

LESSON 30

Changes on the Land

OBJECTIVES:

Students will be able to explain the reasons for monitoring a weed-infested site and the importance of monitoring on a long-term basis.

METHOD:

Students conduct a monitoring study of a weed-infested area using hula-hoops to outline their study plots. Students collect data on the distribution of native and invasive plants over time.

MATERIALS

- ✎ String
- ✎ Stakes
- ✎ Hammer
- ✎ Plant field guides, weed identification materials

For each small group, provide:

- ✎ Tape measure (at least 50' long)
- ✎ Hula-hoops (all of the same size; label each with a different number on a piece of tape)
- ✎ Paper
- ✎ Permanent marking pen
- ✎ **Hula-hoop Monitoring Study Worksheet** and **Study Data Chart**

BACKGROUND

Any plant growing where it is not wanted, especially where it becomes a nuisance because of its presence in large numbers or because of objectionable attributes, is considered to be a weed. Invasive plants, a more specific term than weeds, are unwanted plants that tend to grow aggressively in agricultural lands, home gardens, roadsides and other disturbed sites. Left unchecked, they can invade new areas and can have a significant negative impact on native plant populations and the ecological balance of the area. Some of these plants can cause allergic reactions or poisoning in livestock, wildlife or humans if contact is made or if they are eaten. The majority of invasive plants are exotic species which originate in other countries, spreading in Montana free of the natural competition and pests that limit their populations in their countries of origin.

Monitoring of vegetation allows professionals and citizens (including schoolchildren) to collect information on their local invasive species. This lesson provides students with the opportunity to learn about and participate in the monitoring of species distributions.

Grade level: 2-6

Subject Areas: Life science, mathematics

Duration: Two or more class sessions, ongoing study option

Setting: Outdoors/Indoors

Season: Fall, Spring

Conceptual Framework Topics: Weed management, monitoring

In this lesson we will use readily-available hula-hoops in place of PVC pipe meter square frames generally used by scientists to define areas for sampling.

PROCEDURE

Scout out a suitable weed-infested area containing native and invasive plants ahead of time. Review and make copies of the **Hula-hoop Monitoring Study Worksheet** and **Data Chart**. Gather the supplies listed in the materials section.

1. Explain to students that we are going to begin a project that will track changes in the balance of native plants and invasive plants in a “weedy” area. Scientists use a method called monitoring to track and measure changes in an area over time. This project could form the basis of monitoring a site about to undergo changes, such as weed control treatment.
2. Ask students: Why would it be important for us to monitor the vegetation in the weedy area?

Make a list titled **Why Monitor Weeds & Native Plants?**

Teacher Help: Organize student answers into the following reasons:

- *To test methods or treatments used.*
- *To measure population changes of weeds and native plants over time.*
- *To prevent the spread of weeds by detecting them early.*
- *To track and communicate to others about the status of the vegetation to help with management decisions.*

3. As a class, form questions and predictions about what will be observed in the area over time. Explain to students that it is important to decide what will be measured before setting out to monitor an area.

Make a list titled **What is Being Measured?**

Teacher Help: Organize student answers into the following categories for both weeds and native plants.

- *How many plants of each type are there?*
- *How healthy are the plants?*
- *How much area is covered with weeds?*
- *How do these factors change over time?*
- *What do we think will happen?*

NOTE: Additional questions and predictions can be made, but make sure they are measurable.

4. Determine the timeline for the project and a measurement schedule by asking: When are we going to begin to measure our area? How many times will we return over the span of the project and at what intervals? When will we end our monitoring study of the area?
5. Discuss and outline materials and methods. Explain to students that the next step is to agree on how we are going to measure changes and collect data that will help us answer questions.
6. The area of the study should be at least 50' X 50'. Mark off the area using string and stakes. Divide students into groups and have all students stand spread out around the outside of the boundary of the study area. A student from each group is given a hula-hoop (students will need to determine the area inside of the hula-hoop, this will be the plot sample size.) The group member with the hula-hoop should close their eyes or turn their back towards the study area and throw their hula hoop randomly into the stringed-off area. Use the spot the hula hoop lands on as the sampling plot for each group.
7. Fill in **Worksheet**.
8. Collect data using the **Data Chart**. Repeat data collection on a new sheet during each scheduled sampling period (as planned with this class example of a “long-term” monitoring project).
9. Have students discuss their questions/predictions after sharing the data with the entire class. By the end of the monitoring study, are they able to answer their questions? Do the data support their predictions? Why or why not?

Extensions

Public monitoring projects often rely upon volunteers for the collection of monitoring data. As a class, explore local options to help with a monitoring project in the community. If possible, invite a representative to come to the classroom to give the class an overview of the project. Volunteer on a selected project as a class, or invite interested students to volunteer for a monitoring project as part of an independent research project.

Hula-hoop Monitoring Study Worksheet

Group Members: _____

Location of Study Site: _____

Hula-hoop #: _____

Plot size (area inside of group's hula-hoop in cm): _____

Monitoring Start Date: _____

Planned Monitoring End Date: _____

1. Draw and attach to this sheet a map of the total area being monitored, and include an arrow indicating north on your map. Add to your map the location of your group's hula-hoop sampling plot.

4. How would you expect the study area to change over time if there is no weed control treatment or planting conducted? What about if there IS weed control and planting?

2. Identify or describe the most prevalent plants and other features in your hula-hoop sampling plot.

3. Develop one or more questions you would like to address in this study. Example: Is weed species X increasing, staying the same, or decreasing over time?

5. How can you use the hula-hoop plot class data to estimate plant populations in the larger study area? Is there a way to see how close the estimate is to the actual populations? If yes, how could it be done? Why don't scientists count the exact plant populations in most studies?

Hula-hoop Monitoring Study Data Chart

Copies of this sheet will be needed for data collection each time plot sampling occurs.

Group Members: _____

Date: _____

Hula hoop # _____

Plot size (area inside of group's hula-hoop in cm): _____

Plant Name	Comments about plant	How many in plot?
Additional Notes:		