

## **BATS: ENVIRONMENTAL ALLIES**

**MASTER TEACHER:** Ruth A. Nelson

**GRADES:** 3-5

### **OVERVIEW**

Bats are unique and interesting animals. In this lesson, students will become more aware of bats and their usefulness to mankind and the environment. After viewing video segments and completing hands-on activities, students will understand that bats have an important place in the balance of nature.

### **ITV SERIES**

*Reading Rainbow - "Animal Cafe" #306*

*World of the Wild - Bats (Bracken Cave) #103*

### **LEARNING OBJECTIVES**

- \*Students will be able to conclude that bats are helpful creatures of the environment.
- \*Students will be able to make predictions based on facts about bats.
- \*Students will be able to develop survey questions concerning bats.
- \*Students will be able to understand that much of the information they hear about bats is misconceptions.
- \*Students will be able to demonstrate an understanding of multiplication facts.
- \*Students will be able to interpret survey results.

## **MATERIALS**

pencil

notebook paper

overhead projector (optional)

overhead transparencies (optional)

blackboard or chart

chalk or marker board transparency pens and markers

plastic fork or spoon per child

napkins-1 per child

pre-cut fruits and nuts for tasting-

bananas

peaches

mangos

figs

dates

cashews

carob

guavas

## **VOCABULARY**

nocturnal

migrate

echo-location

guano

beneficial

dusk

mammal

dawn

habitat

## PREVIEWING ACTIVITIES

Give each student a copy of the Pre-Test. After all students have completed the test, record the answers on the board or overhead. Say, "Do most people view bats as bad, dirty, or dangerous?" (Student answers will vary.) Ask, "Why do you think most people have a negative attitude toward bats?" Record student answers on the board.

## FOCUS FOR VIEWING

To give students a specific responsibility while viewing, say, "As you watch this video, you will hear the answers to questions in the pre-test discussed. As you hear the answer, circle it on your paper and we will discuss it afterwards. You will see people at the San Antonio Zoo discussing bats. You will learn that all bats are not the same. They differ in size, in what they eat, and where they live." Continue by saying, "You will also learn that bats are helpful to man and the environment."

Say, "In this video, there are children like you asking questions about bats. Many of you may have questions you want to ask about bats." Ask if anyone has questions about bats. Write down children's questions on an overhead or chart paper. Say, "Listen carefully to see if your question is answered on the tape."

## VIEWING ACTIVITIES

**Begin the video** when Kate Brown, host of *World of the Wild*, introduces the topic of bats and gives their 800 number (1-800-910-7260). Then she says "Now it's time to turn it over to Kelly Hantz, host of **World of the Wild**."

**Stop** the video at the end of the questions and answer segment. Ask the children if any of their questions were answered during the previous section of the video. Check off the questions that were answered during the question and answer segment of the video. Write the answers on the overhead or chart.

Say, "One of the terms used on the video was *echo-location*." Discuss the terms *echo-location* and *navigate*. Explain that bats use *echo-location* to navigate. Say,

*"Bats have a unique way of locating their prey, finding their way around in the dark, and avoiding any objects that might be in their way. When they fly, they emit (or make) sounds which hit other objects and echo back. This echo is picked up by the bat, telling it the exact location of any object in their path. This process is called echo-location." Continue by saying, "A bat emits high frequency sounds that humans cannot hear. These high-pitched sound waves bounce off all objects and echo back to the bat's ears. The signals also let the bat know the size and shape of objects and how far away they are (distance). This helps bats avoid collisions with other objects."*

Say, *"In this next portion of the video, you will meet Judy Tuttle, who cares for bats at the San Antonio Zoo."* Now listen carefully to learn why bats are considered nocturnal animals.

**Resume** the video. Run the tape for a short segment. Judy Tuttle talks about bats as night animals. **Pause** the tape after Judy says, "We've reversed the light cycle in here so the bats will be active in feeding."

**Introduce the term, nocturnal.** Say, *"Bats are nocturnal. This means they come out at night. They also are dark in color to protect them from their enemies. They stay hidden until dusk (when the sun sets), and they travel and feed only at night, returning to their caves, or other homes at dawn (when the sun begins to rise)."* Make sure students understand what "reverse the light cycle" means. Let's continue watching now as Mrs. Tuttle discusses what bats eat and how they effect our environment.

**Resume** the tape. Judy Tuttle is talking about the number of species of bats. Pause the tape after Judy Tuttle says "the two bats we keep in the exhibit are fruit-eating bats."

Explain to the class that different bats eat different things. Most bats eat insects, but there are bats living around the world that have different diets. Some bats eat fruit, nectar, moths, butterflies, birds, fish, frogs and lizards, spiders, and other small animals.

Tell students that it is the vampire bat that has given bats the worst reputation. These bats all live in tropical areas.

Say, "For the most part, bats are very beneficial to man." Tell students that each small mouse-eared bat of North America can eat up to 600 mosquitoes in an hour even though they weigh about a half an ounce each. Bats from Bracken Cave in Texas eat about 250,000 pounds or more of insects in one night. Explain to the students, that in the tropics, bats are very helpful in dispersing (or spreading) seeds and the pollination of plants. In fact, fruit and nectar bats are crucial to the survival of the rain forests. Many wild varieties of valuable crop plants depend on bats for their survival.

Say, "More than 300 plant species depend on bats for pollination and seed dispersal. These plants are responsible for providing us with more than 450 products that are important to the economy. These products are valued in the hundreds of millions of dollars every year.

Say, "Bats are very valuable in efforts to maintain the forests in our world. Seeds dropped by bats are responsible for up to 95 percent of forest regrowth on lands that have been cleared.

Tell students the droppings of bats are another contribution to mankind. These droppings, called guano, make an excellent fertilizer.

**Resume the tape** where Judy talks about the different sizes of bats. **Continue the tape** as Kelly goes to the entrance of Bracken Cave outside of San Antonio.

**Stop** video when Kelly says, "One sure thing is that they'll come back before morning and tomorrow night they'll all go out again."

### **MATH ACTIVITY**

**Say**, "Now that we've learned how beneficial bats can be, let's use some number facts to solve the problems on the math worksheet". Give each student a copy of the worksheet. Have them complete the computations on the worksheet using addition and multiplication skills. Discuss the answers with students.

**Introduce the second video.** Say, "You will get a closer look at Bracken Cave in this next video. It will summarize what we have learned about bats."

**Begin** the *Reading Rainbow, Animal Cafe* tape after the story, where Levar is standing outside the Moondance Diner saying "In fact, 60 percent of the earth's animals live their life at night and sleep during the day. That includes owls,

porcupines, raccoons, frogs, and of course the night's most mysterious and fascinating creatures, the masters of night flight: bats."

**Continue** the tape through Dr. Merlin Tuttle's visit through Bracken Cave.  
**Stop the video** when Dr. Tuttle says, "Bats are truly masters of night flight."

### POSTVIEWING ACTIVITIES

Discuss the segment of the tape from "Animal Café." Ask students if their questions about bats have been answered. Check the questions that the children asked previously, and the questions on the pre-test. This will allow you and the students to clarify any questions or statements they are unsure about. Ask students, *"After learning about bats and their usefulness to man, can we make any predictions about bats?"* Help students to understand that many of our forests and other essential plants might not exist without bats. Also, our insect population and the problems they cause would be worse without bats.

As you heard in the video, bats are very beneficial to mankind. To help you understand how bats relate to products we may use or see often, we will taste some food items which come from plants that are dependent upon bats. Remember that bats help to disperse or scatter the seeds or pollinate some plants. Wild bananas, not the commercial varieties, figs, peaches, mangos, carob, guavas, dates, and cashews rely on bats for seed dispersal.

Say, *"Now we will consume (eat) products that bats consume (eat)."*

Products for tasting by students may include the following:

bananas	peaches
mangoes	figs
dates	cashews
carob	canned guavas

These may be cut into bite-sized pieces and served in paper cups.

While the children help prepare these foods for tasting, remind them again of the many ways bats benefit both humans and the environment.

### **Variation**

Cut the fruit into small pieces and mix in banana or peach yogurt before serving. Products such as guava and mangos may also be found in juice form. For younger children, Fig Newtons might be substituted for figs and date bread for dates. Some beauty products (i.e. shampoos, hands lotions) may also contain mango, peach, or guava extracts. Have children read the labels on products to find some that contain these fruits or extracts. Remind students these products are inedible.

### **ACTION PLAN**

Arrange for a trip to your local zoo to learn more about bats. If this is not possible, check with a local university's Biology Department to find a speaker or more information on bats. Have students find and write to Bat Conservation on the internet.

Have students compile and design a Bat Facts sheet using the computer. This will be a compilation of the facts they learned during this lesson. When completed, they will share a copy with other students. When complete and approved of by the instructor, the Bat Facts sheet may also be placed on the internet by students.

Students may want to work in groups to create a "school-wide" bulletin board on bats, as a way to share what they've learned with other students.

International is located in Austin, Texas. You may write them at:

BCI  
P. O. Box 162603  
Austin, Texas 78716  
1-800-538-2287

or on the internet:

[Bat Conservation International](http://www.batcon.org)  
[www.batcon.org](http://www.batcon.org)

## **EXTENSIONS**

### **LANGUAGE ARTS**

Read and discuss the folk tale of the Nkundo people of Zaire as retold by Marcia Stillerman, "Why the Bat Comes Out Only at Night." *Cricket* February 1997 Vol. 24 #6 Pgs. 35-36.

Students might want to write their own story about why the bat flies only at night.

### **ART**

Have students construct a mobile. They can show bat shapes hanging from a moon.

## PRE - TEST

1. Bats are:
  - a. Birds
  - b. Reptiles
  - c. Mammals
  
2. Bats are blind.                      True              False
  
3. All bats eat blood.                      True              False
  
4. Bats damage buildings.                      True              False
  
5. Bats attack people.                      True              False
  
6. Bats are dirty animals.                      True              False
  
7. Many bats carry diseases, like rabies.  
  

True              False
  
8. Bats are helpful in maintaining balance in the environment.  
  

True              False
  
9. All bats are the same.                      True              False
  
10. If a bat is on the ground, it must be sick.  
  

True              False

## MATH WORKSHEET

Free-tail bats often eat approximately 600 insects in one hour (60 minutes). How many insects would they eat in 2 hours?

How many insects would they eat in six hours?

Using your answer from problem 2, multiply that number times seven (7) days a week. Approximately how many insects will bats consume (eat) 6 hours a night for 7 days a week?

In 30 days (about a month)?