SSL: Habitats: Non-Native Invasive Plant Removal

Available: Year-round
Time Required: >120 minutes for full lesson; >60 minutes for action only

Science Indicators:
6.6.A.1. Recognize and compare how different parts of the world have varying amounts and types of natural resources and how the use of those resources impacts environmental quality.
6.6.B.1 Recognize and explain that human-caused changes have consequences for Maryland's environment as well as for other places and future times.
6.8.B.1. Recognize and explain how human activities can accelerate or magnify many naturally occurring changes.

Enduring Understandings:
- Natural resources are used by living things in a variety of ways.
- Natural resources need protection and conservation in a given environment.
- As resources are used in a habitat, the environment is changed.
- Human resource use can cause changes that have social, economic, and environmental impacts.

Mastery Objectives:
Students will be able to:
- Define what is meant by a "non-native invasive plant" and explain why such plants are harmful to a local ecosystem.
- Identify at least one non-native invasive plant, learn how to remove it, and explain why removal is beneficial to the environment.
- Identify the importance of a healthy habitat for native wildlife.

Background (adapted from "Non-Native Invasive Plants," Carole Bergmann, Forest Ecologist M-NCPPC):
Most plants introduced to our country or region are beautiful and productive additions. Some, however, have escaped to become invasive and destructive. Known as non-native, exotic, or alien invasive plants, they spread unchecked because their natural controls--disease and predators--were left behind in their land of origin. Some non-native invasives were brought here by mistake in soil, ship ballast, or crop seed. Most were intentionally introduced into our country because they provided ornamental landscape material, quick-growing and pest-free erosion control, visual screening, windbreaks, or food for wildlife. Today they cost agriculture, industry, and government billions of dollars a year to control.

Invasive plants threaten our native plants and animals. All non-native invasive plants are especially dangerous because of their ability to colonize, out-compete, and exclude native vegetation. Mechanisms to do so include: rampant growth rates, extra-long growing seasons, ability to block light from other plants, monopolies of nutrients and water, prolific and multiple means of reproduction, seeds that stay viable in the soil for many years, and toxins in roots or leaves that stunt other plants. Native wildlife also suffers because it evolved dependent on native plants for food and shelter. Adapting to eat plants that the native wildlife has not evolved with would take thousands of years of evolution, but with the rampancy and aggression of non-native invasives, native wildlife does not have that kind of time.

Project Prep:

1. Choose the invasive that you would like to defeat!! Talk with your coordinator to choose the plant that is best-suited to the time of year and time constraints of your program. With all plants, we recommend a full lesson to fulfill all SSL requirements. Quick Facts:

Wineberry	Mile-a-minute *SC ONLY	Garlic mustard *SC ONLY	Stilt grass
*All months * Native to Japan, Korea, China *Introduced in 1890 to combine with raspberry and blackberry species *3 heart-shaped leaves white underneath, stem has reddish hairs and small spines *Deer don't eat it and birds spread the seeds  	*April and May *Native to Asia *Stems are armed with curved barbs which are also present on the underside of the leaf blades *Can grow up to 6 inches a day, scrambling over shrubs and other vegetation, blocking the foliage of covered plants from available light, and reducing their ability to photosynthesize *The weight and pressure of the vine causes distortion of stems and branches of covered plants  	*March and April *Native to Europe *One of the few non-native plants capable of invading and dominating forest understory *Tolerant of low light levels, has high seed production and able to spread rapidly *Competes with native spring woodland plants such as spring beauty, trout lily, jack-in-the-pulpit, violets, golden ragwort *The deer don't eat it! 	*April, May, and June *Native to Japan, Korea, China, Malaysia and India *Invades and alters disturbed soils in sun or shade *Produces seed banks which stay viable in the soil for years *Came here because it was used in packaging as a natural bubble wrap, AKA "Japanese Packing Grass" 

2. Meet with your coordinator ahead of time to become familiar with the removal areas and identification guides.
3. For full lesson: a presentation on the Promethean board is available at the Smith Center, and a poster board is available for other sites
4. Gather equipment:

Wineberry	Mile-a-minute *SC ONLY	Garlic mustard *SC ONLY	Stilt grass
1. Gloves 2. Clipper, trowel, and hand rake for adult use (to help with deep root systems) 3. Identification sheets 4. Garbage bags (if throwing away)	1. Gloves 2. Clipper for adult use 3. Rakes 4. Identification sheets 5. Carts (if carting to compost) 6. Garbage bags (if throwing away)	1. Identification sheets 2. Carts (if carting to compost) 3. Garbage bags (if throwing away)	1. Identification sheets 2. Carts (if carting to compost) 3. Garbage bags (if throwing away)

Project Details

1. Preparation/Explain (~20% of time)
    a. Full Lesson
        i. Share presentation with students
    b. Action Only
        i. Engage students: *Are there "bad" plants?* (Accept most of what students offer: From a human perspective, there are plants that are bad: cause allergies, poison people, and grow like weeds to take over other plants) Today, we are going to talk about a special kind of plant that is bad for the native plants and animals
        ii. Discuss the background information and show students the picture(s) of the selected species
2. Action (~65% of time)
    a. Full Lesson & Action Only
        i. Divide students into groups and assign each group a specific area within the larger removal zone. Share the identification guides with the groups.
        ii. Review the removal techniques and instructions.
            1. **Removal Tips**
                - Pick **EVERY** visible plant with stems
                - It's better to get every plant from one place than to get most plants from two places. Leaving a plant is like sowing a hundred seeds.
                - If stems frequently break at the root, wiggle the stem before pulling. Search a bit for a broken root and remove.
                - Be prepared to pick with little talking - it takes concentration to get every plant!
                - When stems grow closely in loose soil, gather several with one hand motion.
        iii. Disposal:

Wineberry	Mile-a-minute *SC ONLY	Garlic mustard *SC ONLY	Stilt grass
1. Create brush piles! (See below) 2. If during berry season, DO NOT LEAVE THE BERRIES ON THE STALK! → Either collect all the berries (you can eat them) and THEN create brush piles OR → Fill large garbage bags with the entire plant (uneaten berries and all) and put in trash room	1. If compost needs nitrogen, cut vines down to 6-inch pieces and add to compost on site! 2. Alternative to compost on site: fill white trailer and drive to transfer station at end of week 3. Alternative to compost: Fill large garbage bags and put in trash room	1. If compost needs nitrogen, add to compost on site! 2. Alternative to compost on site: fill white trailer and drive to transfer station at end of week 3. Alternative to compost: Fill large garbage bags and put in trash room	1. If compost needs nitrogen, add to compost on site! *SC ONLY 2. Alternative to compost on site: fill white trailer and drive to transfer station at end of week *SC ONLY 3. Alternative to compost: Fill large garbage bags and put in trash room

        iv. Creating brush piles (for wineberry):
            1. After you pull the plants, create brush piles to provide habitats for small mammals and birds
                a. Why?
                    i. Provide shelter to keep small animals safe from predators
                    ii. Provide safe nesting places for ground dwelling birds
                    iii. Great way to visibly see how much you've accomplished
                b. Where?
                    i. Forest edges and forest openings
                    ii. Field corners and edges

iii. On the margin between a stream and a marsh
iv. Near land that is being cleared
v. Near forests that are being thinned
vi. Partially submerged along pond edges

c. How?
i. Pile your pickings at that location!

v. **Return equipment at the end of the session!!! Account for all equipment and return to the proper location.**

3. Reflection (~15% of time)
   a. Full Lesson
      i. Have students brainstorm and then share with class their answers to reflection questions in presentation
      ii. Record in their journals if applicable
   b. Action Only
      i. Have students share their answers to following questions:
         1. What did you do and how did it benefit the environment?
         2. How will you share what you learned and continue your action with your family, community, and school?
      ii. Encourage them to record in their journals if applicable