



Pest & Disease Control Department

Lesson 2 - Insect Adaptations are Amazing!

Essential Questions:

What is echolocation?

What are the body parts of an insect?

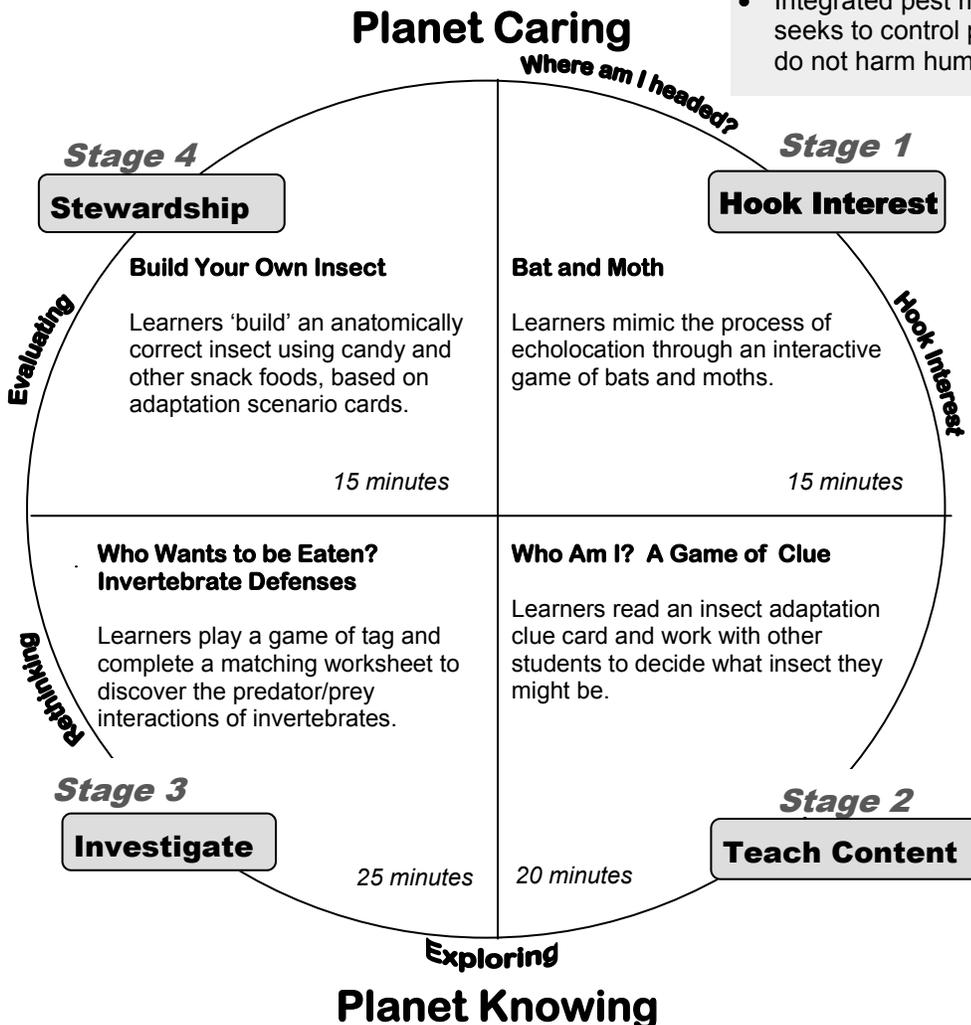
What are some insect adaptations that help them survive?

At a Glance:

Learners start this lesson with an active game to understand the process of echolocation between bats and their prey. Next, a game of clue teaches about different insects and some of their adaptations. Predator and prey interactions are learned through a game of tag, along with worksheet that discusses these interactions. Last, learners are able to 'build' their own insect with specific adaptations using healthy snack foods.

Concepts:

- Due to their numbers and sizes, insects and other invertebrates are links in most food chains.
- Insects and invertebrates are major predators of other insects and related invertebrates.
- Predators have varied means of getting prey; insects and their relatives use a variety of defenses for protection.
- Most insects and invertebrates are beneficial, and all have roles in their ecosystems.
- 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.



Objectives

Learners ...

- 1) use their senses to learn about bat adaptations.
- 2) mimic the process of echolocation through an interactive game.
- 3) identify insects according to their adaptations and characteristics.
- 4) name five predators of insects and invertebrates.
- 5) describe five ways invertebrates defend themselves against predators.
- 6) identify the parts of an insect.
- 7) build an edible insect with correct body.

PROCEDURES IN BRIEF: Lesson 2—Insect Adaptations are Amazing!

Stage 1. Bat and Moth

Procedure:

1. Discuss that bats do not use their sense of sight to locate food. Ask the children what senses they think bats use. Explain the concept of *echolocation* and tell them that they will play a game where they will pretend that they are bats looking for food.
2. Have the children stand in a circle. Choose one child to be the bat and another to be a moth. The children that remain standing in the circle are the trees. Give the bat and moths a blindfold to wear. The bat relies on its hearing to find the moth. The moth also has adapted to hear the high-pitched sounds emitted during echolocation, so they will also rely on their hearing to escape.
3. Explain the rules of the game:

Both the bat and the moth must remain on their hands and knees. Everyone in the circle must be quiet. The bat tries to catch the moth. If the bat calls out “bat”, the moth must answer “moth.” If the bat gets close to the edge of the circle and bumps into the trees, the trees can say “trees.” When the moth is touched, the round is over.

OR

Have the bat and moth standing. The bat claps once to represent the echolocation sound being emitted. The moth must clap twice to show that the sound has bounce off the moth. The bat must track down the moth by walking around the circle trying to touch the moth. The moth must try and evade capture. The trees keep the bat and moth contained by holding their arms out to prevent escaping the circle. The round is over once the moth is touched.

Supplies

- blindfolds (1-3)

Stage 2. Who Am I? A Game of Clue

Procedure:

1. Review the concept of adaptations with learners. Provide examples of insect adaptations that help them to function better as both predators and prey. Discuss how adaptations of an introduced insect can help it to become established and invasive.
2. Show the GEN Eco-Service cards of several insects, pointing out their special adaptations. These cards will include the answers to the activity (caterpillar, fire ant, dragonfly, mosquito, ladybug, and Walking stick). Display these at the front of the classroom where the learners can see them during the activity.
3. Tell learners that they will each receive a ‘Who Am I?’ clue card that will help them identify their insect. Some learners will have clues that match their insect, while others will be working to figure out a different insect.
4. Learners will try to find the other learners whose clues go with their insect, then decide as a group which insect matches their clues.
5. Once all the learners have found their groups and decided on their insect, have them present their insect and its adaptations to the class.

Supplies

- Who Am I? clue cards
- GEN Eco-Service Cards
 - Caterpillar
 - Fire ant
 - Dragonfly
 - Mosquito
 - Ladybug
 - Walking stick

Stage 3. Who Wants to be Eaten? Invertebrate Defenses

Procedure: See full write-up for other activities PREDATOR/PREY TAG

1. The premise of this part of the activity is a simple game of tag. Introduce the various defense strategies and how they will be performed during the game of tag (show signs). Tell learners that specific invertebrates use these defense strategies to protect themselves against predation.
 - Playing Dead:** freeze for 5 seconds
 - Color Startling:** flash sign to show colorful display
 - Noise Startling:** freeze and make hissing sounds
 - Cover to Hide in:** bend down and cover self with arms
 - Attack Weapons:** make chomp/biting motion with arms – mandibles
2. Give each student a sign that distinguishes which type of defensive strategy they will use against predators.
3. Choose one student to be the predator or “It” and give them the Predator sign. A bird is an example of a predator that would go after these types of prey. The predator will chase its prey and try to tag them. The predator must keep moving at all times.
4. The prey must perform their defense strategy before the predator is able to tag them. They may continue their defense for 5 seconds, then must keep moving. If the prey is tagged, they will become another predator. This shows how increased food supply helps increase the predator population levels. Have learners remove their sign to signify that they are now predators.
5. Play until the predator/prey levels are about equal. Discuss what may happen if the predator level continued to grow and the prey decreased (overpopulation, disease, etc.).

Supplies

- Invertebrate Defense Tag signs
- Cones

Stage 4. Build Your Own Insect

Procedure:

1. Review with learners the different parts of an insect. Discuss adaptations and their use in finding food and survival as predators or prey. Show the Pest and Disease Eco-service Cards as picture references for your discussion.
2. Ask: What type of mouthparts do butterflies and moths have? (*a long tube that they use to suck up nectar from flowers*); fly? (*broad sponge-like tip to soak up liquids*); mosquito? (*piercing/sucking needle-like*)
3. An insect’s legs also are adapted to suit the life it lives. For instance, many swimming insects have long, flat, oar-like hind legs. Grasshoppers have long, muscular hind legs for jumping.
4. Tell learners they are going to use candy and/or other snack foods to make their own insect with a special adaptation.
5. Show an example of an insect made from snack foods highlighting the insect’s special adaptation.
6. Provide learners with the ‘Build an insect...’ scenario cards and explain that they will be making an insect that addresses the specific adaptation mentioned on the card.
7. Display associated GEN Eco-Service cards as examples of insects with these various adaptations.
8. Allow learners time to assemble their insect.
9. Learners have to point out the body parts and explain their adaptation to the class. Ask the learners if they know what type of insect they made (use the GEN Eco-Service cards as reference).

Supplies

- assorted snack foods
- toothpicks
- paper plates
- ‘Build an insect...’ scenario cards
- GEN Eco-Service Cards