Pest & Disease Control Department

Lesson 1 - Are You a Pest?

Essential Questions:

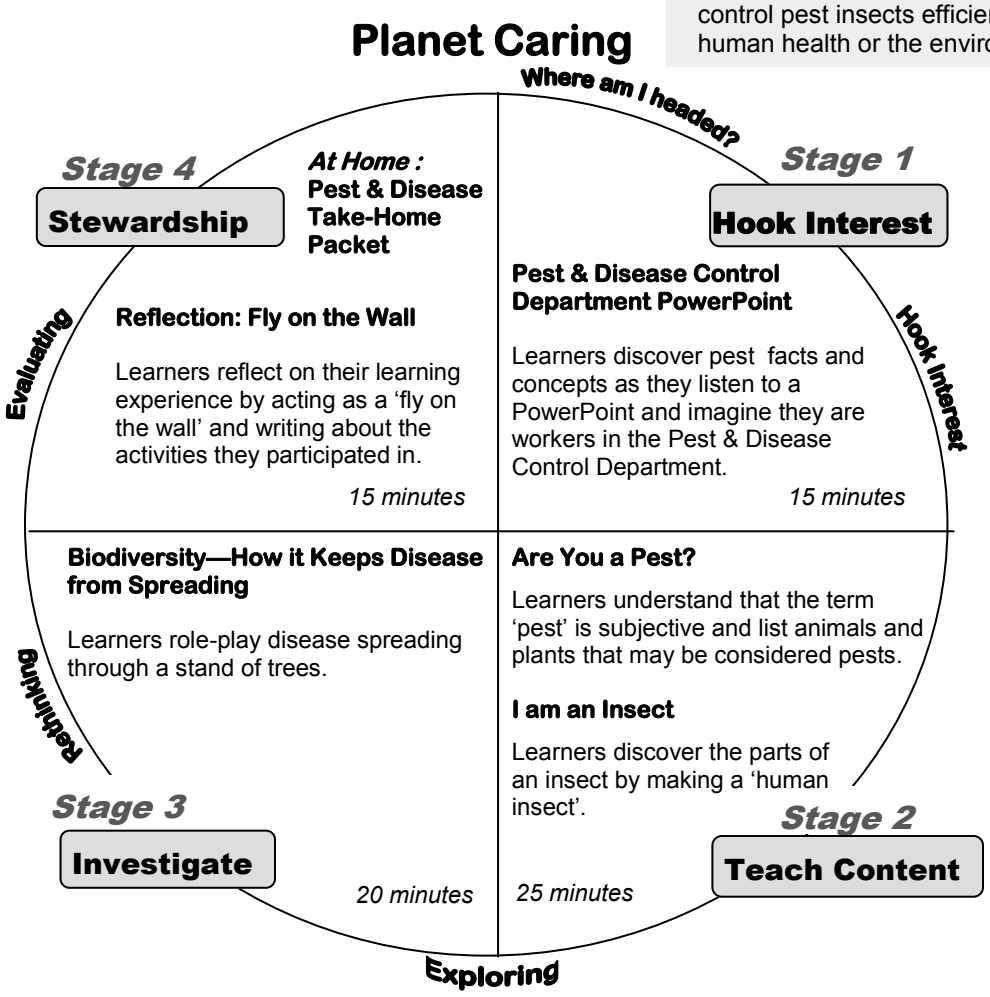
What is a 'pest' and why is the term subjective depending on the situation?
What are the body parts of an insect?
How does biodiversity keep disease from spreading?

Concepts:

- Populations of most organisms are kept in balance by interactions with other species. This is called biological control.
- In general, what animals eat determines whether humans classify them as helpful or harmful and determines their roles in ecosystems.
- Insects and invertebrates are major predators of insects and related invertebrates.
- Some insects and invertebrates are clearly harmful to human health, crops, and livestock and/or animals and need to be controlled.
- Most insects and invertebrates are beneficial, and all have roles in their ecosystems.
- Integrated pest management is an approach that seeks to control pest insects efficiently in ways that do not harm human health or the environment.

At a Glance:

An interactive presentation (PowerPoint & dramatization) hooks learner interest and concern for the Pest & Disease Control Department on their club site. Next, learners understand the term 'pest' and its subjective nature, then make a 'human insect' to discover the parts of an insect. A role-play about disease spreading through a stand of trees shows the importance of biodiversity. The lesson ends with a reflection on what they've learned so far about the Pest & Disease Control Department.



Objectives

Learners ...

1) display curiosity about the major concepts related to the Pest and Disease Control Department.
2) explain that the term 'pest' is subjective.
3) discuss why some organisms are considered pests.
4) name the parts of an insect.
5) understand why biodiversity is important.
6) state how biodiversity can stop the spread of dis-ease.
7) reflect on what they have learned about the pest and disease control eco-service.

PROCEDURES IN BRIEF: Lesson 1—Are You a Pest?

Stage 1. Pest & Disease Control *PowerPoint*

Procedure:

Supplies
- PowerPoint on CD
- LDC projector
- Monitor
- Eco-service Worker Cards (see manual for complete list)

1. Explain that Garden Earth has many eco-service departments that make up every ecosystem. Many organisms live and work in the Pest & Disease Control Department. Show learners some of the eco-service worker cards. Briefly introduce the worker on each card. Explain that we will be learning more about these workers in this module. Ask the children if they have seen any of them at our club site.
2. Present the PowerPoint presentation. It introduces the major concepts of the Pest & Disease Control module as follows:
   - Populations of most organisms are kept in balance by interactions with other species. This is called biological control.
   - In general, what animals eat determines whether humans classify them as helpful or harmful and determines their roles in ecosystems.
   - Insects and invertebrates are major predators of insects and related invertebrates.
   - Some insects and invertebrates are clearly harmful to human health, crops, and livestock and/or animals and need to be controlled.
   - Most insects and invertebrates are beneficial, and all have roles in their ecosystems.
   - Pesticides, which can be persistent, are harmful to the environment, to species beyond those targeted and to human health when used inappropriately.
   - Integrated pest management seeks to control pest insects efficiently in ways that do not harm human health or the environment.

Stage 2. Are You a Pest?

Procedure: ***In depth activities-Please see full write-up***

Supplies
- Eco-services ID cards
- pencil/pens
- chalkboard
- worksheet or blank paper

1. Provide background information on pests.
2. Form groups of 3-4 and pass out the worksheet.
3. Learners are to list some organisms, when they are considered pests and when they are not.
4. Discuss the results as a group.

I am an Insect

Head: Person 1, sit on the floor Indian style. You are the head.
Thorax: Person 2, sit on the floor behind Person 1, in the middle of the circle with your legs stretched out. Leave a space between person 1 and 2. You are the insect thorax.
Abdomen: Person 3, sit on the floor behind Person 2. Leave a space between 2 and 3. You are the abdomen.
Antennae: Person 4, stand to the left of the head, hold your arms straight up over your head. Person 5, stand to the right of the head, hold your arms straight up over your head. You are the insect's antennae.
Wings: Person 6, stand with your back to the left leg of the thorax, stretch your arms out in front with your palms together. Person 7, stand with your back to the right leg of the thorax, stretch your arms out in front of you with your palms together. You are the wings.
Legs: Person 8, get on your hands and knees with your head under Person 6's outstretched arms (Leg 2). Person 9, get on your hands and knees to the left of Person 8 (Leg 1). Person 10, get on your hands and knees to the right of Person 8 (Leg 3). All three heads are toward the insect's body. You are three legs.
Legs: Do the same with Person 11-13 to make the other three legs.

Stage 3. Biodiversity-How it keeps disease from spreading

Procedure: ***In depth activity-Please see full write-up.***

Supplies
- Biodiversity tree cards

1. Have learners stand spread out in an area. Explain that they are a monoculture (all one species) of loblolly pines.
2. The loblolly pine is susceptible to the southern pine beetle. Touch the nearest student. This loblolly pine has now been infected with the beetle.
3. Ask the student to reach out and touch the trees around her/him. The student should now sit down to represent a diseased/dead tree. The other infected trees should 'infect' other students until all the trees are dead. Because there is no biodiversity all the trees are susceptible to this beetle.
4. Distribute the Biodiversity tree cards (look at side with picture). Explain that they are all pine trees, but now they are different species of pine trees.
5. A certain type of weevil prefers eastern white pines to other pines and will readily infect these trees. 'Infect' an eastern white pine. They should reach around and touch surrounding trees. Allow the weevil to spread through the eastern white pines. Because there are different species of pine tree present, the weevil was not in the target range of all the susceptible trees.
6. Have the learners all stand up again. A fungal diseases called fusiform rust infects loblolly and slash pines. Introduce the disease. Repeat the procedure of touching surrounding trees and sitting down. A lot of the trees may have died, but only the loblolly and slash pine trees.
7. Now the southern pine beetle invades and infects all the pines. The trees should all die. Even though we have some biodiversity the forest is still very vulnerable. What could we do to improve the health of this forest?
8. Ask learners to turn over their cards. They are now representing a much more diverse forest. Now introduce the white pine weevil to an eastern white pine – only that tree or maybe another one will die.
9. Introduce the fusiform to a slash or loblolly. Even if all those pine species died there would still be a lot of other tree types in the forest.
10. Lastly, introduce the pine bark beetle. It should be contained and not all the pines will die. **High biodiversity means a healthy ecosystem**!

Stage 4. REFLECT: Fly on the Wall

Procedure:

Supplies
- Journal or blank paper
- Pencils/pen

1. Ask students to take a couple of moments to reflect on the learning experience (where they've been, what they've done, whom they've worked with, tools they used, etc.).
2. Then ask them to pretend they were a "fly on the wall" observing, but not participating in the scene. Have students write a short descriptive passage based on their observations.

Reflection Questions:

What has been your favorite part of the Pest & Disease Control Department module so far?

How was it pretending you were just observing the activities in the Pest & Disease Control Department module rather than participating in them?

Can you name some organisms (plants or animals) that are 'Eco-service Workers' in this department? What is their role in this department?

Why do you think the Pest & Disease Control Department is important?

Complete lesson write-ups are in the GEN manual or on the website at http://gen.uga.edu/gen