and seeds. Find large rocks or logs, trowels and watering cans.

1. Prepare soil: remove weeds and crops grown the previous season.
2. Plant crocus bulbs and crimson clover. Water garden.
3. Place large rocks or logs in a pile. These will be cover for ladybugs to hibernate in over the winter.
4. Discuss how plants and hibernacula support garden organisms.

Activity 2: March garden visit

Purpose of Activity: Prepare garden bed

Methods and Instructions: Source trowels and shovels.

1. Remove weeds from the garden.
2. Dig in crimson clover cover crop.
3. Add compost to soil.
4. Take care not to dig out the crocus bulbs.
5. Discuss importance of healthy soil.

Activity 3: Early April garden visit

Purpose of Activity: To plant and add an insect water dish

Methods and Instructions:

Set-up prior to experiment: Buy strawberries, perennial alyssum and winter heather plants. **Choose plants that are or are about to flower.** Buy coriander, annual alyssum and sunflower seeds. Source trowels, watering cans, shallow water dish (i.e. round tray for plant pot) and small rocks.

1. Remove weeds from the garden.
2. Plant strawberries, heather and perennial alyssum. Sow coriander, annual alyssum and sunflower seeds. Water garden.
3. Make water dishes for insects: glue rocks in shallow water dishes, add water and place in garden
4. Discuss how plants and hibernacula support garden organisms.

Activity 4: May garden visit

Purpose of Activity: To plant seeds and care for garden

Methods and Instructions:

1. Remove weeds from the garden.
2. Thin seedlings as needed. If there are too many seedlings in a small space they will compete for resources (water, sun, nutrients) and be less successful.
3. Plant dill seeds. Water garden.
4. Discuss how plants will benefit animals in the garden.



SCIENTIST IN RESIDENCE PROGRAM

Activity 5: June garden visit

Purpose of Activity: To plant seeds and care for garden

Methods and Instructions:

1. Remove weeds from the garden.
2. Thin seedlings as needed.
3. Plant kale seeds. Water garden.
4. Discuss how plants will benefit animals in the garden.

Closure Discussion

1. What type of insect is a ladybug? What other names does it have?
2. What resources do ladybugs need?
3. Why do we want to encourage ladybugs in our garden?
4. How do we build healthy soil?
5. Why are different types of seeds planted at different times?
6. Why do we thin seedlings?

References

1. Cain, Michael L., William D. Bowman and Sally D. Hacker. 2008. Ecology. Sinauer Associates, Inc.
2. Cox, Martyn. 2009. Wildlife Gardening. How to Bring Birds and Bugs to Your Backyard. DK Publishing.
3. Elliott, Lea. 2011. Birds and Bees Landscape Plan.
<http://naturehood.ca/pdfs/birdsandbeesplantingplan.pdf> Accessed February 18, 2013
4. Elliott, Lea. 2011. Black-capped Chickadee Nest Care.
<http://naturehood.ca/pdfs/chickadeecaresheet.pdf> Accessed March 10, 2013.
5. Freeman, Jennifer. 2007. Science 101: Ecology. Smithsonian.
6. Levin, Simon A. Editor. 2009. The Princeton Guide to Ecology. Princeton University Press.

Extension of Lesson Plan

1. Create signs for the garden to help others learn about the habitat features.
2. Draw a map of the garden.