Emerald Ash Borer Tag

Grade level: 4 - 9

Duration: 45 minutes

Location: Outdoors

Theme:

The Emerald Ash Borer is an invasive species that has caused tremendous economic, social, and biological impacts in the United States since its introduction.

Objective:

Students will learn about local invasive species, their impacts, and biological and chemical controls that are being utilized to protect native species.

Concepts:

- Invasive Species
- Native Species
- Biological Control
- Chemical Control
- Parasite
- Stability
- Parasite

Materials:

- Ash tree markers
- Inoculation cards
- Parasitic Wasp Card
- Stopwatch (optional for extension)

NYS Standards:

MST4.C.LE.LE.1.1f
MST4.C.LE.LE.5.2b

MST4.C.LE.LE.6.1g
MST4.C.LE.LE.7.1c
MST6.C.ES.PC.5

Instructions:

Round 1:

1. Set up a large playing field that is about 100 feet by 100 feet.
2. Many of the students will be ash trees and they will hold a yellow “Ash tree marker” and move about in the playing area avoiding emerald ash borers.
3. Two students will be emerald ash borers.
4. The ash borers will tag as many ash trees as possible.
5. When an ash tree is tagged, they will become infested and they must walk along the perimeter of the field. They will drop their ash tree marker card into a bucket and then they become an emerald ash borer. They will tag other ash trees.
6. Play for several minutes until there are only a few more ash trees.

Round 2:

1. Round 2 will be played in the same manner except this time there will be some controls introduced.
2. Introduce a biological control, a parasitic wasp (*Spathius galinae)* that preys on the ash borer larvae. The parasitic wasp will tag any infested trees and eliminate the infestation. That ash tree can now return to the playing field as an ash tree.
3. Introduce the inoculation cards (chemical control). Ash trees can be injected with a pesticide to kill the ash borers and prevent future attacks to the tree, but inoculation is very expensive. Pass out about one inoculation card per 10 ash trees, make sure that the ash borers do not see which trees get inoculated. Inoculated ash trees will hold one of these cards to protect them from the ash borers. If the ash tree is tagged, they show the ash borer their inoculation card and the ash borer dies and leaves the playing field.
4. Play for a while until there seems to be a steady population for the ash borers.

Discussion:

How effective were the biological and chemical controls of the Ash Borer? What is a possible impact of introducing a predator of the ash borer? How else might the ash borer be controlled or eliminated? What happened when the Ash borers figured out which trees were inoculated? Can animals grow a tolerance or resistance to chemicals?

Extensions:

During the game, have the students freeze every 30 seconds and count the number of ash trees and emerald ash borers. Record the information and have the students make a graph and determine the differences before and after the controls were added.

Have students survey the ash trees in your schoolyard. Which ash trees have a full foliage, 50% foliage, less than 50% foliage, woodpecker marks, and “D- shaped” exit holes?

Resources:

Parasitic Wasp:

http://blogs.usda.gov/2014/05/21/a-new-weapon-in-the-fight-to-protect-americas-ash-trees-is-under-evaluation/

Pesticides:

http://www.emeraldashborer.info/documents/Multistate_EAB_Insecticide_Fact_Sheet.pdf

Hungry Pests Middle School Curriculum:

http://www.hungrypests.com/resources/HP_InvadeMS_Curriculum.pdf

http://horizonfrene.com/le-traitement/