

Virginia Big-Eared Bat and Echolocation

Curriculum: Science

Grade: K-3

Virginia Standards of Learning: SCI.K.2, SCI.K.5, SCI.1.1, SCI.1.2, SCI.1.5, SCI.1.7, SCI.2.1, SCI.2.5, SCI.2.7, SCI.3.4, SCI.3.5

Objectives: Students will:

- *recognize the big-eared bat as the state bat of Virginia*
- *be introduced to the concept of radar and sonar*
- *learn about echolocation through a version of the game “Marco Polo”*

Time Required: 30 minutes

Background Information: (Also printed on the back of the graphics card)

Characteristics: This bat is of medium size (total length is about 3.5 to 4.5 inches, and weighs less than 1/2 a pound) with huge ears joined across the forehead. They have elongated nostril openings and soft long fur that is dark brown and light brown at the tips. Females gather during April and May to form colonies in warm caves to have their babies. At rest, the bat’s ears are coiled slightly and lie along the neck. It is one of only two Virginia bat species which roost in caves in the summer. In the winter they commonly roost by themselves or in small groups. This is not a migratory bat, although, if disturbed, the entire colony may move to an alternate site. Virginia big-eared bats usually only live for 16 years. These bats are designated as state and federally endangered animals, mainly because of their small population and limited habitat and distribution. **Distribution:** Virginia big-eared bats can only be found in three caves in Tazewell County during the summer, and five caves (Highland, Bland and Tazewell counties) in the winter. They are found exclusively in limestone caves. There are also only three known maternity colonies. **Foods:** Virginia big-eared bats eat mostly moths and other small insects. These bat feeds mostly over open pasture, corn and alfalfa fields, and around the crowns of trees.

Materials and Resources: bat graphics card, glass pie plate, overhead projector and screen, water, eyedropper, ruler, blindfold

Procedure:

1. Hold up the bat graphics card of the big-eared bat. Ask students to identify the picture. Explain that the big-eared bat is the state bat of Virginia.
2. Ask students questions about a bat’s characteristics, habitats, and habits. End with a question about how a bat might fly and find food in the dark without bumping into anything. If your classroom can be made dark enough, turn the lights off to emphasis how hard it is to see in the dark.
3. Explain to students that bats use echolocation to fly in the dark and find food in the dark.
 - *Echolocation is a sonar-like process used by certain animals for locating objects by emitting high pitched sounds that reflect back to the animal’s ears.*
4. Explain to students that you are going to illustrate how the concept works using the pie plate.
 - *Place the pie plate on the overhead projector and turn it on so the class can see it on the screen.*



- *Pour about 1/2 inch of the water in the pie plate and let the water settle so there is no movement.*
 - *Ask a student to take an eyedropper and add one droplet of water from a 6 inch to 12 inch height into the middle of the pie plate.*
 - *Have students describe what happens. (The drop of water falling into the plate creates a wave that goes out from the middle of the plate and bounces back from the sides.)*
 - *Add an object to the water, allow the water to settle, then repeat the process. Ask students to describe how the ripples were different.*
5. Explain that a bat hears the echoes of its own sound when it bounces off objects and its brain works out a sound picture of that object. Tell the students that every object has a specific sound to the bat.
 6. Explain that they are going to play a different version of the game “Marco Polo.”
 - *Choose one student to be the bat and blindfold him/her. The bat will call out “BEEP, BEEP, BEEP.” While you are tying the blindfold, the other students can clear a space for the game.*
 - *Tell the other students that they will be assigned as either trees or insects. The trees will whisper “TREE, TREE” and the insects will whisper “BUZZ, BUZZ.”*
 - *The bat walks around and calls “BEEP, BEEP, BEEP.”*
 - *The insects walk around and answer the bat’s call with “BUZZ, BUZZ.”*
 - *The trees must remain in one place and when the bat gets close whisper “TREE, TREE.”*
 - *The bat tries to tag the insects and avoid the trees by listening to the sounds. A tagged insect must sit out. The last person tagged becomes the new bat. Switch out trees and insects in each round so all the students get different perspectives.*

Assessment:

1. Student can explain the process of echolocation.

Extension:

1. Talk about other animals that may use echolocation (dolphins and whales, birds and shrews)
2. Show your students an amazing video! Meet Ben Underwood.

<http://www.youtube.com/watch?v=XUXh-X1iveU>

Source:

“Virginia big-eared bat.” Virginia Department of Game and Inland Fisheries. 2008
<<http://www.dgif.virginia.gov/wildlife/information/?s=050035>>.





Bat: Virginia Big-Eared Bat

The Virginia Cave Board came up with the idea of a state bat to use as a tool for educating Virginians about caves and the creatures that inhabit them. A board member thought of the Virginia big-eared bat as an ideal candidate because of its name and its status as a federally endangered species.

On March 22, 2005, Governor Mark Warner signed the legislation designating the Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*) as the official state bat of the Commonwealth of Virginia, effective July 1, 2005.

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