

ACTIVITY 7

THE ELM STREET TREE HOUSE CLUB

In Chapter 7 of *Wisconsin Forest Tales*, students read about a group of boys who plan to build a tree house, but the tree becomes a victim of Dutch elm disease. In this activity, students investigate Dutch elm disease and other alien invaders, share their findings with the class, and play a game using what they have learned.

BACKGROUND

In each ecosystem there is a natural balance that keeps everything running smoothly. The system can get out of balance when something new is introduced into the ecosystem. Since everything in an ecosystem is related in some way to everything else, a complicated series of cause and effect events can take place.

Gypsy moths are an invasive exotic species in Wisconsin. An invasive exotic species is a species that enters an area and causes harm by out-competing species already there. They cause problems for trees by stripping them of their leaves. Gypsy moths can eat all the leaves off one oak tree in a week. Trees are usually able to grow a new set of leaves before the growing season ends, but if trees face another stress (such as drought) at the same time, the trees may die. Defoliation makes trees more vulnerable to other pests and diseases. In addition, oak trees may not make any acorns for several years following defoliation. This has an impact on the amount of food available for wildlife. Leaves serve as a buffer against strong rainstorms. Without the leaves, water may pound the soil, causing erosion and runoff into nearby streams. Without shade from trees, water temperatures in streams and lakes increase and oxygen levels decrease, causing stress to aquatic life.

This example demonstrates the chain of events that can happen when an ecosystem gets out of balance. For this reason, we try to keep invasive exotic species under control to minimize their affect on our ecosystems.



LESSON OBJECTIVES

Upon completion of this activity, students will be able to:

- Describe four invasive exotic species present in Wisconsin.
- Describe actions that can help prevent the spread of invasive exotic species.

TIME

Introduction.....5 minutes
Activity.....30 minutes
Conclusion.....30 minutes

MATERIALS

- Overhead projector
- Four copies of the Investigation Worksheet
- Two copies of the Alien Invader Cards
- Overhead transparency of the Alien Invader Cards
- One copy of each Alien Profile
- Scissors

SUBJECT AREAS ADDRESSED

Language Arts
Science

INTRODUCTION

Review the story from Chapter 7 of Wisconsin Forest Tales with your students. Ask your students what the boys in the story were planning to do with the elm tree in the Butlers' backyard. (*The boys wanted to build a tree house for the Elm Street Tree House Club.*) Ask what happened to the tree in the story. (*The boys noticed that some of the leaves were yellow and wilted. They later found out the tree had Dutch elm disease and needed to be cut down.*) Ask how this made the boys feel. (*They felt disappointed that they wouldn't be able to build a tree house. They also were disappointed that many other trees in their neighborhood had to come down.*) Ask what was lost when the trees were taken. (*The cool shade that had protected their skin, their homes, and their lawns from the hot sun. The roots that protected the soil from washing away and places for animals to make their homes.*)

Put the transparency showing drawings of the alien invaders on the overhead projector. Uncover the drawing representing the fungus that causes Dutch elm disease. Tell your students that in this story, Dutch elm disease was the problem. Remind your students that Dutch elm disease is caused by a fungus that came from another part of the world. Tell your students that scientists call this fungus an invasive exotic, but you could also think of it as an alien invader. Dutch elm disease is not the only alien invader to damage our trees in North America. Uncover the drawings of the emerald ash borer and the Asian longhorned beetle. Explain that the larvae of these insects can chew through enough wood to cause a tree to die. Next, uncover the drawings of the gypsy moth and explain that the larvae of this insect can eat enough leaves off of trees to cause serious and lasting impacts.



ACTIVITY

1) Divide your students into four groups and assign each group one of the following alien invaders to investigate: emerald ash borer,

gypsy moth, Asian longhorned beetle, or Dutch elm disease.

2) Hand out one blank Investigation Worksheet to each group. Explain to your students that you are going to ask them to find out more about the alien invader that was assigned to their group.

3) Give each group the Alien Profile for the alien invader they were assigned. Explain to your students that their job will be to use the Alien Profile to fill in all the boxes on their Investigation Worksheet.

The information they gather will include:

- Description: How to recognize the alien
- Target: Which tree(s) the alien attacks
- Strategy: How the alien harms the tree
- Arrival: How the alien invaded North America
- Infiltration: How the alien spreads to other areas
- Defense: How we can help prevent the spread of the alien (**Note:** their worksheet requires them to list three defenses)

Help your students break down the task of filling out their worksheet. Encourage them to divide the questions among the group members so each member works on one or two questions, or suggest that they work in pairs within their group. Explain that the worksheets are later going to be cut into information cards and used to play a game called *Identify the Culprit*. Tell your students to be careful not to use the name of their invader on the cards. If they do, they will give the answer away. Give your students time to work. In the meantime, be sure you have two sets of the four Alien Invader Cards cut apart.

4) Once your students have had time to start on their investigations, tell them that you are going to ask each group to give a summary to the class on their findings. Ask the groups to think about whether they will have each person share about the question(s) they answered, or if one person will present all the information on behalf of the group.

5) When every group has completed their Investigation Worksheets, tell your class it is time to hear each group present their information. Allow each group to use the drawings of their invader from the overhead during their briefing. Remind your students to listen carefully during

each presentation. Explain that they will need to know as much as possible about each alien invader in order to play the game *Identify the Culprit*. Begin having each group give their presentations. When all the presentations are over, ask each group to cut their worksheets apart into eight cards. Collect all the cards into one container and mix them up.

6) It is time to play *Identify the Culprit*. Make a row with each of the two sets of alien invader cards on either side of a table at one end of the room. Divide the class into two groups. Have each group line up on the opposite end of the room from the table. Hand out 16 cards to each group. Explain to your students that in relay race fashion, they will take turns picking one of their 16 cards and walking to their set of alien name cards on the table. They will then match the information on their card to the alien it refers to and set the card down below the alien invader card. When they have finished, they will return to the group and slap the hand of the next teammate.

Play the game until both groups have completed placing their cards under the corresponding alien invader card. When everyone is finished, check the work of the first group to finish. If they got all their cards in the correct location, they win. If any of their cards are not in the correct position, check the work of the second group. If the second group got all their cards in the correct position, they win. If neither team got all of them correct then have your class do the race again.



CONCLUSION

Discuss with your students how the alien invaders are capable of killing trees. Have your students reflect on a tree that has meaning to them. Ask them how they would feel if an alien invader killed their special tree. Ask them what benefits they would lose if this tree died. Have your students write a poems about their tree and the things they appreciate about it. When everyone is finished, ask several students to share their poem for the class. Ask questions like: Where is your special tree? Why did you choose

this tree? Would anyone besides you be sad or disappointed if the tree died?



ASSESSMENT

Explain to your students that emerald ash borers, gypsy moths, Asian longhorned beetles, and Dutch elm disease are not the only invasive exotic species threatening Wisconsin's forests. Ask your students to uncover an invasive exotic which is threatening Wisconsin's forests and is not described in this activity. Assign your students to write their own Alien Profile describing the invasive exotic they uncovered. Each profile should include at least three of the following pieces of information concerning the exotic they chose.

- Description: How to recognize the alien.
- Target: Which tree(s) the alien attacks.
- Strategy: How the alien harms the tree.
- Arrival: How the alien invaded North America.
- Infiltration: How the alien spreads to other areas.
- Defense: How we can help prevent the spread of the alien.

MORE INFORMATION

Emerald Ash Borer

www.dnr.state.wi.us/org/land/Forestry/FH/Ash/index.html

Gypsy Moths

www.dnr.state.wi.us/org/caer/ce/eeek/critter/insect/moth.htm

Asian Longhorned Beetle

www.dnr.state.wi.us/org/land/Forestry/FH/exotics/index.html#3

Dutch Elm Disease

www.sdeda.ca/kids/factsheet.pdf

Invasive Exotic Species

www.dnr.state.wi.us/invasives



ALIEN PROFILE: ASIAN LONGHORNED BEETLE

Description: How to recognize an Asian longhorned beetle

Named for their long antennae, adult beetles have black armor covered with white spots. They lay eggs on trees. The eggs hatch into larvae, which look like small white worms. Larvae tunnel into the tree to go through metamorphosis and emerge later as adult beetles.

Target: Which tree(s) the alien attacks

Asian longhorned beetles prefer maple trees. However, birch, horse chestnut, poplar, willow, elm, ash, and black locust have also been known to sustain attacks by these black and white invaders.

Strategy: How the alien harms the tree

Larvae tunnel into the wood, causing branches to die. If enough tunneling is done on one tree, the tree can die.

Arrival: How the alien invaded North America

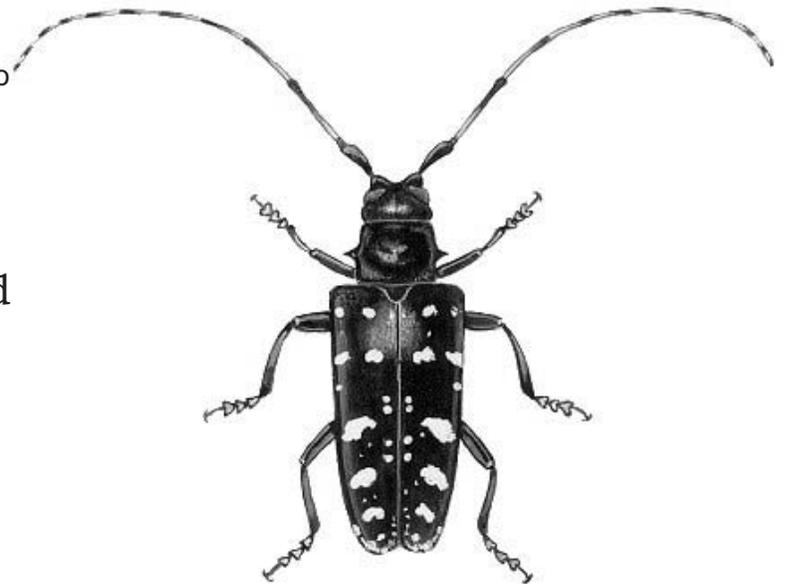
As the name tells you, Asian longhorned beetles came from Asia. They probably arrived in North America burrowed into some kind of wooden shipping crate. Asian longhorned beetles were first detected in Brooklyn, New York in 1996.

Infiltration: How the alien spreads to other areas

Since Asian longhorned beetles hide below the bark of the tree for most of their lives, they are difficult to detect. The beetle can easily hitch a ride in firewood or in trees from nurseries without people being aware of it.

Defense: How we can help prevent the spread of the alien

Wooden packing materials need to be checked for the presence of Asian longhorned beetles and treated to kill any insects in the wood. Infested trees need to be cut down and chipped or burned to get rid of the beetle. People must be careful not to take wood materials from infested areas to uninfested areas.



ALIEN PROFILE: EMERALD ASH BORER

Description: How to recognize an emerald ash borer

Named for their color, adults have a metallic green color on their backs. They measure only a half-inch long at most. The adults lay eggs that hatch into larvae. The white worm-like larvae have a pair of brown pincers. These larvae spend the winter changing into adult beetles.

Target: Which tree(s) the alien attacks

Emerald ash borers feed exclusively on ash trees. Ash trees can be commonly found in the city and in the country all over Wisconsin.

Strategy: How the alien harms the tree

The eating habits of emerald ash borer larvae cause severe damage to an ash tree. They chew through the part of the wood that transports water and nutrients to the branches and leaves. Without water and nutrients the tree can die.

Arrival: How the alien invaded North America

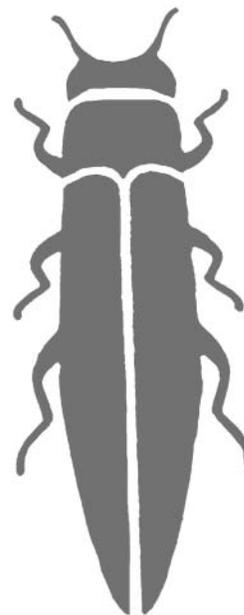
Emerald ash borers originally came from Asia. At some point, there must have been larvae hiding in some wood that was shipped from Asia to North America. Scientists first discovered the emerald ash borer in Michigan in 2002. As of 2005, emerald ash borers had not yet spread to Wisconsin.

Infiltration: How the alien spreads to other areas

Larvae hide in logs and firewood without people knowing about it. When people move the logs or firewood from one region to another, they can accidentally help to spread the beetles to a new location.

Defense: How we can help prevent the spread of the alien

Never bring firewood from a known emerald ash borer-infested area into Wisconsin. Keep an eye on the ash trees near your surroundings. Help keep trees healthy by watering them if the weather has been dry. Report any suspected emerald ash borer infestations.



ALIEN PROFILE: GYPSY MOTH

Description: How to recognize a gypsy moth

Adult gypsy moths grow to be 1 to 1.5 inches long. They have brown and black wings. Adults lay eggs in masses, which eventually hatch into caterpillars. Covered with long stiff hairs, gypsy moth caterpillars are mostly black. As they grow, they get pairs of blue and red spots on their backs. The grown caterpillars go through metamorphosis and turn into adult gypsy moths.

Target: Which tree(s) the alien attacks

Gypsy moths chew the leaves of alder, apple, aspen, birch, basswood, hawthorn, white birch, tamarack, oak, and witch hazel trees.

Strategy: How the alien harms the tree

Gypsy moths do the most damage while they are caterpillars. Gypsy moth caterpillars can eat all the leaves off of trees. For instance, all the leaves on an oak tree can be gone in one week. This makes the trees weak and slows down their growth. In some cases, the tree dies.

Arrival: How the alien invaded North America

In the late 1800s, a professor wanting to breed a hardy silkworm, brought gypsy moths to the U.S. Some of the gypsy moths escaped from a jar that fell from his window in Massachusetts. Soon a Gypsy moth population grew in the surrounding area. It took over 120 years, but eventually gypsy moths spread throughout the eastern U.S.

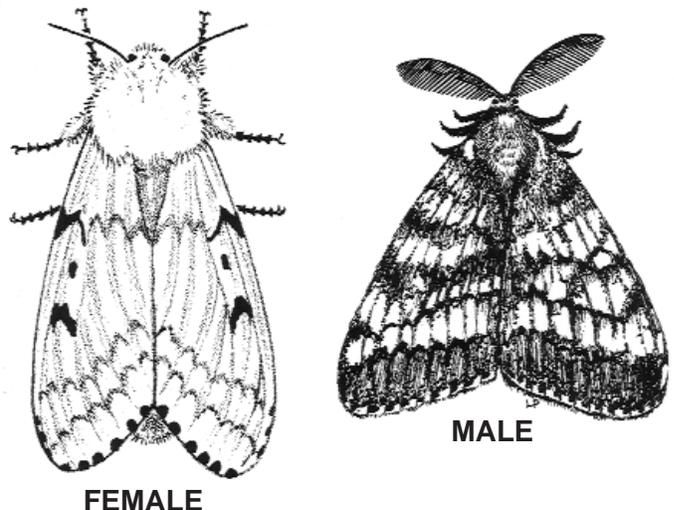
Infiltration: How the alien spreads to other areas

After the caterpillars hatch out of their eggs, they spread out. From the top of a tree, caterpillars spin themselves a thread and dangle from it. Then they wait for a breeze to blow them to another tree.

People can transport gypsy moths from one area to another without knowing it. Accidental spread can happen easily when clumps of eggs attach to things like cars, firewood, plants, and outdoor furniture.

Defense: How we can help prevent the spread of the alien

Look for and remove eggs on vehicles and equipment before you go on a trip and again before you return. Look for and remove eggs from your trees, buildings, and outdoor furniture every fall. Allow state and federal investigators to trap gypsy moths on your property. Report any gypsy moths you find to the Wisconsin Department of Agriculture.



Photos: Cooperative Extension Service, University of Maryland System

ALIEN PROFILE: DUTCH ELM DISEASE

Description: How to recognize Dutch elm disease

Dutch elm disease is caused by a fungus that is carried by the elm bark beetle.

Target: Which tree(s) the alien attacks

Dutch elm disease attacks only elm trees. Elm trees grow in cities and forests all over Wisconsin.

Strategy: How the alien harms the tree

The fungus damages the water transporting system in elm trees. Without water, the leaves turn yellow, wilt, and the tree dies.

Arrival: How the alien invaded North America

The disease came to America in wood that was brought into the United States from Europe during the early 1900s.

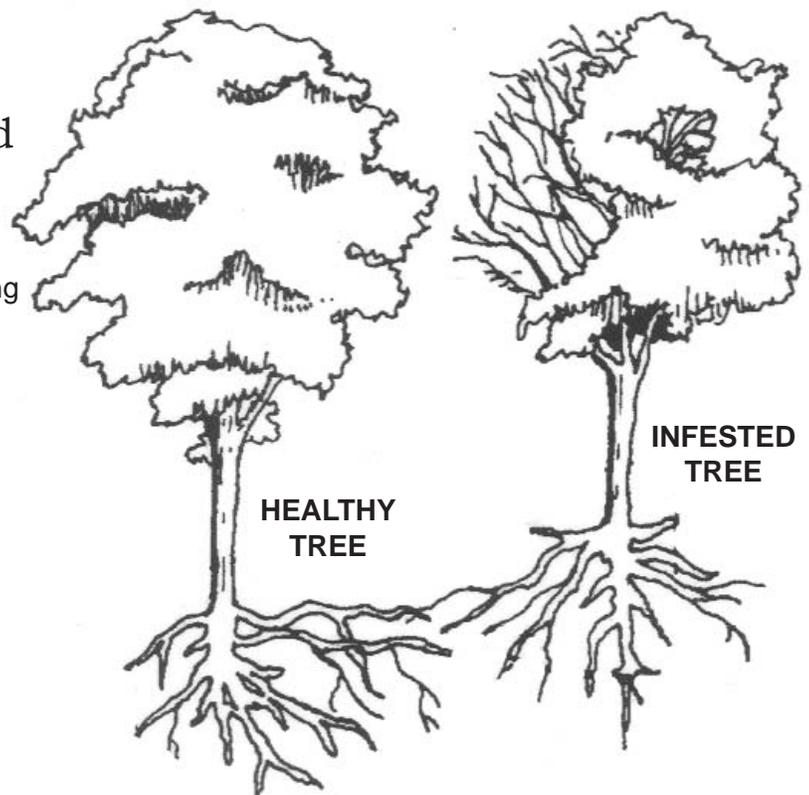
Infiltration: How the alien spreads to other areas

Dutch elm disease spreads when the fungus hitches a ride with elm bark beetles. The bark beetles move from tree to tree, spreading the

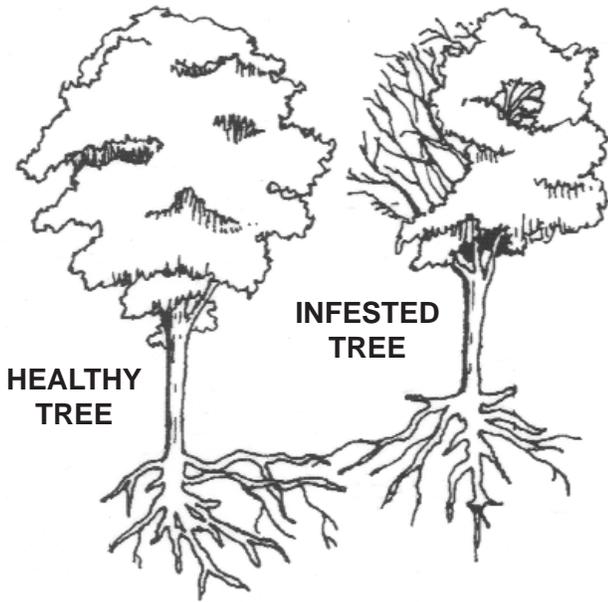
disease-causing fungus. The fungus also spreads directly from tree to tree when the roots of two elm trees connect.

Defense: How we can help prevent the spread of the alien

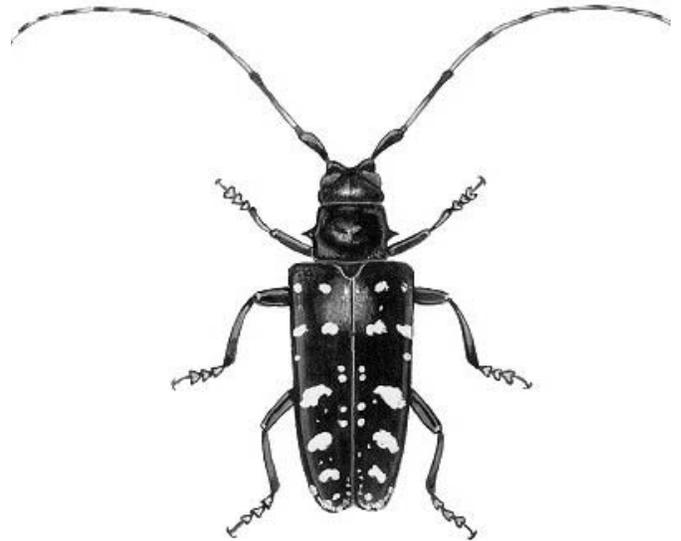
Don't transport firewood containing elm logs. If you do, you may accidentally spread Dutch elm disease to a new area. Take special care of elm trees so they stay healthy and resistant to disease. Don't prune elm trees during the growing season because this will attract elm bark beetles to the tree and make the tree more susceptible to infection.



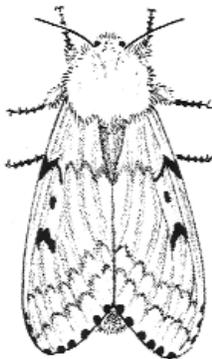
Dutch Elm Disease



Asian Longhorned Beetle



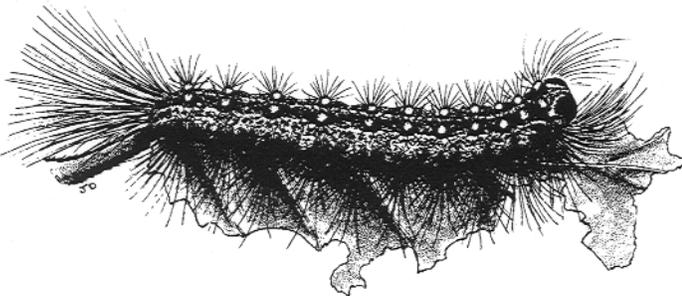
Gypsy Moth



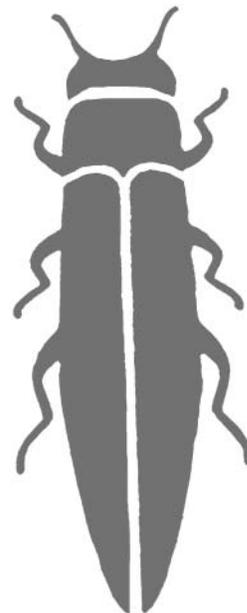
FEMALE



MALE



Emerald Ash Borer



INVESTIGATION WORKSHEET

Work with your group to fill in the following information about your alien invader. These cards will be used to play *Identify the Culprit*. Be careful not to use the name of your invader on these cards. If you do, you will give the answer away.

What the alien invader looks like:

Type(s) of tree the alien invader attacks:

How the alien invader hurts trees:

How the alien invader got to North America:

How the alien invader spreads to other areas:

One way we can help prevent the spread of the alien invader is:

One way we can help prevent the spread of the alien invader is:

One way we can help prevent the spread of the alien invader is: