



***Dedicated
to Reducing
Pesticides***

Unit 5 Section 1 Lesson 2: Bug Busters

Focus Areas: Pest Control: Biological; Science

Focus Skills: observing, researching, reading for information

Objectives

- To recognize that bats help control the insect population
- To understand nature's food chain

Essential Questions

- How do bats help to control the insect population?
- What would happen to insect populations without natural predators such as bats?

Essential Understandings

- Bats help to control insect populations without using insecticides. Some species of bats are capable of eating 250 tons of insects in one night.
- If there were no natural predators such as bats, insects would overrun the world.

Background

Although few people ever see a bat, many are afraid of them. Bats are often associated with witches, ghosts, and other scary things. In reality, these nocturnal creatures are shy and gentle animals. Like elephants, dogs, and cats, bats are mammals and not birds, like many people think. They are warm-blooded and give birth to live babies instead of hatching their babies from eggs as birds do. They are very special mammals because they are the only ones that can fly.

There are about 1,000 different kinds (species) of bats. Some are very small, like the hog-nosed bat that weighs less than 1/14 of an ounce.



University of
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Unit 5 Section 1 Lesson 2: Bug Busters

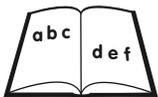
Others can be quite large such as the great flying fox with its 5-foot wingspan.

Bats can live all over the world except on very cold continents like Antarctica. Whatever continent they inhabit, they are enormous insect-eaters. The Mexican free-tailed bat that lives in Texas eats almost 250 tons (227,000 kg) of insects in one night. The brown bat, which is the most common bat found in North America, can eat 600 insects an hour.

Bats are blind, but they are able to hunt using a special type of radar called echolocation. They can fly in complete darkness by emitting sound waves that bounce, or reflect, off objects. The reflected sound waves, or echoes, are heard by the bat and allow it to sense the position and size of objects. This is how they “see” in the dark.

Although most bats can live to be 10 to 14 years old, many bats are facing serious threats from human populations. Development destroys bat habitats along with air pollution and using pesticides to kill insects that damage crops. Without bats, the number of insects in the world would soar out of control as they lived and reproduced unchecked by natural predators. Bats play an important role in the balance of nature. In the United States, almost one half of all bat species are endangered.

Vocabulary



balance	when the predator population is the right size for the population of prey and vice-versa
bat	a small, winged, nocturnal mammal
echolocation	the method a bat uses to locate prey
insect	a cold blooded animal with six legs that is usually hatched from an egg



Unit 5 Section 1 Lesson 2: Bug Busters

insecticide	a chemical used to control insect pests
mammal	a warm blooded animal with a skeleton on the inside that gives birth to living young
nature	the natural environment and its ecosystems that plants and animals, including us, inhabit
predator	a creature that hunts other animals for food
prey	animals hunted by others for food
reptile	a cold blooded animal with a skeleton inside whose young hatch from eggs

Logistics



Time: 30 to 45 minutes (additional time may be needed to complete the bat facts research project)

Group Size: 2 to 25

Space: a classroom

Materials



Izzy puppet *

Overhead 1 "Biodiversity Pie" *

Overhead 2 "A Bat" *

Handout 1 "Bat Pattern" *

multiple boxes of paper clips

books *Bats* by Gail Gibbons or *Stella Luna* by Janell Cannon

* single copy provided



Unit 5 Section 1 Lesson 2: Bug Busters

Preparation



1. Make copies of the bat pattern.
2. Obtain the book *Bats* by Gail Gibbons or *Stella Luna* by Janell Cannon

Activity



Introduction

1. Show Overhead 2 of the bat.
2. Izzy invites the children to share:
 - a. Their feelings about bats
 - b. What they know about bats
 - c. Are bats our friends or enemies?
3. Izzy explains that bats are shy and gentle creatures and that they are important to humans. They are one way that nature controls the number of insects that multiply and live on the Earth.
4. Read one of the following books: *Bats* by Gail Gibbons or *Stella Luna* by Janell Cannon.
5. Discuss with the children why bats are endangered. (habitat loss, air pollution, pesticide use)

Involvement

1. Izzy polls the participants, by a show of hands, which group they think there are more of on Earth: mammals, insects, or reptiles. Results are recorded.
2. Display Overhead 1, "Biodiversity Pie" that shows the huge wedge that represents insects.
3. Explain how we need natural predators like bats to keep the insect population under control.



Unit 5 Section 1 Lesson 2: Bug Busters

4. Conduct a **Bug Buster** simulation:

Round one

- a. Scatter 2 boxes (3 if you have them) of paper clips on the floor, and tell the children these represent mosquitoes in their neighborhood at night.
- b. Call on one child to be a bat and tell them they can eat ten mosquitoes a minute.
- c. The “Bat” picks up ten paper clips.
- d. Appoint other bats to help and allow time for them to pick up ten paper clips each.
- e. Continue appointing bats until all the paper clips are picked up.
- f. Tally the number of mosquitoes eaten by the bat population in one minute.
- g. Tally the number of bats it took to eat this many mosquitoes in one minute.

Round two

- a. Rescatter the paper clips on the floor.
- b. Have the children count off by fours.
- c. Tell the children:
 1. Bats from the #1 nest had their home destroyed when a barn was torn down. They moved away and no longer hunt in the neighborhood.
 2. Air pollution from all the cars and trucks on the highways nearby choked the entire #2 colony.
 3. A nearby farmer sprayed a pesticide on his crops and it killed all but two of the bats in colony #3.
 4. Only the bats in colony #4 are able to be Bug Busters now!
- d. Have the #4 children and two from the #3 pick up ten paper clips each.
- e. Count the remaining paper clip mosquitoes.



Unit 5 Section 1 Lesson 2: Bug Busters

5. Ask the children to speculate what will happen if even fewer bats remain in their neighborhood to hunt mosquitoes! (The mosquitoes will become a serious problem.)

Follow Up

Make a “Bat Facts” bulletin board.

1. Trace the bat shape.
2. Have the children read other books about bats and write an interesting bat fact on the board. A great teacher resource is Ronald Rood’s book, *Animals Nobody Loves*.

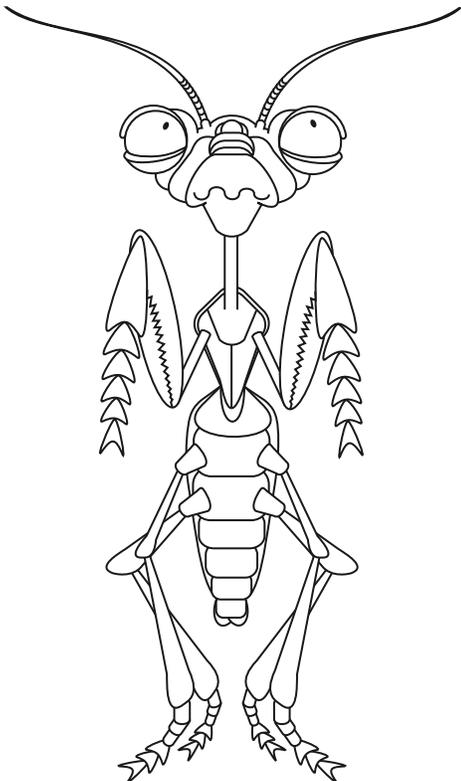
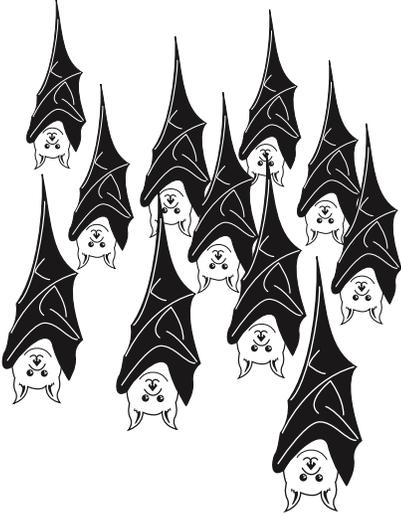
Play a version of Marco Polo called “Bat Tag.”

1. Tell the children that bats are able to fly at night in complete darkness by emitting sound waves that bounce or reflect off objects such as trees and houses. The reflected sound waves the bat hears are called **echoes**. The bat uses **echolocation** to determine the position and size of the objects. It helps bats to “see” in the dark. Bats are not blind at all!
2. Play the game outside in a large grassy area. One player is blindfolded and the other players emit bat beeps to help the “bat” find them using echolocation.
 - a. Blindfold the child who wishes to be the bat.
 - b. The other children act as the insects. They call out and make noise (simulating the echoes a bat uses to navigate).
 - c. The blindfolded child attempts to tag them within the defined territory. A child is out once he or she is tagged.



Unit 5 Section 1 Lesson 2: Bug Busters

Notes





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