



***Dedicated
to Reducing
Pesticides***

Unit 1 Lesson 2: "I" is for Invasive

Focus Areas: Pest Control: Biological; Science, Language Arts

Focus Skills: conducting research using the Internet, graphing economic loss, mapping infested areas

Objectives

- To distinguish between native and non-native plant species in the United States
- To understand the economic impact of certain invasive species, such as Oriental bittersweet, Japanese knotweed, and leafy spurge
- To determine the geographical extent of the infestation of selected plants

Essential Questions

- What is an invasive plant, and what are some examples of invasive plants?
- Where are they found?
- What characteristics do they share?
- How can people prevent the spread of invasives?

Essential Understandings

- An invasive plant is a non-native plant that grows and takes over natural areas, such as woodlands, meadows, or wetlands. Examples of invasive plants include Oriental bittersweet, Japanese knotweed, and leafy spurge.
- There are hundreds of invasive aquatic and terrestrial plants that pose a great ecological and economic threat throughout the United States.
- Invasive plants spread rapidly and displace native species of plants and animals.
- The public needs to learn to identify, detect, and control these dangerous plants.



University of
Connecticut
College of Agriculture
and Natural Resources
Cooperative Extension System



Unit 1 Lesson 2: "I" is for Invasive

Background

Invasive non-native plants are becoming a widespread problem in aquatic and terrestrial habitats throughout North America. Once introduced, these noxious or harmful plants can displace native plants, which are important sources of food and shelter for wildlife. For these reasons, state and federal agencies, environmental organizations, and landowners are spending millions of dollars each year to control the spread of invasive plants and reverse their impacts in affected habitats. It is estimated that the annual cost to control invasive plants is \$30 billion. Invasive plants now cover 100,000 million acres of our country and are spreading rapidly. Each day they invade 4,500 acres.

Invasive plants are referred to as “introduced” or “non-native.” Species native to North America, however, may also become invasive when transported to another region. Invasive plants are sometimes introduced when gardeners move to warmer climates and take plants with them that would otherwise have been controlled in colder climates (i.e., these plants would be killed during colder temperatures). Instead, these plants thrive and become invasive in their new warmer habitat. Invasive plants may also “hitchhike” into the country accidentally as seeds and plant parts that come with cargo on ships. Some plant enthusiasts even sneak novel plants into the country illegally. By introducing these exotic plants, they run the risk of causing great harm. (**Note:** Any plants that are brought into the country should be declared with customs officials.)



Many aquatic invasive plants, such as the aquatic fern giant salvinia (*Salvinia molesta*), cause severe economic and ecological problems as well. Giant salvinia grows rapidly to cover the surface of lakes and streams, spreading aggressively by vegetative fragments. It forms floating mats that shade and crowd out important native plants. Thick mats reduce oxygen content and degrade water quality for fish and other aquatic organisms. The mats impede boating, fishing, and swimming while they clog water intakes for irrigation and electrical generation.



Unit 1 Lesson 2: "I" is for Invasive

Regardless of their origin, invasive aquatic plants, as well as invasive fish and invertebrates that feed on them, may be accidentally spread by pet shops, plant enthusiasts, water gardeners, and aquarium hobbyists. Boater and anglers can help to prevent the spread by removing all aquatic plants from propellers, intakes, trailers, and other gear before leaving a launch area.

CHARACTERISTICS OF INVASIVES

Most invasive species have certain traits that make them successful in habitats that they invade. Invasive plants generally:

- tolerate a wide range of environmental conditions
- reproduce early, often, in large numbers, and in multiple ways
- grow rapidly
- resist management control efforts
- generally have little or no economic value

From: Invasive Aquatic Plants: What Every Plant Enthusiast Needs to Know and the Connecticut Invasive Plant Working Group (www.hort.uconn.edu/cipwg). Used with permission.

HOW THEY SPREAD

Mother Nature

Invasive aquatic plants can spread to natural waterways accidentally. These unintentional introductions are more likely if a water garden or a retention basin containing invasive plants is built near a natural body of water. The natural waterway may flood into the artificial pond and carry away the contents, or the artificial pond may flood and have its contents swept away into the natural waterway. In addition, seeds and plant fragments of invasive plants can be spread by wind or by wildlife traveling between artificial and natural waterways.



Unit 1 Lesson 2: "I" is for Invasive

Terrestrial invasive plants spread their seeds by blowing in the wind and being swept away in rivers and streams. Many seeds easily attach themselves to animals and even humans as a means of dispersing throughout the environment.

HYDRILLA: AN EXAMPLE OF A GOOD PLANT GONE BAD

Hydrilla (*Hydrilla verticillata*), also known as water thyme, is a well-known aquarium plant native to parts of Asia and Africa. It was first found growing wild in Florida in 1960. Since then, it has spread as far north as Massachusetts and as far west as California. Hydrilla tolerates a wide range of nutrient and pH levels and persists in low sunlight. It can also reproduce through fragmentation, turions (buds that form in leaf axils), and subterranean turions (commonly called “tubers”). These plant parts can take root in the sediments and provide the beginnings for a whole new plant. As the plant grows toward the surface, it branches more frequently, forming dense mats. These mats create an inhospitable habitat for other plants and animals and hinder activities such as boating and swimming. They can also clog water intake pipes and restrict water flow in irrigation canals. Methods to control hydrilla, including mechanical harvesting and herbicides, are costly. Florida alone spends millions annually in hydrilla management.



Vocabulary

aquatic plant	any plant that lives, grows, or reproduces in water
biological control	the introduction of a living organism that is the natural enemy of a pest, such as a beneficial insect or fungus
dense	closely crowded or packed together
ecosystem	the interactions of all plants and animals with their environment



Unit 1 Lesson 2: "I" is for Invasive

environment	the combination of all of your surroundings including air, water, and land
eradicate	to eliminate all members of a plant or animal species from an area
Eurasia	the land mass that includes the continents of Europe and Asia
habitat	the surroundings where a plant or animal lives
hitchhiker	a seed that clings or sticks onto other objects in order to disperse
invasive plant	a plant that grows over or displaces native plants and animals or agricultural crops
native plant	a plant found in North America before European settlers arrived
non-native plant	a plant introduced to North America after European settlers arrived
noxious	harmful
organism	any form of animal or plant life
pest management	keeping invasive plants under control to reduce problems in the environment
prohibited plant	a plant that is so invasive that state or federal laws prohibit buying or selling it
shoot	new growth that forms from the roots or stems of a plant



Unit 1 Lesson 2: "I" is for Invasive

weed

a plant growing in a place where it is not wanted

wetland

an area that is sometimes wet, then dry



Logistics

Time: 45 minutes

Group Size: 5 to 30

Space: a room with comfortable seating, an outdoor area for field experiences, and a library or other area for research



Materials

Handout 1 "Invasive Plant Information Sheet" *

Handout 2 "Invasive Plants of Connecticut Chart" *

Supplement: Connecticut Invasive Plant List *

Video/DVD: *Bug Mobile vs. The Invasive Species* *

Pamphlets and Fact Sheets *

large laminated map of the USA

Invasive Plants Picture Card Set *

Assessment for a Pamphlet or Poster *

Assessment for a Dramatic Presentation *

* single copy provided



Preparation

1. Assemble some examples of fact sheets on invasive plants.
2. Display the map of the USA on a large bulletin board with a blank map key.
3. Research examples of invasive plants on the Internet.
4. Make copies of Handout 1, "Invasive Plant Information Sheet."





Unit 1 Lesson 2: "I" is for Invasive

Activity



Challenge: Investigate invasives.
(Display for group viewing)

Introduction

Write the word **HIPPO** on the board. Explain that each letter stands for a problem facing the Earth:

- “**H**” stands for habitat loss
- “**T**” stands for introduced species
- “**P**” stands for pollution
- “**P**” stands for population growth
- “**O**” stands for over-consumption



1. Paraphrase the **Background** information.
2. Show the children examples of invasive plants from the Invasive Plants Picture Card Set. Explain that many plants are crowding out native species all over the USA. Tell the children that they will be using books, pamphlets, and Internet resources to develop a creative way to educate people about the beauty and the danger of invasive plants.
3. Show the DVD *Bug Mobile vs. The Invasive Species*.

Involvement

1. Have children select an invasive plant from Handout 2, “Invasive Plants of Connecticut Chart.”
2. Give children one of the Invasive Plant Information Sheets. Using printed and Internet Resources, children will find the necessary information for each category as exemplified in the information sheet.



Unit 1 Lesson 2: "I" is for Invasive

3. Have the children create a symbol to represent the invasive plant they are profiling. Add the symbol to the key that accompanies the USA map and place the symbol on the state(s) where the species has invaded, including Connecticut.
4. Have the children identify which states have the most species. Create a graph to show states with the most problems with invasive plants. Do they see any trends or patterns?

Follow Up

Challenge teams of children to design a creative campaign to inform people about the dangers of invasive plants. The children could design costumes and dress up as the species to advertise themselves. They could also create puppets and write a puppet show to demonstrate the interaction between native and non-native species fighting for control. The campaign could be printed as posters, billboards, or pamphlets. Have the children approach the local Conservation Commission or design a pamphlet to be available at town offices and parks.

Assessment

Use the appropriate rubric to evaluate creative campaigns against invasive plants.



Follow Through

Using Internet resources, invite the children to obtain information regarding the economic impact in dollars that each invasive plant species costs. While this data may be difficult to locate, children could brainstorm the types of losses that occur as invasive plants disrupt the natural environment. Have the children graphically display this information. Which states suffer the most? Which regions? Which industries?