Quick & Easy Habitat Education Activities

Plant Growth Monitoring

Developed by Heidi Bohan/ Starflower Foundation

Third Grade
30 minutes 1st time/ then 10 minutes
Outdoors/ Indoors: Feb- July

Description: Students conduct growth monitoring activities using seedlings propagated in the *Growing Native Seeds* activity, or seedlings and young plants occurring in the habitat area. Students read and record soil and air temperatures using thermometers, and plant height using rulers. This information is used to create line graphs that show the relationship between these conditions and plant growth.

Objectives:

- Students use common measurement tools to monitor plant growth.
- Students understand there is a relationship between plant growth, the temperature of soil and air, and the seasons.

Print Materials:

- 'How-to-do Activity: Suggested Plants & Data Collection'
- Master: 'Plant Growth Monitoring Record', 'Plant Growth Monitoring Chart'

- **Kit Materials:**
- Transparency: 'Plant Growth Monitoring Record', 'Plant Growth Monitoring Chart'
- Soil and air thermometers: 1 of each or more
- Foam core clipboards: 1 per student

Teacher supplied:

- Seedlings from previous activities or from nature: 1 per student
- Copies of 'Plant Growth Monitoring Record' and 'Plant Growth Monitoring Chart' (select metric or English scale): 1 per student
- Student journals and pencils: 1 per student

Vocabulary

Monitor: *to watch, keep track of, or check usually for a special purpose*
Temperature: *a degree of hotness or coldness measured on a definite scale*
Graph: *a diagram that represents a comparison between two or more variables*

Washington State EALRs

Science 2.1.2 Understand how to plan and conduct simple investigations. Collect data using simple equipment and tools that extend the senses. **2.2.2** Understand that observations and measurement are used by scientists to describe the world. Raise questions about the natural world and seek answers by making careful observations and trying things out. Make observations and measurements about natural phenomena. **3.2.3** Understand how knowledge and skills of science, mathematics, and technology are used in common occupations. Identify occupations using scientific, mathematical, and technological knowledge and skills.

Science Kit: Plant Growth & Development

Before activity: Determine which seedlings or young plants to use for the activity (see 'How-to-do Activity'). Establish a schedule, including at least 3 equally spaced visits before the end of the school year, to conduct observations and record monitoring data.

Activity:

- Go to habitat or propagation area. Locate and observe seedlings. Ask students to make general observations about the season; air temperature, evidence of new growth, change in the length of day, location of the sun in the sky, etc.
- Review the requirements for plant growth (sun, soil and water in the right combination). Ask students to consider, "How big do you think these seedlings will grow? Before the end of the school year? Next year? How can we find out?"
- State that, "We are going to 'monitor' plant growth using soil and air thermometers to record changes and rulers/tape measures to record plant growth, during each season. This information will show the relationship between the seasons, soil and air temperature and how fast plants grow."
- Demonstrate using the thermometers in a consistent manner (location, depth in soil, etc.), and how to measure the plant using the ruler/tape measure. Identify measurement system to use (metric or English) and demonstrate where to record this information on the 'Plant Growth Monitoring Record'.
- Allow students to begin monitoring activity and assist as needed. Rotate students in small groups if space is limited.
- Return to classroom. Use overhead transparencies to demonstrate how to transfer information from 'Plant Growth Monitoring Record' to the 'Plant Growth Monitoring Chart'. Explain that completing this chart will create 3 line graphs.
- Repeat this activity over at least 3 equally spaced times before the end of school year to complete a 'Plant Growth Monitoring Chart'. Use the data points to create line graphs showing the change in plant growth, soil and air temperature.
- Student journals: Ask students to draw conclusions about the relationship between plant growth, air and soil temperatures represented by the line graphs. Share conclusions as a group.
- Summarize: Ask, "How is this information helpful to a habitat restoration?" (Evaluating when and where to plant new plantings.)

Extension:

- Ask, "What might make some plants of the same species grow at different rates?" (differences in light, soil, water, weather, called "variables"). Have students plan a monitoring project investigating these variables (one species growing in a variety of light, soil and water situations). Create a classroom size chart of the project results using different colors to record soil, air temperatures and plant growth. Draw conclusions that explain the results.

HOW-TO-DO ACTIVITY- PLANT GROWTH MONITORING
SUGGESTED PLANTS & DATA COLLECTION

Suggested Plants for Monitoring

Engaging students in collecting data about plant species teaches valuable skills and can provide meaningful information. Short-term monitoring of fast growing plant species offers students an opportunity to gain skills in collecting data, and to gain understanding about conditions for plant growth.

Short-term monitoring during one school year requires plant species that have predictable, measurable growth. Ideal species for elementary school students to monitor include fast growing seedlings, especially those from the *Growing Native Seeds* activity, and deciduous herbaceous perennials (plants that die back to the ground and return in spring). Many newly planted shrubs and trees in habitat restorations will also develop measurable new growth in a short period. The list below provides suggestions for these species.

Long term monitoring over several years can provide meaningful restoration information, especially as it relates to hydrology, soil type, habitat types and plant communities. One strategy that enables students to provide stewardship to restoration sites over a period of years, involves "classroom adoption" of a particular site or plot. The succeeding classes of the "adopting teacher" collect plant growth data on the same plants over several years. A second strategy involves a "school-wide adoption" in which students continue to monitor "their plants" as they move through the grades, each year adding new data that relates to their studies, such as hydrology, soil type, etc.

Consult with habitat restoration stewardship groups, native plant specialists, or refer to the Starflower Plant ID cards to locate listed plant species. Note: It is easiest to locate species in fall, while field ID characteristics are present. Native plant specialists can assist with field ID while plants are dormant.

Herbaceous perennials	**Fast growing seeds**	**Newly planted, young shrubs & trees**
Bleeding heart	Tufted hairgrass	Red osier dogwood
Lupine species	Puget sound fescue	Wild rose
Lady fern	Western mannagrass	Mock orange
Siberian miner's lettuce	Idaho fescue	Red flowering currant
Goat'sbeard	Slough sedge	Red alder
Western coltsfoot	Goldenrod	Oceanspray
Pearly everlasting	Fireweed	Red elder
Yarrow	Red columbine	Grand fir, Douglas fir
Hedge nettle (not stinging nettle)	Siberian miner's lettuce	Vine maple
		Snowberry
		Indian plum
		Willow species

Collecting Data

Fill out the 'Plant Growth Monitoring Record' with student name and monitoring date (see below). As a group, choose and mark a site where you will measure temperature each visit. Use the air and soil thermometers to assess the air and soil temperatures. (Note: If time or resources permits, have each students record the temperatures where their plant is growing).

Choose a measurement scale (English or metric). Distribute measuring devices (such as plastic rulers, wooden yardsticks and cloth tapes). Have students measure the height of the plant and record their measurements in the 'Plant Growth Monitoring Record'.

Return to the classroom, and transfer the data to the 'Growth Monitoring Chart' as shown in the first column on the right.

At each consecutive monitoring activity, repeat the activity and record the information in the appropriate column. When complete, draw lines between the data points (dots) to create 3 line graphs. Using tracing paper and colored pencils, show the relationship between line graphs and draw conclusions.

PLANT GROWTH MONITORING RECORD

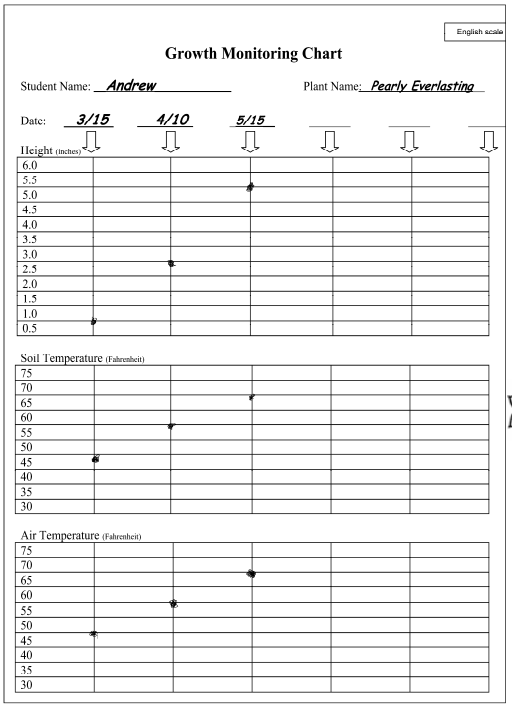
Student name: *Andrew*

Plant #1 name: *Pearly everlasting*

Date:	3/12	4/10	5/15		
Height	1	3	6.5		
Soil Temp.	48	56	64		
Air Temp.	50	60	68		

Plant #2 name: *Red osier dogwood*

Date:	3/12	4/10	5/15		
Height	20	26	34		
Soil Temp.	48	56	64		
Air Temp.	50	60	68		



PLANT GROWTH MONITORING RECORD

Student name:

Plant #1 name:

Date:						
Height						
Soil Temp.						
Air Temp.						

Plant #2 name:

Date:						
Height						
Soil Temp.						
Air Temp.						

PLANT GROWTH MONITORING RECORD

Student name:

Plant #1 name:

Date:						
Height						
Soil Temp.						
Air Temp.						

Plant #2 name:

Date:						
Height						
Soil Temp.						
Air Temp.						

English scale

Plant Growth Monitoring Chart

Student Name: _____ Plant Name: _____

Date: _____ _____ _____ _____ _____ _____

Height (inches)

6.0					
5.5					
5.0					
4.5					
4.0					
3.5					
3.0					
2.5					
2.0					
1.5					
1.0					
0.5					

Soil Temperature (Fahrenheit)

75					
70					
65					
60					
55					
50					
45					
40					
35					
30					

Air Temperature (Fahrenheit)

75					
70					
65					
60					
55					
50					
45					
40					
35					
30					

Metric scale

Monitoring Growth Monitoring Chart

Student Name: _____ Plant Name: _____

Date: _____ _____ _____ _____ _____ _____

Height (cm)

15					
14					
13					
12					
11					
10					
9					
8					
7					
6					
5					
4					
3					
2					
1 cm					

Soil Temperature (Celsius)

22					
20					
18					
16					
14					
12					
10					
8					
6					
4					
2					

Air Temperature (Celsius)

22					
20					
18					
16					
14					
12					
10					
8					
6					
4					
2					