

Title

Save the Bats!

Objective: Students will be able to understand bats and their importance, as well as identify their characteristics, habitats and ways to help insure their survival.

Standards:

k-LS1-1, K-ESS3-1, K-ESS3-3, G.9.K.1, G.9.1.1, 2-LS4-1, 3-LS3-2, 4-LS1-1, 4-LS1-2, G.9.4.1, 5-ESS3-1, 6-ESS3-3

Introduction:

This program will educate students about the benefits of bats and their importance to the park's ecosystem. Activities will be incorporated to help distinguish the difference between birds and bats, demonstrate echolocation, illustrate bat anatomy, and provide them with something to take home for reinforcement. Students will learn how they can help protect bats against human intervention and natural threats such as White-Nose Syndrome.

Audience:

This program is specifically designed for a young audience, primarily K – 2nd grade levels.

Objective:

After completing this program, kindergarten, first and second grade students will be able to: 1. List 3 differences between bats and birds. 2. List 3 similarities between bats and birds. 3. Explain echolocation and how bats use it to find food.

Duration:

45 – 60 Minutes

Vocabulary:

Mammal
Insectivore
Frugivore
Echolocation
Nocturnal
White-Nose Syndrome

Materials:

Book, *Stellaluna* by Janell Cannon
Bat Diagram
Diagram of Echolocation
Bandana/Blindfold
Photos – Tri Colored, Ozark Big Eared, and Gray Myotis; Little Brown colony with White-Nose
Tri Colored Bat Skull/Skeleton

Warm up:

What do you think of when you think of bats? Are they neat? Or maybe a little scary? Or maybe just annoying? Well, bats are a very important animal. They aren't really scary; bats are actually really cool mammals, and they do lots of things that help people!

There are many stories or myths about bats. They are unique, gentle creatures. Bats are mammals just like us, except they are the only mammals that can fly. There are more than 1,000 different kinds of bats. They live all around the world except in the coldest and hottest places on the planet. Only one bat actually lives on blood, the vampire bat. All other bats eat either insects (about 70% of bat species) or fruit (30%). In the Ozarks, bats are the primary hunters of night flying insects. When night falls and the insects come out, it is dinner time for bats. One bat can eat about 600 insects in an hour or about 3,000 in a night of hunting. Today, we will learn more about these night-time fliers, and we will compare them to birds. We will discuss how bats and birds are the same and how they are different. Let's start our adventure into the fascinating world of bats with a story.

Main Lesson/Activities:

- Read *Stellaluna* by Janell Cannon aloud to the class (10 minutes).

Questions about the story, *Stellaluna*.

- A. Describe what happened in the beginning of the story.
- B. Describe what happened in the middle of the story.
- C. Describe what happened at the end of the story.
- D. How was *Stellaluna* the same as her bird friends?
- E. How was *Stellaluna* different from her bird friends?
- F. How was *Stellaluna*'s bat family the same as her bird family?
- G. How was *Stellaluna*'s bat family different from her bird family?
- H. How did *Stellaluna* adapt to live with her new family of birds?
- I. In the end, *Stellaluna* and her bird friends figured out they were different. How did this make them feel about one another?
- J. If you could make the story longer, describe what might happen to *Stellaluna* and her friends. (e.g. When would they see each other? How would they spend their time together?)
- K. Can you predict what might happen to *Stellaluna* after the end of the story?

- Bird v. bat movement activity

Directions:

1. Have the students stand up with a little space between each other for moving their arms.
2. Demonstrate the difference between how a bird flaps its wings and how a bat flaps its wings.
3. Ask the students the following questions about *Stellaluna* and have them flap their arms in response as if they were a bird or a bat.
 - a. I hatch out of an egg.
 - b. My mom fed me bugs to eat.
 - c. I sleep hanging upside down.
 - d. I can fly in the dark.
 - e. My wings are covered with feathers
 - f. I could not land gracefully on the branch.
 - g. I eat fruit, I am a frugivore.
 - h. I live in a nest.

- Compare bats and birds
 - A. Baby birds v. baby bats
 - 1. How many baby bats were in our story, Stellaluna?
 - a. Baby bats are born alive, just like humans and other mammals.
 - b. Bats, like humans, usually have just one baby, but may occasionally produce twins.
 - c. Bats are one of the slowest reproducing mammals on earth for their size, most producing only one offspring annually.
 - B. Food for baby bird v. food for baby bat
 - 1. What does the mama bird feed her babies and how does she feed them in our story, Stellaluna? Bugs from her mouth.
 - a. Before baby birds can fly, mama bird brings food back to the nest.
 - b. Birds will eat the same thing their entire lives.
 - 2. This was not in the story, but what does the mama bat feed her baby? Milk.
 - a. Baby bats, like human babies, drink their mother's milk.
 - b. Bats will change to their adult diet of insects or fruit once they can fly.
 - 3. Are humans more like bats or birds when it comes to how and what we eat as babies?
 - C. Care of babies
 - 1. In our story, Stellaluna, the mama bat carried Stellaluna with her when she went out to feed.
 - a. Why do you think she did this? To protect her, to teach her to find food, etc.
 - 2. Once bats deliver their babies, they often place them together with other baby bats in a nurse colony while they are out hunting (like daycare for working parents).
 - a. The colony is a safe place where the babies are close together, which helps them stay warm.
 - b. A mother can return to the colony and find her baby by knowing the baby's smell and voice, just like how Stellaluna's mom found her in the story.
 - D. Bird nest v. bat cave
 - 1. Where did the mama and baby birds live and sleep in our story, Stellaluna? A nest.
 - a. Many kinds of birds make a home in a nest.
 - b. Other types of birds live in caves, cracks in the rocks, buildings etc.
 - 2. This was not in our story, but where do you think bats live?
 - a. Bats can be found living in almost any type of shelter: trees, bridges, barns, abandoned buildings, mines, churches, attics, basements, though they are best known for living in caves. Resting in high places keeps bats safe from predators.
 - b. Their home is called a roost.
 - c. Bats sleep by hanging upside down from their strong feet.
 - 1. Show picture of sleeping bat and ask students if they could hang upside down from their feet.
 - 2. Hanging upside down allows bats to fly away quickly as most bats cannot take off in flight from the ground.
 - 3. Bats wrap their wings around themselves to stay warm.
 - E. Bird bodies v. bat bodies.
 - 1. What are bird bodies covered with? Feathers.
 - 2. Bat bodies are covered with fur to help keep them warm.
 - a. Fur can be of different colors and designs to act as camouflage.
 - b. Fur is kept clean by licking, like a cat.
 - c. Bats, like humans, have arms, hands and feet.
 - F. Bird wings v. bat wings.
 - 1. What are bird wings covered with? Feathers.

- a. Bird wings are connected to the bird body at the shoulder.
- b. Bird wings are fairly rigid.

- Bats at the Buffalo

A. Did you know that Buffalo National River has 12 different kinds of bats? They like to live in the caves that we have here.

B. Has anyone been out to Rush? Well, Rush used to have a bunch of mines, but they're all closed now. Mines are a lot like caves when no one is working in there anymore, so our bats like to live in the mines, too. One kind of bat that lives here on the Buffalo is the Tri Colored Bat.

C. Why are they important?

- 1. Bug control
- 2. Guano as fertilizer
- 3. Pollination and seed spreading in other parts of the world by their nightly visits to flowers and fruit. These bats are called
- 4. Medical and technological advances learned through studying bats.

- Echolocation

- Echolocation is a really cool thing that bats can do to help them hunt bugs as insectivores. It's kind of like playing Marco Polo. Bats make a sound with their mouth or their nose. Humans can't hear this sound, but it's really loud for bats because they have very sensitive ears. When a bug flies near them, the sound bounces off the bug and returns to the bat's ears, which tells them where the bug is. When they get close to the bug, they can use their wings to scoop it close to their mouths.

- Some bats around the world don't eat insects. They eat fruit and plants instead. Do you think they need echolocation? These bats do not need to use echolocation because their food is bigger and they can see it better! But the bats in the Ozarks all eat insects, so they all use echolocation to help them out.

- **Activity: Bats and Moths ("Marco Polo")**

- 1. Line the students up to go outside (weather permitting) or find a large open space in the room.
- 2. Arrange the students in a large circle.
- 3. Quickly review how bats use sound waves/"peeps" and echoes to fly and hunt in the dark.
- 4. Ask one student to be the bat and another student to be the moth.
- 5. The remaining students will be the trees in the forest.
- 6. Have the students who are trees stand still with their arms pressed to their sides.
- 7. Cover the bat's eyes with a bandana to simulate how a bat uses echolocation to pinpoint its prey. **Remind the students that bats really aren't blind. The eyes are covered just to focus on echolocation and not sight.
- 8. Ask the student "trees" to remain quiet or they will disrupt the echolocation of the bat.
- 9. Lead the blindfolded bat and the moth to the center of the circle.
- 10. The moth and the bat will both move around the circle.
- 11. The goal is for the bat to find the moth using echolocation.
- 12. Have the bat call out, "PEEP!?"
- 13. The moth is to reply or echo, "PEEP!" or to clap their hands in response.
- 14. The bat must listen closely for the moth's response in order to find it. The bat can call out as many times as necessary to find the moth.
- 15. For every "PEEP" made, the bat and moth can each take one step.
- 16. If the bat gets close to a student "tree," the student should whisper, "TREE."

17. Once the moth has been captured, both the bat and moth become trees and new students should rotate in to play the bat and moth.
18. In the next and following rounds, increase the number of moths and/or the number of bats.
19. At the end, ask the students if it was harder to find dinner when there was only one moth or many moths.
20. Was it harder to find dinner when there were more bats?
21. Wrap up the game and lead the students back to the classroom.

- White-Nose Syndrome and how can you help protect bats
 - Bats all over America are getting really sick with a disease called White-Nose Syndrome. It makes the bats wake up during hibernation, which makes them really hungry because they can't find any food during the winter, so they often starve or die of thirst when they have this disease. Unfortunately, some of our bats at the Buffalo River have this disease, too. Don't worry – you can't get sick from this disease! Only bats get sick from it.
 - Now that we know how cool and helpful bats are, do you think it's important for us to help them out? How do *you* think you can help bats?
 - Change your attitude – bats aren't scary, they're cool! And they're very important.
 - Don't mess with bats! Leave bats alone, especially when they are hibernating or if they are sick. Don't touch a bat if you see it on the ground. If it's on the ground, it's probably sick! Tell an adult if you find one and let them call your local wildlife agency.
 - Share the love! Tell everyone you know about bats and why they're important! Make sure they know that bats are in danger, so we should help them in any way that we can.
 - Make a home for bats! If you live in an area that has a lot of bats, you can ask your mom and dad if you can build a bat house. They are not hard, and the bats won't bother you or your home if you build a bat house for them. You don't have to feed them or give them water (they already know how to do that!) and they will help get rid of all the extra bugs in your yard!
- Conclusion

Bats are really cool animals, aren't they? They help us humans out a lot, and they help out other animals a whole bunch, too. It's important for us to help them out in return, isn't it? We want all of the students who come after you to be able to enjoy the benefits of bats, too, so let's do our best to help the bats out.

You can learn even more about bats and the caves that they live in by doing a Junior Ranger book called Cave Explorer. When you have done all of the activities for your age, you can visit Buffalo National River and get your badge!