

# Plants in the Schoolyard

## Science Instructional Materials Lesson Upgrade

This lesson upgrade was developed as part of an Office of Superintendent of Public Instruction (OSPI) and Washington State Leadership and Assistance for Science Education Reform (LASER) project funded through an EPA Region 10 grant. The purpose of the lesson upgrades is to incorporate environmental and sustainability concepts into high use science instructional materials and also address the cultural relevancy of the lessons by incorporating Native American stories.

**Grade:** 1-2

This lesson replaces Investigation 3 from the FOSS “New Plants” instructional materials kit.



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Science Instructional Materials  
Lesson Upgrade

## Lesson Summary

This lesson brings scientific practices (observation and inquiry) outdoors, using the schoolyard ecosystem. The investigation focuses on the relationship between students and plants, addressing Washington State Science and Environmental and Sustainability learning standards using experience-based activities to bring relevance to the students’ lives. Tribal storytelling is also brought into the lesson.

## Lesson Objectives

Students will:

- Investigate plants and other features of the schoolyard ecosystem.
- Record observations of their “adopted” plant.
- Discover connections and relationships between plants and themselves.

## Student Friendly Learning Targets

- I can name the parts of the schoolyard ecosystem.
- I can describe how the ecosystem changes over time.
- I can explain how my plant is connected to other parts of the ecosystem.

## Essential Questions

- What are the parts of the schoolyard ecosystem?
- How are the parts of an ecosystem interconnected?
- How are people and plants interdependent?
- How are Native American stories connected to the science and environmental concepts?

## Content Standards Connections

- WA Environmental and Sustainability Standards: ESE 2
- WA Science Standards: K-1 SYSA; K-1 INQA, C, D, E; K-1 APPD; K-1 ES2A; K-1 LS1B, K-1 LS2A, K-1 LS2C, 2-3 APP2C; 2-3 LS2A; 2-3 LS2D
- A Framework for K12 Science Education (and NGSS Placeholder): CCC: Structure and Function; LS1A,B
- ELA Common Core: Reading Standards for Literature (1 and 2)
- Social Studies Standards: EALR 3.2.1 – Geography (human interaction with the environment)

## Key Vocabulary

- Observe
- Record
- Ecosystem
- Depend
- Environment
- Interconnections
- Interdependence
- Sustainability

## Materials

### For each student:

- Science notebook
- 1 Clipboard
- 1 Pencil

### For the class:

- Plant field guides (one field guide for every 4 or 5 students – see suggested guides below) or online resources for plant identification.
  - **Plants of the Pacific Northwest Coast.** Jim Pojar and Andy MacKinnon, Lone Pine Publishing, Vancouver, BC, 1994.
  - **Plants of Southern Interior British Columbia and the Inland Northwest,** Robert Parish, Lone Pine Publishing, Vancouver, BC, 1999.

- **Washington Native Plant Society website:**  
[http://www.wnps.org/education/native\\_plant\\_info.html#identifying](http://www.wnps.org/education/native_plant_info.html#identifying)
- (Copy pages in color. You will need to predetermine which plants students will see.)

**For the teacher:**

- Digital Camera (optional)
- Native American Story Lesson Plan
- MP3 of native American Stories
- Video of Roger Fernandez on Native American Stories

### Getting Ready

1. Time to do the lesson: 15-30 minutes for each observation and follow up activities.
2. Site Preparation: Check for safety and hazard factors. Create and know defined observation area.
3. Tips for Success: Review “Outdoor Field Study Considerations,” at the end of this lesson
4. Safety Considerations: Check for and be aware of any harmful plants or hazardous items in investigation area.
5. Sustainability/Conservation: Rethink, Reduce, Reuse, and Recycle materials as much as possible.
6. Teacher background knowledge: Ecosystems
  - WHAT IS AN ECOSYSTEM?
  - An ecosystem is a community of animals and plants interacting with one another and with their physical environment. Ecosystems include physical and chemical components, such as soils, water, and nutrients that support the organisms living within them. These organisms may range from large animals and plants to microscopic bacteria. Ecosystems include the interactions among all organisms in a given habitat. People are part of ecosystems. The health and wellbeing of human populations depends upon the resources provided by ecosystems and their components - organisms, soil, water, and nutrients. From “Ecological Society of America”  
[http://www.esa.org/education\\_diversity/pdfDocs/ecosystems-services.pdf](http://www.esa.org/education_diversity/pdfDocs/ecosystems-services.pdf)
  - Additional resources:  
<http://forest.mtu.edu/kidscorner/ecosystems/definition.html>

**NOTE:** If you are teaching this in the winter, plan to make an initial observation in the fall prior to the plants going into hibernation. Make at least 1 or 2 observations in the winter, then make 1 or 2 observations in the spring.

## Guiding the Investigation

### Part 1: The Schoolyard Ecosystem

1. Administer the [New Plants](#) pre-assessment. Using the rubric, score assessment and use the data to guide your instruction.
2. Tell students they will be learning about plants that are part of the schoolyard ecosystem. Ask: *What is an ecosystem?*
3. Elicit student preconceptions about ecosystems. *What does “eco” mean?* (It is short for ecology- the study of habitat.) *What is a “system”?* (A system is a set of interrelated parts through which matter, energy, or information flow.)
4. Ask: *What are the parts of our schoolyard ecosystem?*
5. Ask: *Why should we study our schoolyard ecosystem?*
6. Discuss with the students how to make observations. *What makes a good observation? What makes a good scientific drawing?* Draw what you see, you’re eyes are like a camera.
7. Take the students outside with their science notebooks, a pencil, and a clipboard.
8. Ask students to list all the parts of the schoolyard ecosystem they can observe in their science notebook, using pictures and/or words.
9. Bring students back inside with their initial observations.

**Wrap-up:** Discuss as a class: *What did you observe in our schoolyard ecosystem?*

- a. Teacher generates a list with the class.
- b. Ensure that components such as air, water, soil, human-built structures, living and non-living pieces are included. Students tend to just list components such as plants and animals.

## Guiding the Investigation

### Part 2: Plant Adoptions and Observations

1. Tell students they will be studying the plants in the schoolyard ecosystem. They will be doing a descriptive field study of their ecosystem or plant describing how their plant or ecosystem changes over time.
2. Ask: *What plants do we have in our schoolyard ecosystem (what were some of your observations)? How do you think they got there? How do they help us? How do animals depend on them? How do we depend on them? How do they depend on us? How do they change over time?*
3. Tell students they will each select (adopt) their own plant in the schoolyard to observe and record over time. They will discover how it is related to other parts of the ecosystem and themselves. Encourage them to choose a plant that interests them. Have students date their notebook pages and remind them to draw what they see. Ensure that students label their drawings.
4. Take students outside and give them three minutes to select a plant within the area you define. Once they have selected their plant, they can begin to make

observations including drawing their plant. If digital cameras are available, students can take a picture of their plant to print out and glue or tape into their notebooks.

### Mid-investigation wrap-up:

- a. Ask: *What did you observe about your plant? What is a question you have about your plant?*
  - b. Have students record their questions in their science notebooks.
5. Repeat the outdoor observations as often as you can (2–4 times) during the module, focusing the observations on different aspects of the investigation. Students sit or stand in same spot each time:
    - a. Draw interesting features of the plant as well as the whole plant.
    - b. Look for changes in the plant over time.
    - c. If you can, take photographs of students with their plants.
  6. Invite students to share their observations with the class after each outing.
  7. Ask: *What did you notice about your plant? Has your plant changed since you last observed it? Has the environment or habitat around your plant changed? Record answers in their science notebooks.*
  8. Display students' drawings and observation notes.

### Wrap-up:

- a. Ask: *What did you wonder about your plant?*
- b. Help students identify their plants and answer their questions. Discuss and share with class: *What did you learn about your plant?*

## Guiding the Investigation

### Part 3: Making Connections

1. Tell students they will be making connections between themselves, the plants they observed, and their ecosystems.
2. Take students outside to observe their plant. Tell them they will now be observing and recording other parts of the ecosystem the plant has a relationship with (for example, a slug is on the trunk, insects have been nibbling leaves, the soil is very dry).
3. Based on the observations in Part 2, each student creates a concept map showing the plant in the center and other parts of the ecosystem around it. See template, "Concept Map" at the end of this lesson.
4. As a class create a larger concept map or mural of the schoolyard ecosystem using information from the students' concept maps. This could be done on a white board or by creating a class bulletin board of the schoolyard ecosystem.
  - a. In the center of the concept map is "Our Schoolyard Ecosystem".

- b. Radiating out from the center is each student’s individual concept map. If multiple students studied the same plant, then group these concept maps together.
5. Discuss: *What are the interconnections between plants and animals, including us?* Explain that “interdependence” is depending on each other, much like our learning community where we depend on one another. In an ecosystem, the parts all play a role, are interconnected, and interdependent.
  - a. *How do we (humans) depend on plants? How do plants depend on us?*
  - b. *How do we affect/impact our schoolyard ecosystem?*
  - c. *How are we connected to the plants and other parts of our schoolyard ecosystem?*
  - d. *What could you do to help our schoolyard ecosystem?*
6. Administer the Adapted New Plants post-assessment. Note: This assessment is for Adapted Investigations 3 and 4, so if you are doing Investigation 4, administer the post-assessment after investigation 4. Score using the rubric.

**Extension:** Each student creates a page for a class book, “Our Schoolyard Ecosystem Field Guide,” using the concepts maps and information collected.

## Guiding the Investigation

### Part 4: Stories

1. Students will be writing/creating a story about their plant from the perspective of the plant. For example, “I’m a plant growing in the sidewalk crack. My roots are feeling really squished. It has been sunny for many days; I sure could use a drink! Sometimes a rabbit wanders by and nibbles on my leaves...”
2. Teacher will discuss respect/story-telling protocols/Tribal cultural connections.
3. Students will listen to Roger Fernandez’ story.
4. See Native American Story Lesson Plan for facilitation questions. Additional questions may be: *What does this story mean to you? What do you think this story is about? How does this story relate to your own cultural traditions? How does this relate to our schoolyard ecosystem? What questions do you have about this story?*
5. Students tell their stories to the class.

## Assessment

- Formative: Monitoring student notebook observations.
- Pre and Post Assessment: Adapted New Plants Assessment

## Teacher Reflection

After teaching the lesson spend some time reflecting on how the lesson went, whether students, met the objectives, and what adjustments you would do if and when you (or your colleagues) teach the lesson again.

## Credits

- Lesson upgrade developed by Wendy Whitmer, Northeast LASER Alliance Director and NEWESD Regional Science Coordinator and Susan Milan, Teacher South Whidbey School District.
- Adapted from Science in the Schoolyard Guide: FOSS New Plants, Boston Schoolyard Initiative, [www.schoolyards.org](http://www.schoolyards.org).

## Accessing Lesson Online

[http://www.wastatelaser.org/support/ESEL/new\\_plants/index.asp](http://www.wastatelaser.org/support/ESEL/new_plants/index.asp)

## Outdoor Field Study Considerations (by Steven Coleman)

If you are new to taking students outside, here are a few things to consider. These will not apply in all situations but are good things to think about.

1. Check out the area before bringing students outside.
  - Define the boundaries within which you want them to stay.
  - Look for potential hazards such as unstable slopes, streets, etc.
  - Consider natural hazards; predators, other animals, snakes, rivers, etc.
2. Before going out, go over the lesson objectives and materials.
3. Before going out, go over behavior expectations (you might have the students themselves come up with proper behavior). Examples are:
  - Use your quiet voice
  - Walk don't run
  - Be safe and be aware of your surroundings
  - Stay with your buddy
  - Be respectful of each other and of the environment
  - Stay focused on your objective
  - Stay within the defined boundaries
  - Use all your senses
  - Do not touch or harm animals
  - Stay out of the water
  - Don't stick your hands or feet where you have not looked
4. Plan for safety considerations. For example:
  - Who has a history of asthma, seizures, etc. and how will you deal with it?
  - Who has food allergies, allergies to stings, bites, etc.
  - Plan for communication: is there cell service where you are headed?
  - Do you have access to first aide? Do you have training? Field kits?
  - Do you have a parent who could meet EMS and lead them to you?
  - Restrooms... are they available, clean, safe, adequately supplied?
  - What if inclement weather moves in quickly? Have a plan "B"
  - Do you need to reserve picnic tables, gazebos, bring shade covers, rain gear, transportation, etc.?
  - Do you need additional help and if so does everyone know their expectations, roles, and responsibilities? Have they passed background checks?

### Concept Map

