

Garlic Mustard Invasion

Method

Students will use a simple sampling method to determine if invasive species impact other plants and animals in the forest. This activity focuses on garlic mustard, but the same procedure can also be used with other invasive plants in different habitats.

Getting Ready

1. Locate an area that has been infested with garlic mustard in close proximity to an area that is free of garlic mustard. Be sure the area does not contain poison ivy, stinging nettles, or other hazardous plants. **Note:** If you can't go outside, do this activity indoors using different kinds of leaves (e.g., real leaves, silk leaves, or paper cutouts) to represent different plants. Spread the leaves out on the floor. You can rig the outcome by clumping the "invasive" leaves. Distribute the plastic insects among the "native" leaves and the earthworms among the "invasive" ones. This indoor activity is a good warm-up for doing the activity outdoors.

Introducing the Activity

The plants and animals that live in a forest depend on each other for survival. When an invasive species takes over an area, the native plants and animals are affected.

Doing the Activity

1. **Introduce garlic mustard (or other invasive plant) to the students.** Be sure students can recognize the plant in different stages of its life cycle. See box on page 61.
2. **Randomly choose a sampling site in an area that garlic mustard has not invaded.** Be sure to work in the uninfested area first so students don't accidentally transfer garlic mustard seeds into the rest of the forest. Ask a student to throw the tennis ball into an area that is free of garlic mustard.
3. **Mark off the sample site.** Find the tennis ball and lay a hula hoop or other frame down so that the tennis ball is in the middle of the sample site.
4. **Carefully observe the plants and animals inside the hula hoop.** Start by looking for vertebrates, invertebrates, and signs of earthworms inside the circle. Then, identify and count any garlic mustard plants. It isn't necessary to identify



Objectives

- Describe the differences between an area invaded by garlic mustard and an area that is free of garlic mustard.
- Observe how invasive plants affect forest plants and animals.

Grades

2 – adult

Group Size

Small groups of 5 – 8

Activity Time

20 – 30 minutes

Setting

Wooded area in early spring

Materials

- Tennis ball
- Hula hoop or other similar-sized frame
- Garlic mustard drawings or photos (Wisconsin Wildcards work well)
- Plant identification books for older students (See list on page 139.)
- Copies of *Garlic Mustard Invasion* data sheet (page 62)
- Clipboards and pencils

Connections

See next page.

Academic Standards

Grades 2 – 4

- Environmental Education: A.4.2
- Science: C.4.5, F.4.1, F.4.2, F.4.4

Grades 5 – 8

- Environmental Education: B.8.8, B.8.21, C.8.2
- Science: C.8.2, F.8.8, F.8.9

Grades 9 – 12

- Environmental Education: B.12.3, B.12.6
- Science: F.12.7, F.12.8

Scout Connections

- Junior Girl Scouts: Plants and Animals

all the other plants in the sample area. Depending on the ages and abilities of your students, you may ask them to simply count the number of other plants, count both the number of different species and the total number of plants, or identify and count all the plants in the sample area. Count the trees and shrubs that are directly above the sample site. Finally, dig up a small area to look for worms.

5. **Ask students to enter their data on the data sheets.**
6. **Choose a sampling site in an area where garlic mustard is present in large quantities.** Follow the same procedure for choosing and marking your sample area.
7. **Observe, count, and record the plants and animals inside this sample area.** As you leave the area with garlic mustard, take time to brush off your clothing and remove any mud from your shoes in order to not spread seeds into uninfested areas. See *Extending the Learning* below.
8. **Compare the results.** Discuss some of these questions:
 - How are the two sites different? How are they the same? Which one is the most interesting?
 - Which sample site had the greatest variety of plants? What do you think is happening in the area with garlic mustard? Which plant do you think is the toughest? How do you think it is taking over?
 - Which sample site had the greatest number of invertebrates? Which site had the greatest number of earthworms or signs of earthworms? See box page 61.
 - What will happen to the forest plants if garlic mustard completely covers the forest floor? Do you see any tree seedlings? What will happen when the big trees die?
 - If garlic mustard takes over, what will happen to the mammals, birds, amphibians, reptiles, and invertebrates that live here? How will they find the food and shelter they need to survive?

Adapted from “Invasive Plant Sampling with Young Children” developed by Kelly Kearns, WDNR.

Assessing the Learning

Instruct students to compare the two areas they observed by drawing pictures, writing a poem, or performing a pantomime that reflects how they feel about garlic mustard.

Extending the Learning

Check out muddy shoes. If the area is muddy, ask everyone to scrape the mud off of their shoes into a bucket. Take the soil to school and place it in a planting flat. Keep the soil moist and watch what happens. What grew from the mud? What does this say about how garlic mustard spreads in the forest? How else can garlic mustard spread?

Investigate the worm/invasive plant connection. Follow up this investigation with *A Can of Worms* on page 67 to find out more about how worms influence soil, forest litter, and vegetation.

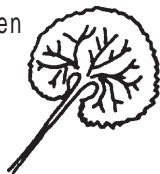
Calculate percent cover. Follow an online lesson plan to teach high school students how to calculate percent cover. The classroom activity focuses on English ivy, but the technique learned can be used with any invasive in any habitat. <www.pbs.org/americanfieldguide/teachers>

Finding Out More!

Wisconsin Wildcards. Wisconsin Department of Natural Resources. 2005. Order 30-packs of select Wildcards. <www.dnr.wi.gov/education/pdf/wildcard.pdf>

Garlic Mustard and Worms

Garlic mustard leaves smell like garlic when crushed.



In spring of its second year, the plant shoots up to about three feet and blooms quickly, crowding out many other flowers. The small, white, four-petaled flowers bloom from May through early July.



As the flowers mature, they form long seedpods. Later in summer, the plant dies back. One plant can produce hundreds of seeds!



The first year, garlic mustard is a low-lying plant that can carpet the forest floor. Garlic mustard stays green throughout the winter. It can photosynthesize all year if there is no snow cover!



Earthworm droppings look like small beads of soil. They are called castings.

Earthworms pull clumps of leaves down into their underground tunnels.

Earthworms are not native to Wisconsin. They act as mini-rototillers, pulling the leaves and other organic matter down into the soil. Many native plants and animals need that leaf litter to germinate or survive. New research is showing that earthworms may alter the soil conditions of a forest floor to encourage invasives and discourage natives.

Garlic Mustard Invasion

Compare two areas — one that has been invaded by garlic mustard and one that is free of garlic mustard. Be careful not to spread garlic mustard seeds into new areas.

Plants and animals found inside the hula hoop	Area with NO garlic mustard	Area with garlic mustard
Vertebrates or signs of vertebrates		
Invertebrates or signs of invertebrates		
Earthworms or signs of earthworms (Count worm holes and castings.)		
Earthworms in the ground (Do this last!)		
Total animals		
Garlic mustard plants with flowers and/or seeds		
Garlic mustard seedlings or rosettes		
Total number of garlic mustard plants		
Understory plants (Count all remaining wildflowers, grasses, ferns, and tree seedlings.)		
Overhead trees and shrubs (Count trees and shrubs in the hula hoop's airspace.)		
Total number of other plants		

On the back of this page, draw a picture of a forest without garlic mustard and a picture of the same area after it has been invaded by garlic mustard.