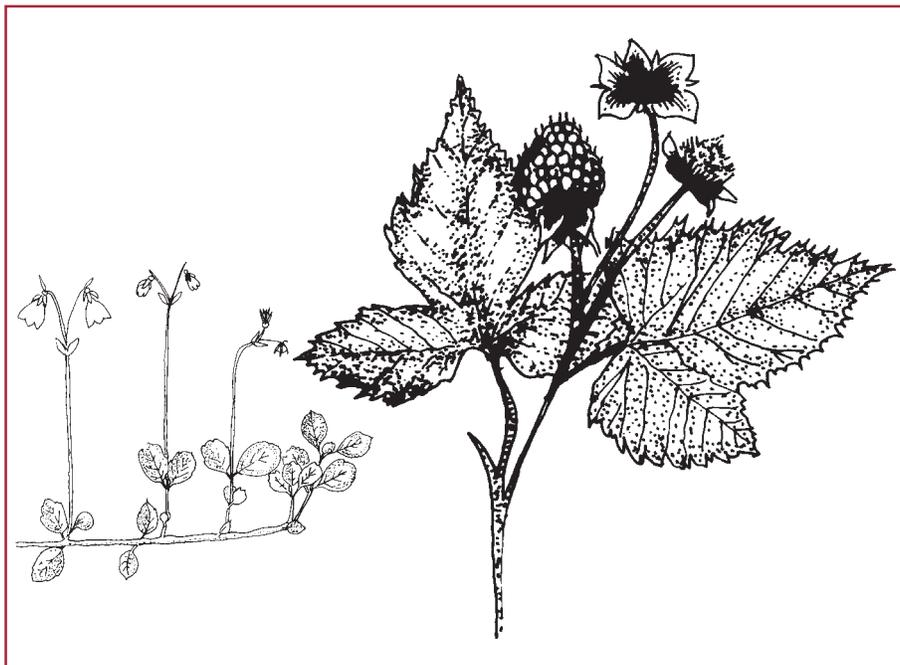


Investigating Plants

2 EXTENSIONS *ALERT: ALASKA ECOLOGY CARDS OPTIONAL*

Section 3

ECOLOGY ACTIVITIES



Grade Level: 4-12

State Standards: M A-3, M A-6, S A-14, S A-15, S B-1, S B-5, S B-6

Subject: Science, math, language arts, art

Skills: Observing, recording, analyzing, describing, drawing, computing, measuring, estimating, identifying

Duration: 90 minutes

Group Size: 2-5

Setting: Outdoors /indoors

Vocabulary: Abundance, annual plants, chlorophyll, dominant plants, dormant, fruit, habitat, multi-cellular, transect

Objectives:

1. Students will recognize and identify some plants from their local ecosystem, including plant signs during the non-growing seasons.
2. Students will describe the differences in abundance of plants in their local environment.

Complementary Activities:

“Five Kingdoms But No King,” “Take a Deep Breath,” and all the “Investigating(Nonliving Things)” in Section 1, *Elements of Ecosystems*. Also “Who Eats Whom,” “Mineral Cycling,” and “Create a Classroom Compost Box” in Section 2. Also all the “Investigating (Living Things)” activities in this section.

Materials:

For each student: hard surface for drawing or recording data. For each group: one copy of the “Science Card” several copies of the “Plant Data Sheets I and II” (see following pages), paper for drawing, field guide to plants or *Alaska Ecology Cards*, small plastic cup or container for collecting soil, and a

transect line made with a 3-meter (or shorter – see step #5) piece of rope or string.

OPTIONAL: a journal for drawing and recording names of plants.

Background:

See *INSIGHTS, Section 1, Elements of Ecosystems: “Plants” fact sheet; INSIGHTS, Section 2, Community Connections; and INSIGHTS, Section 3, Living Things in their Habitats.*

Procedure:

1. IN CLASS: review how plants are different from fungi, monerans, and protists. (Plants are **multi-cellular** and have **chlorophyll** for performing photosynthesis). Explain to the class that they will investigate their local ecosystem for **diversity** and **abundance** of plants.

2. Explain that students will be locating and drawing as many plants as they can find along **transect** lines. They will include any plants within five centimeters to each side. Demonstrate how to draw a plant and



note which characteristics help to identify one plant from another. *Shape, size, edges, and texture of leaves are important.*

3. Give examples of questions to ask as students draw and take notes about plants they find: *Do leaves form a pattern such as three leaves on a stalk? Are leaves found opposite one another on a stalk or do they alternate? Does the plant hold dried flowers or **fruit**? Is the plant stem woody or easily bent? Does this plant grow under trees, on rocky soil, or in wet places?*

4. Discuss “annual plants” that grow from seeds or buried roots, flower, produce new seeds, and die in one calendar year. What evidence do these organisms leave behind? *Dead leaves, tubers, seed pods, and roots.* Instruct students to include such evidence when they identify plants along their transect lines.

5. OUTDOORS: if you are studying an area with a high **biodiversity** (*i.e. many different plant types*), use a shorter piece of **transect** line so that students won’t get overwhelmed.

6. Distribute the “Plants Data Sheets I and II” to each group.

7. Ask each group to lay its transect in a straight line. You may want to challenge the groups to lay their rope so that it touches the highest number of kinds of plants and still maintains a straight line. Have students identify their working area of 5 centimeters to each side of the line.

8. The following roles could be rotated so everyone experiences each assignment: Project Coordinator (*makes sure everything runs smoothly and watches for duplication in plants that are drawn*), Plant Illustrator, Plant Counter, a Plant Classifier (*to key out names for plants*), and a Plant Recorder (*to record the group’s answers to the worksheet*).

9. Students begin surveying. They will describe each kind of plant and then keep a tally of how many of each kind grow along their transect. Students can each draw plants, if desired, checking with the coordinator to avoid duplication. After the observation/drawing session is complete, the Plant Recorder should collect all drawings.

10. When all plants along the transects are drawn and recorded, distribute the Science Cards and ask the groups to sit together and answer the questions.

11. Give each group a small container (such as a paper cup) to collect soil to take back to the classroom to make a “mystery garden.”

12. IN CLASS, share information and drawings on the plants. Was there a pattern in where the groups found certain plants growing? Why do certain plants grow better in some places than others? Focus the discussion on the **habitat** of the plants.

VARIATION

Instead of a making a transect line, have groups make study plots. Cut a 4-meter piece of string and tie the ends together. Instruct students to make a square out of their length of string, thus creating a one-meter-square plot. Students examine all the plants within the plot.

Evaluation:

1. Given drawings, pictures, or specimens, recognize and identify abundant local plants.

2. During discussion, demonstrate awareness of the dominant plants in the local ecosystem.

3. Give examples of evidence of annual plants during the non-growing season.

EXTENSIONS:

A. **Use the drawings to create a display.** Have the students sort through the drawings to find samples of each kind of plant found along their transects. Use those to create posters or a display of schoolyard plants. Students research plant facts from field guides, the *Alaska Ecology Cards*, and other sources.

B. **Make a school herbarium.** Students collect and press *one example* of each plant found. Herbarium specimens may be used by future groups or classes to help identify plants on their transect studies.



NOTE: *Before collecting any living thing, discuss with the students the importance of preserving the environment and disturbing the area as little as possible.*

- For small plants, collect the entire plant including the root, flowers, stems, and leaves if possible. Shake off any loose dirt.
- For trees and shrubs, collect sample branches, leaves, flowers or seeds. Make rubbings of bark by using paper and crayons or charcoal.
- Press samples in a plant press (between sheets of cardboard and newspaper, bound with rubber bands or weighted with heavy books), changing the newspaper every few days.
- When samples are dry, students mount them on poster board and label with the plant's name, where it was found, who collected it, and the date that it was collected. Also identify plants using local names and uses.

Curriculum Connections:

(See appendix for full citations)

Books:

How Nature Works (Burnie)

Plant (Eyewitness) (Burnie)

Plants (Silverstein)

Science of Plants (Bocknek) (Gr. 4-6)

Website:

Plants Database <plants.usda.gov/plants/home_page.html>

Teacher Resources:

(See appendix)



Plant Transect

1. **Biodiversity.** How many kinds of plants did you find along your transect line?

2. **Identification.** If you haven't already, try to identify the most common plants by using a field guide to plants. If you cannot find the name of the plants in your guide, or if a field guide is unavailable, record details about the plant to help you identify it later.

3. **Dominant species.** Which three kinds of plants were the most abundant on your transect? These "dominant" species will have the highest numbers in the third column of your "Plant Data Sheet I." *Make sure that you have counted individual plants, not every leaf or stem. Count a moss clump as one plant.* Write the total for each plant on its drawing.

4. **Dormant annual plants.** Depending on the time of year and where you are, many plants may be dormant, which means you won't clearly see their leaves, flowers, or even stems. Describe the kind and amount of the following plant remnants that you found on your transect:

- (a) Dead leaves or needles
- (b) Dead flowers
- (c) Seeds
- (d) Roots above the ground

5. **Mystery gardens.** You can find out more about what plants are in the soil as seeds by taking a small sample of soil back to the classroom, putting it in an open container (an empty milk carton, for example), watering it well, covering it with plastic, and placing it in a sunny spot. Watch your mystery garden closely for 2-3 weeks and record what happens.



Plant Data Sheet II

PLANT DRAWINGS

Plant # _____ Name _____

