

Pest and Disease Control Eco-service *Understanding by Design Curricula Plan*

Title: GEN Patrol: Friend or Foe?

Module Overview: In this module learners learn how Earth’s ecosystems provide the vital eco-service of Pest and Disease Control. They investigate insect pest and friends as well as invasive plants on their site. They learn how ecosystems provide controls for pests through a variety of games and hands-on learning activities. Specific activities include collecting insects with pitfall traps, nets and baits. They also investigate and identify invasive plant species and adaptations of insects and plants that increase their survival potential. A GEN take-home pamphlet allows learners to extend their knowledge by looking for pest organisms near their home and sharing their knowledge with other family members.

Grades: 3rd – 5th

Stage 1 – Desired Results

Established Goals

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Related GPS Science Content

Third Grade: Earth Science

Life Science S3L1. Learners will investigate the habitats of different organisms and the dependence of organisms on their habitat.

- d. Explain what will happen to an organism if the habitat is changed.
- S3L2. Learners will recognize the effects of pollution and humans on the environment.**
- a. Explain the effects of pollution (such as littering) to the habitats of plants and animals.
- b. Identify ways to protect the environment (conservation of resources, recycling of materials).

Fourth Grade: Life Science

S4L1. Learners will describe the roles of organisms and the flow of energy within an ecosystem.

- a. Identify the roles of producers, consumers and the flow of energy within an ecosystem.
- b. Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments.
- c. Predict how changes in the environment would affect a community (ecosystem) of organisms.
- d. Predict effects on a population if some of the plants or animals in the community are too scarce or if there are too many.

S4L2. Learners will identify factors that affect the survival or extinction of organisms such as adaptation, variation of behaviors (hibernation) and external features (camouflage and protection).

- a. Identify the external features of organisms that allow them to survive or reproduce better than organisms that do not have these features (e.g. camouflage, use of hibernation, protection, etc.)
- b. Identify factors that may have led to the extinction of some organisms.

Fifth Grade: Life Science

S5L1. Learners will classify organisms into groups and relate how they determined the groups with how and why scientists use classification.

- a. Demonstrate how animals are sorted into groups (vertebrate and invertebrate) and how vertebrates are sorted into groups (fish, amphibian, reptile, bird and mammal).

S5L4. Learners will relate how microorganisms benefit or harm larger organisms.

- a. Identify beneficial microorganisms and explain why they are beneficial.

Habits of the Mind:

3rd Grade skills

- Records investigations
- Analyzes whole number data
- Measures
- Makes sketches
- Compares and describes numerically
- Researches
- Uses tools
- Answers their own questions
- Communicates findings
- Understands safety concerns

4th grade Skills

- Ask Questions that lead to investigations
- Conduct simple investigations
- Uses tools for collecting data
- Uses charts and graphs
- Uses data to answer questions
- Writes and uses instructions
- Understands fairness
- Justifies reasonable Answers
- Identifies Patterns of change
- Researches for information
- Understands importance of safety concerns

5th Grade

- Records observations
- Offers and considers reasoning
- Quantifies data
- Measures and estimates
- Uses scientific tools
- Assembles, describes, takes apart, and reassembles
- Identifies parts and makes models
- Describes changes
- Compares physical attributes
- Draws and sketches
- Questions and seeks to find answers
- Researches for scientific information

b. Identify harmful microorganisms and explain why they are harmful.	
<p>Understandings:</p> <p>U</p> <p><i>Learners will understand that...</i></p> <ul style="list-style-type: none"> Populations of most organisms are kept in balance by interactions with other species. This is called biological control. Most insects and invertebrates are beneficial, and all have roles in their ecosystems. 	<p>Essential Questions:</p> <p>Q</p> <ul style="list-style-type: none"> What is a pest? What organisms are considered pests? How do ecosystems control pests and diseases? Are there any pests on my school site? Should people at my school try to control pests? If so, what should they do?
<p><i>Learners will know...</i></p> <p>K</p> <ul style="list-style-type: none"> 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 their ecosystem. Due to their numbers and sizes, insects and other invertebrates are links in most food chains. Insects and invertebrates are major predators of insects and related invertebrates. Predators have varied means of getting prey; and insects and their relatives use a variety of defenses for protection. 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 quite persistent, are harmful to the environment, species beyond those targeted and to human health. It is desirable to restrict use of pesticides and other chemicals and utilize other means of control such as natural predators and attractants, where possible. Integrated pest management is an approach that seeks to control pest insects efficiently in ways that do not harm human health or the environment. 	<p><i>Learners will be able to...</i></p> <p>S</p> <ul style="list-style-type: none"> explain that the term 'pest' is subjective. identify advantages and disadvantages of having mosquitoes on Earth. investigate pests and signs of pests on their school site/outdoor location. capture and observe arthropods with pitfall traps. capture and observe insects with sweep nets. classify organisms found on their site as pests or beneficials. identify the parts of an insect. differentiate between insects and some common invertebrates. describe four adaptations of insects. build an edible insect with a survival adaptation. discover how insects eat different kinds of food. describe how insect mouthparts differ between species and limit diets. explain why predators are important to ecosystems. use their senses to learn about mammal and insect adaptations. define the terms native, introduced and invasive. name 3 invasive plant species in Georgia. discuss ways to control pests on their site.
Stage 2 – Assessment Evidence	
<p>Performance Task:</p> <ol style="list-style-type: none"> AT HOME: Complete 'A Visit to the Pest Control Department', eight page pamphlet with insert letter to parents; visit designated websites and complete associated questions. Teach parents and other siblings about the Pest Department. GEN Science Night Project: Learners chose a species that is part of their school site Pest Department, research and develop a poster or diorama depicting a habitat for their chosen school site organism. Project can include everything the organism needs to survive. Record results of Pest Department studies in a club journal. 	
Key Criteria	
<p>Other Evidence</p> <p>1. Develop and perform a puppet show for younger learners that interprets the importance the school site Pest Control department; puppet show can also be performed at GEN Science Night.</p> <p style="text-align: right;">OE</p>	
Stage 3 – LEARNING PLANS: See Pest 'Quick Guides' 1-5	