

Animal Exploration: All About Bats

People have far more in common with bats than they realize, and people rely on bat populations throughout the world in a variety of ways. In this lesson, students will study the skeleton of a bat, learn about their special adaptations through games, discover why bats are important to our environment and find that bats are friends, not foes.

Objectives:

1. Students will be able to explain echolocation and how it is used by bats.
2. Students will be able to define the word "adaptation" and provide examples of adaptations.
3. Students will be able to list the ways in which bat populations are helpful to humans and the environment.
4. Students will think critically to determine the ways our world would change without bats.
5. Students will create informational art posters to share what they have learned.

Standards:

-2.W.2 Write informative/explanatory texts

-2.SL.1 Participate in collaborative conversations about grade level topics and texts with peers and --adults.

-2.SL.2 Recount or describe key ideas or details from a text read aloud, information presented orally, or through media.

-2.SL.5 Create audio recordings, visual displays, performances, or media presentations of stories or poems to express ideas, thoughts, and feelings.

-2.SL.6 Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

-3.W.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly

-3.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) on grade level topics and texts, building on others' ideas and expressing their own clearly.

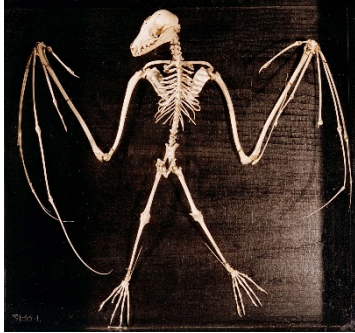
-3.SL.6 Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Materials:

- Paper & pencil
- Image of bat skeleton (printed out or projected)
- Image of human skeleton (printed out or projected)
- Blindfold
- Markers
- Image of bat and flower (printed out or projected)
- Poster board, construction paper, or other thick paper

Step One: Invitation (5-7 minutes)

To begin the lesson, hand out the image of a bat's skeleton to each student. Rather than tell the students exactly what they are looking at right away, ask them instead to respond to the following questions:



1. What do you notice about this picture?
2. What questions do you have about this picture?
3. What does this picture remind you of?

After students have had time to study the image and answer questions, have volunteers share what they learned. If no students have yet discovered that it is a bat skeleton, you can share that information with them now.



Next, hand out the image of a human skeleton and ask students to work in pairs and circle any similarities they see between the two skeletons. If they see any differences, they can mark those with an "X". As a class, discuss what similarities were found (each have 10 fingers, 10 toes, elbows, knees, ribcages). Ask the students if they were surprised to find so many similarities and explain that bats and humans are both **mammals** (warm-blooded vertebrates with hair). Bats are special mammals because they are the only ones that can fly!

Step Two: Exploration (20 minutes)

What else makes bats special? Students may already know some of the things that bats are known for, such as echolocation. Ask them to share what they already know. *This may be a great time to bust some bat myths if students happen to bring them up. Some myths that just aren't true: bats are blind (nope, they can see just about as well as humans can in the dark! Which is to say, not all too well) bats will drink your blood (only a few species of bats live off blood, but not blood from people – more commonly they would feed on cows or chickens and they don't live in the United States), and bats will try to burrow into your hair (false!).*

After a few minutes of sharing, shift to a focus on **echolocation** specifically. To begin, ask if anyone can explain what an echo is, and a little bit of how it works (a sound that bounces off an object and reflects back to the listener). Echolocation is the process of using a series of echoes to help locate objects. Bats may not have the best eyesight, but they have incredible hearing. By producing a series of high-pitched chirps, bats can listen to the echoes bouncing back on the objects around them (such as trees, rocks, and insects) and with those echoes create a map of where they need to fly to avoid hitting the objects – or to successfully capture their prey. Nearly all bats in North America eat insects for food (they can eat over 8,000 insects every night!) and they use echolocation to find insects flying through the air.

Activity: Bat/Moth

To enhance understanding of echolocation, play the game “Bat/Moth”. For this game, you’ll need an area large enough for the students to stand in a tight circle (shoulder-to-shoulder) and a blindfold. Ask for two volunteers: one to be the bat, one to be the moth. All the other students will be trees. The tree students form the circle, while the bat and moth are in the center. Explain that the bat’s goal is to tag the moth, and the moth’s goal is to avoid being tagged. The bat will be blindfolded and will use “echolocation” to figure out where the moth is. How the “echolocation” works is similar to the game “Marco Polo” – except the words are “bat” and “moth”. Each time the bat wants to know the location of the moth, it says “bat”, to which the moth *must* respond with “moth”. The bat can repeat itself as often as it wants.

During the game, the “trees” must stay in the circle and remain silent, except if the bat bumps into them, at which time they should say “tree” so that the bat doesn’t think it’s tagged the moth. Trees should be standing with their hands up by their shoulders, palms facing out, to avoid any accidental head-collisions.

Once the bat has tagged the moth, you can cycle through with new volunteers. Play as many times as is fun for everyone. To wrap up, ask the students to share what was difficult, or easy, about using echolocation.

Step Three: Define & Apply (15 minutes)

In this step, students will move from an understanding of what echolocation is specifically and come to understand that it is one of several **adaptations** bats have to survive. They will also understand that bats play an important role in our lives – without them, we would have a big problem on our hands.

Move into this next step by asking the question: what do you think would happen to bats if they didn't have echolocation? The big answer: they wouldn't be able to fly around at night, and they wouldn't be able to catch insects for food. You could say that echolocation is bats' special superpower that helps them to survive. Every animal, including humans, is born with special superpowers that help them to survive. The scientific word to explain those superpowers is **adaptation**. Ask: can anyone think of a special adaptation ("superpower") that we as humans have and helps us survive? If no students mention opposable thumbs, ask them to imagine if their thumbs were stuck and couldn't move at all. How would their lives be different? If there's time, it can be fun to challenge students to attempt every-day tasks without their thumbs (i.e. writing in their notebooks, zipping up a jacket, etc.).

While every animal is born with adaptations to help them survive, animals often rely on other animals to help them as well. Humans rely on bats in two important ways:

1. **Bats help keep insect populations down, which means there are fewer insect pests eating and harming crops.** On an average night, an insect-eating bat will eat their body weight in bugs. That's like a human teenager eating 200 cheeseburgers in a single night! ([Benefits of Bats - Bats \(U.S. National Park Service\) \(nps.gov\)](#))
2. **Bats help make bananas** – and mangos, too! Not all bats eat insects. Some are like hummingbirds and feed on nectar. As the bats move from flower to flower sipping the nectar, their fur collects pollen, leading to pollination. Without this pollination, fruit can't grow. Bats are responsible for pollinating bananas, mangos and more!



Writing prompt:

After discussing how bats are important to our lives, ask students to write down the ways that not only humans, but the planet, would be impacted if bats disappeared. What might happen to the plants if insects were no longer being eaten by so many bats? What about the fruits that need them to help with pollination? What about the animals that eat those fruits? If time, ask for students to share what their ideas with the class.

Step Four: Action

Now that the students have learned why bats are so important, they can be empowered to share what they've learned with their community. Bats are often misunderstood, believed to be disgusting, diseased, and worse. Have students create bat-positive posters to be hung either at school or in their neighborhoods, using their own creativity and facts learned from the lesson.