



ARREST THAT PEST!

LESSON ONE:

Invasive Species Investigator: *What are Invasive Species?*

Goals:

Youth will demonstrate an understanding of what invasive species are, and why they are an environmental and economic threat.

Purpose of Lesson:

It is important for youth to understand the threat of invasive species. Federal studies indicate that more than \$137 billion is being spent yearly in the United States to control about 900 invasive species and repair their damage. The environmental losses, such as the extinction of native plant and animal species, as well as reduced biodiversity and natural beauty, are incalculable.

Learning Objectives:

Youth will be able to:

- Define the following terms: **native species**, **alien or exotic species**, and **invasive species**.
- Give **three examples** of exotic species that are considered beneficial and three that are viewed as a threat.
- List **three reasons** why invasive species can dramatically change urban and rural landscapes, as well as forests.

Teacher Preparation:

- Read **Background Information** and become familiar with the suggested websites.
- As you work with students, check for their understanding of vocabulary words and any other new words that come up during discussions.

Materials and Resources:

- Computer with internet access
- Copies of Invasive Species Investigator worksheet
- Pencils
- PowerPoint slides

Vocabulary:

- Native (indigenous) species
- Alien (exotic or non-indigenous) species
- Invasive species

Introduction:

Begin the lesson by engaging youth in a brief discussion about non-native and invasive species and the reasons why they may be harmful to an ecosystem. Make connections between prior knowledge and experiences; find out what they already know about invasive species. Example questions might include the following:

- Has anyone ever heard the term invasive species?
- If so, what have you heard?
- If not, what do you think the term might mean?

Explain that in this lesson, youth will research invasive species and study the effect that these species have had on their new environment. Using the **Background Information** provided, introduce the content and vocabulary for the lesson.

BACKGROUND INFORMATION:

Every animal has a native habitat. Sometimes, either intentionally or by accident, species are moved to a new environment. Many of these “non-native species” are beneficial to us. They include major food crops like corn, wheat, barley, potatoes, and soybeans; in fact, it is easier to list the common agricultural crops that are native to the United States than those that are not: cranberries, pecans, sunflowers, tobacco, and a few legumes and that's about it! In addition, there are many common horticultural plants including iris, willow trees, and lilac bushes, and livestock including cattle, pigs, sheep, and chickens, as well as pets including dogs and cats that are non-native. Honeybees were imported from Europe for pollinating most crops grown in the US. But in some cases, these imported species begin to multiply too rapidly and start to compete with native species for survival...and they begin to win!

What is a native species?

Everything comes from somewhere. Every kind of animal, plant, or micro-organism has a home in some part of the world where it has existed for many thousands of years; this area would be referred to as its *native* range.

What is an exotic species?

A **non-native, alien** or **exotic** species is one that isn't native to an area - it came from somewhere else. Not all exotic species are harmful; in fact some exotic species are beneficial. Ornamentals such as tulips and chrysanthemums, as well as food sources including oats, wheat, kiwi fruits and animals like honey bees are not native to the United States and pose little or no

threat to our natural ecosystems. In most cases the introduction of these species was very much intentional and their spread has been managed. Agriculture in the United States would have a far different appearance if it were limited to the several dozen food crops known to have been cultivated in North America before 1492! But when an exotic species out-competes a native species for resources such as food, water, and sunlight, and rapidly grows out of control, it becomes **invasive**.

What is an invasive species?

An **invasive species** is one that is not native to the ecosystem being considered and when present, may cause economic or environmental harm or harm to human health. These species have been introduced into an area beyond their original range and could cause many problems in their new home. They can spread rapidly because they have no natural enemies in place to limit their growth. They can pose a significant threat to the biodiversity of the new area and create enormous costs to agriculture and forestry as well as the health of humans.

Once these **non-native, exotic** or **alien** species have crossed the line, they become known as **invasive species**. The federal government defines invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Invasive species can represent a fight for survival to native species because they have several advantages that enable them to survive. They **reduce biodiversity because they can out-compete natives for resources, have few native predators to keep their populations in check, and can be resistant to diseases found in their adopted communities**. Did you know that many scientists believe the spread of invasive species is second only to loss of habitat as the primary reason for the loss of the Earth’s biodiversity in recent years? A number of the most serious pests (Japanese beetle, gypsy moth, emerald ash borer) have been brought to the United States accidentally from other countries.

Development:

Divide the youth into teams and assign each group three invasive species from the list below for their research.

- Gypsy Moth
- Kudzu
- House Finch
- Asian Long Horned Beetle
- Periwinkle
- Garlic Mustard
- Emerald Ash Borer
- Purple Loosestrife
- Sudden Oak Death
- Ambrosia Beetle
- Asian Carp
- European Starling
- Tree of Heaven
- Zebra Mussel

Exploration:

Once youth have been divided into small groups and received the names of the organisms they will investigate, explain that they will be conduct their research using the suggested websites listed below:

Suggested Websites:

- NAPIS – Pest Tracker, <http://pest.ceris.purdue.edu/index.php>
- USDA – National Invasive Species Information Center, <http://alic.arid.arizona.edu/invasive/sub1/index.shtml>
- The Nature Conservancy, <http://www.nature.org/initiatives/invasivespecies/>
- National Biological Information Infrastructure administered by the Biological Informatics office of the U.S. Geological Survey, <http://invasivespecies.nbii.gov/portal/server.pt>
- USDA APHIS Cooperative Agricultural Pest Survey Program, http://www.aphis.usda.gov/plant_health/plant_pest_info/pest_detection/pestlist.shtml
- Center for Invasive Species and Ecosystem Health, <http://www.invasive.org/>

To answer the following questions on the **Invasive Species Investigator** worksheet:

- Where did it come from?
- Is it a plant or an animal?
- How did it get here?
- What kind of damage does it do?
- What are its host species?
- What are the signs and symptoms?

Assessment:

Once the students have completed the **Invasive Species Investigator** worksheet, have them share their results and discuss what they have learned to assess their understanding.

Concept Extension:

- Invasive Species Word Search, <http://extension.entm.purdue.edu/arrestthatpest/dev/index.php?page=part1/index>
- Native, Exotic, or Invasive? <http://extension.entm.purdue.edu/arrestthatpest/dev/index.php?page=part1/index>
- Origin of the Species: A Mix and Match Game, <http://extension.entm.purdue.edu/arrestthatpest/dev/index.php?page=part1/index>