
Growing Native: The Power of Invasion

- Summary:** This activity explores the how invasive species are causing a decline in the biodiversity of native plant communities. Students will research the invasive plants that inhabit their community, take a survey to determine the prevalence of invasive plants and learn from experts about techniques to eradicate these harmful species.
- Objective:** Students will identify and describe the invasive species. They will learn about different techniques to eradicate the invasive species.
- Grades:** 6-8
- Subject:** Science and language
- Skills:** Research, communication, plant identification, problem-solving, organization and team-building.
- Materials:** Internet access; field guides to trees, shrubs and wildflowers, list of invasive species
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BACKGROUND

Non-native plants (also called non-indigenous plants, invasive plants, exotic species, or weeds) are plants that have been introduced into an environment in which they did not evolve. Introduction of non-native plants into our landscape has been both accidental and deliberate. Purple loosestrife, for example, was introduced from Europe in the 1800's as a medicinal herb and ornamental plant. It has quickly spread since that time and can now be found in wetland areas throughout the continental U.S. except for Florida.

In general, aggressive, non-native plants have no enemies or controls to limit their spread. As they move into complex native plant communities, consisting of hundreds of different plant species that support wildlife, are converted to a monoculture of the invasive species. This means the community of plants and animals is simplified, with most plant species disappearing, leaving only the non-native plant population intact. The animals that inhabited the native plant community may lose the food and shelter that is critical to their survival.

For example, purple loosestrife colonizes wetland areas, replacing native plants unable to compete for available sunlight, water, and nutrients. Wetlands infested with purple loosestrife lose as much as 50% of their original native plant populations. This limits the variety of food and cover available to birds and may cause the birds to move or disappear from a region altogether (<http://www.epa.gov/glnpo/greenacres/nativeplants>).

The spread of invasive plants in parks and yards is a national problem. Invasive plants rapidly invade open space, parks and wildlife refuges, and compete with native plants for light, water and



nutrients. They have been introduced (either accidentally or on purpose) into an environment in which they did not evolve and thus are not affected by natural controls such as herbivores, parasites, and pathogens that keep them in balance in their native habitats. Many invasive species have escaped and are especially quick to colonize disturbed areas such as residential, commercial, and agricultural development areas. Some invasive species were introduced to control erosion. Invasive plants typically exhibit the following characteristics:

- Rapid growth and maturity
- Prolific seed production
- Highly successful seed dispersal, germination, and colonization
- Ability to out-compete native species
- High cost of removal and control

Students may be familiar with two classic invasive plants in the northeast – garlic mustard (*Alliaria petiolata*), which carpets native woodland forest floors and Japanese honeysuckle (*Lonicera japonica*) that engulfs and smothers small trees and shrubs. Chinese tallow tree (*Sapium sebiferum*) and Brazilian pepper-tree (*Schinus terebinthfolias*) are problems in the southeast. In the southwest, tamarisk or saltcedar (*Tamarix ramosissima*) is invading streambeds and cheat grass (*Bromus tectorum*) is colonizing semi-arid grasslands. In the northwest, scotch broom (*Cystius scoparius*) is overtaking hillsides. In general, all of these plants quickly overtake an area and drive out the native plants - reducing the biodiversity of the natural area.

WHY ARE INVASIVE SPECIES SUCH A PROBLEM?

Biodiversity is greatly reduced when invasive species take over and dominate native plant communities. Invasive plants cause significant changes in native plant communities, altering vegetation composition and structure. As a result of the loss of native food and cover, the wildlife community must adapt, emigrate or perish. Most native vegetation communities support a great variety of native flora and fauna. Non-native species threaten two-thirds of endangered species world wide, and are considered by some to be the second most important threat to biodiversity after habitat destruction. Other problems of invasive species include:

- Loss of habitat (food and cover) for insects, birds, and other wildlife
- Reduction of the amount of space, water, sunlight and nutrients that would be available to native plants, which in increases the likelihood of disease or stress.
- Loss of and encroachment upon endangered and threatened species and their habitat
- Changes to natural ecological processes such as plant succession
- Alteration of natural fire regime
- Disruption of native plant-animal relationships such as pollination, seed dispersal and host-plant relationships
- Prevention of the establishment of native trees and shrubs
- Reduction of native plant vigor

This lesson is divided into three phases – pre-lesson, field lesson and a follow-up lesson. The pre-lesson introduces students to the concept of invasive species focusing on species in their community. The field lesson provides an opportunity for students to study the effects of invasive species on an ecosystem. The follow-up lesson encourages students to think about the different methods for eradicating invasive species.

Pre-Visit Lesson: *What Plants Invaded Our Community?*

To understand why invasive species decimate native plant communities, students should know what invasive species are in their community, how they arrived and how they can be eradicated. Students should be able to identify invasive species and know when to report a sighting to a natural resource professional.

1. Present the background information to the students. Identify invasive species that occur in your community. This is an excellent opportunity to invite a guest expert to your class. Organizations such as the state native plant society, local Natural Resources Conservation Service (NRCS) office, or local conservation district can provide guest speakers and a list of invasive species. Go to <http://www.wildlifehc.org/managementtools/backyard>. This website provides links to NRCS, and National Association of Conservation Districts (NACD), native plant societies and other state resources.
2. Discuss the ways in which these species probably invaded your community (i.e. wind, seeds/spores tracked in on shoes, ship's ballast, etc.)
3. Divide the students into teams assigning one team to each invasive species. Have the students research and answer the following questions about their species using the internet or the library.
 - a) What is the common and scientific name?
 - b) How did this species invade your community?
 - c) When was the first reported sighting?
 - d) Was the species brought in initially for a beneficial purpose? If so, for what purpose?
 - e) Why is this species such a problem?
 - f) What benefits does the species have?
 - g) How this species controlled or eradicated?
 - h) What are other interesting facts about this species?
4. Have each group present information on their invasive species to the entire class. Students can prepare their presentation as a simple report using the answers from the above questions as the foundation for their report. Students can be given fifteen minutes at the beginning of class to prepare their presentation. Each group can have five to ten minutes to present their information. If there is more time available, students can develop visual presentations such as a brochure, flier or poster about their invasive species.

Ecological Study Visit: *Identifying Invaders*

Note: This field visit can be done in conjunction with the ecological study visit for native plants.

Materials: field guides to wildflower, trees and shrubs, notebooks, pencils, string, tape measures, gloves, trowels, plastic bags, labels, markers. A study kit can be pre-assembled for each group.

Now that the students understand the problems with invasive species, they can now undertake a survey to local invasive species in their community. This activity will teach them to identify invasive species in the wild.

Working with local plant experts, identify a site in your community such as a WHC corporate wildlife habitat, refuge, park or schoolyard that is home to invasive species. Invite local experts to lead or participate in this exercise to assist students with plant identification. Once at the site:

1. Divide the students into teams. Students can self-select their teams or be assigned to teams. Four students per team is optimal to prevent the students from trampling the habitat.
2. Review how to determine the diameter of a circle. Give each team a piece of string and have the students place the string in a circle 10 feet in diameter for a field or meadow and 20 feet for a forest. Pass out guides to wildflowers, trees and shrubs, pencils and a notebook to each team. If possible have ask your local expert to help the students with the identification.
3. Ask the students to first determine which invasive species they studied are populating the circle. For non-poisonous species, the students can collect a sample.
4. If time permits, have students identify other species in their circle. For a field or meadow, the students can focus ground-dwelling species. For a forest, the students will want to identify species in the understory, the middle story and the canopy.

Extension: If time permits, ask a local expert to speak to the class about eradication techniques such as hand-pulling, prescribed burning and spraying. Ask them to bring their equipment and talk about when they would use each technique to the students.

Post-Visit Analysis: *Stop the Invasion*

1. Based on the ability of the students, determine the structure for their essay assignment. Determine the length and the need to include supporting documentation from their research and the speakers. Determine how it will be graded. If you are a non-formal educator working outside the school system, work with the classroom teacher to determine the parameters.
2. Have students write an essay about invasive species summarizing what they learned, what invasive species inhabit their community and what they can do to remove invasive species.
3. As a class, discuss the ways that invasive species enter our communities and how we can prevent this invasion.
4. As a class, discuss the pros and cons of various methods to eradicate invasive species.