McKeesport Area School District

Flexible Instruction Days – High School Lesson Plan

SUBJECT: 10th Grade Biology ADAPTED			**LESSON TITLE: Managing Invasive Species in Pennsylvania**	
☐**LESSON 1:** 1st or 2nd 9-Weeks	☐ **LESSON 2:** 2nd or 3rd 9-Weeks	☐ **LESSON 3:** 2nd or 3rd 9-Weeks	☐ **LESSON 4:** 2nd or 3rd 9-Weeks	☒ **LESSON 5:** 3rd or 4th 9-Weeks

STANDARD(S):

BIO.B.4.2.4 Describe how ecosystems change in response to natural and human disturbances (e.g., climate changes, introduction of nonnative species, pollution, fires).

INSTRUCTIONAL OUTCOMES:

Students will be able to:

- Identify species native and invasive to Pennsylvania
- Describe the characteristics of an invasive species
- Develop a management plan for an invasive species

STUDENT PARTICIPATION *(Lesson steps):*

Students will:

1. Read the attached handout "Managing Invasive Species in Pennsylvania" and answer the questions which accompany the reading in Part 1.
2. Develop and budget a plan to manage the spotted lanternfly in Part 2.
3. HONORS BIOLOGY: expand the management plan to include the spotted lanternfly's preferred host plant, the tree-of-heaven.

ACCOMMODATIONS:

- I recommend that students underline their answers in the reading before writing them down.
- Adapted lessons include cloze statements. Students complete the statements with information from the reading.
- This video describes invasive species and may help the reading: https://www.youtube.com/watch?v=spTWwqVP_2s.

HANDOUTS *(exact names of ALL accompanying handouts)* **& RESOURCES** *(materials, websites, books, etc.)*

- Writing utensil
- Handout: "Managing Invasive Species in Pennsylvania"
- Internet access (optional)

EVIDENCE OF LEARNING

Students will demonstrate:

- Understanding of how to distinguish invasive and native species by reading and responding to comprehension questions.
- Management and budgeting skills by completing a plan to manage the spotted lanternfly.

Adapted from: https://www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/Pages/default.aspx
https://www.nrcs.usda.gov/wps/portal/nrcs/main/pa/technical/ecoscience/invasive/
https://dnr.wi.gov/topic/Invasives/control.html
https://extension.psu.edu/spotted-lanternfly
https://extension.psu.edu/tree-of-heaven

NAME _____

Class period / Teacher _____

Managing Invasive Species in Pennsylvania - ADAPTED

Part 1: What is an invasive species?

Invasive species are species that:

- Are not from an area
- Spread quickly
- Cause economic or environmental harm, or harm to human health

Many invasive species have appeared in Pennsylvania over the years, mainly by human travel or travel that moves them from their normal ecosystem. The movement of an invasive species can happen accidentally or on purpose. If enough individuals move into an area to form a breeding population, they can become an invasive species.

1. What kinds of harm do invasive species cause?

Invasive species can cause harm to _____

_____

2. What is the main method by which invasive species arrive in a new ecosystem?

The main method by which invasive species arrive in a new ecosystem is _____

_____

When invasive species are mentioned, often invasive animals come to mind first. One of the most famous invasive animals in Pennsylvania, and the entire United States, is the feral hog. In the early 1900s, European boars were introduced to the United States for hunting sport. These wild hogs bred with escaped domestic pigs to make a smaller, and very aggressive, feral hog.

However, invasive plants pose a more common and varied problem than invasive animals. Invasive plants out-compete natives and “take over” native plants’ habitats. They often emerge earlier in the spring and reproduce rapidly. Rapid reproduction limits habitat available for native wildlife and disrupts the food chain.

3. Why were European boars introduced into the United States?

European boars were introduced into the United States for _____

_____

Invasive species also cost money. According to the U.S. Fish and Wildlife Service, the United States spends more than $120 billion to control invasive species each year. Farmers spend money to protect their crops from invasive insects and plants such as Japanese beetles and bindweed. Waterfront property loses value when Eurasian watermilfoil occupies lakes.

4. How much money does the United States spend each year to control invasive species?

Each year to control invasive species, the United States spends _____

_____

Strategies and methods to control invasive species generally fall into two categories: proactive, which limit the spread of invasive species, and reactive, which manage existing invasive species.

Proactive control:

- research the risks posed by various species
- quarantine regions already exposed to an invasive species.

Reactive control:

- manual (uprooting plants, trapping animals, etc.)
- chemical (pesticides, herbicides, etc.)
- biological (grazing animals, supporting native competitors, introducing a predator, etc.)

Biological and manual control are generally less harmful to native ecosystems than chemical control but are often more expensive and less effective.

5. What is an example of proactive control for invasive species?

One example of proactive control for invasive species is _____

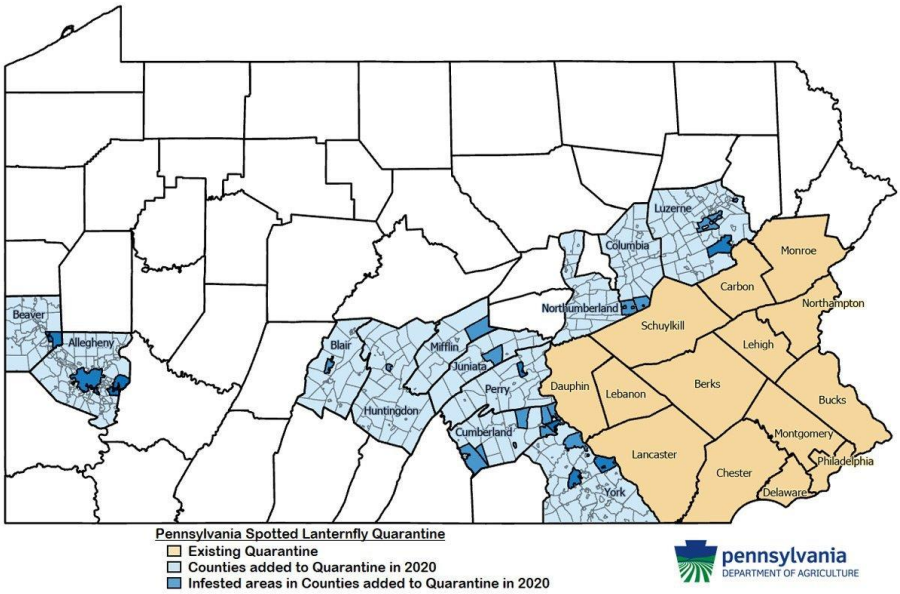
_____

6. Which is generally more effective against invasive species, biological or chemical control?

Biological / Chemical control is generally more effective. (Circle one)

Part 2: Managing the spotted lanternfly

The spotted lanternfly is a serious invasive pest in Pennsylvania. It has a strong like for feeding on important plants including grapevines, apple trees, black walnut, birch, willow, and other trees. The feeding damage significantly stresses the plants which can lead to decreased health and potentially death. If not contained, spotted lanternfly potentially could cost Pennsylvania's economy at least $324 million annually, according to a study carried out by economists at Penn State.



According to this map, the spotted lanternfly was recently identified in Allegheny County. Spotted lanternfly often spreads by laying eggs on trains or trucks.

The Pennsylvania Department of Agriculture has selected YOU to develop a management plan for the spotted lanternfly in Allegheny County. You will have a budget of $10,000. In the table on the next page, list at least three strategies, activities, or methods to limit the spread of spotted lanternfly or control its abundance in Allegheny County. Budget your $10,000 between these strategies and describe HOW each strategy will manage the spotted lanternfly.

Consider these strategies:

- public awareness campaign
- inspections of trains and trucks
- inspections of trees
- insect traps
- insect poisons
- support a native predator
- introduce a non-native predator
- restrict travel between states/counties
- invest in agricultural plants resistant to spotted lanternfly

Example:

Strategy/Activity/Method	Budget	Description
0. Spotted lanternfly traps	$4,000	These traps will catch the spotted lanternfly before it damages any trees.

Strategy/Activity/Method	Budget	Describe HOW this strategy will manage the spotted lanternfly
1.		
2.		
3.		
	TOTAL: $10,000	