**Cave Organisms**

**Objective:** Students understand how cave organisms adapt to conditions within a cave. For some students, this lesson is a precursor to a field trip to Lehman Caves. During that field trip, students will learn how caves are formed and will be able to identify various cave formations (speleothems).

**Time Consideration:** 60 minutes

**Materials:** Construction paper, markers, scissors, yarn, five chapsticks of various scents (suggested: mint, cinnamon, fruity, etc.), blindfold or bandana, hole punch

**Introduction:** During this fun lesson, students will complete two hands-on activities to understand how bats have adapted to live in caves. Students will utilize their senses of smell and hearing, understanding that bats cannot rely on their eyesight inside of caves. For students who will soon be visiting Lehman Caves, this lesson introduces them to cave ecosystems.

**Content:**

**Background:**

Bats are not blind, but when they are inside of caves their eyesight is useless. To overcome this, bats have adapted to use echolocation to locate their prey within the cave. Most bats eat insects, particularly moths. Bats can consume up to their full body weight of insects every night!

Lehman Caves, located in Great Basin National Park, serves as a maternity roost for Townsend’s big-eared bat - a location that bats return to each summer to have their young. The mother bat will leave the cave to retrieve food for her baby. When she returns, she uses her sense of smell and hearing to locate her young in areas that can be densely crowded with baby bats. In addition to the Townsend big-eared bat, nine other species of bats have been found in and around Great Basin National Park.

**Introduction:**

1. Tell students that today they will be learning about bats. Have they ever seen a bat before? Where do bats spend a lot of their time?
2. Do students know how a bat navigates inside of a cave or in other dark places?
   1. If students say “hearing” or “echolocation”, tell them that today they will be pretending to be bats. They will learn how to find food and their babies in the dark.
3. Show students [this video](https://www.youtube.com/watch?v=bpYNYRr81pQ&t=7s) about bats in Great Basin National Park. Play the video from the start until 3:55.

**Activity:**

1. Have each student draw a bat on a piece of construction paper. Students should then cut out the bat. Punch a hole in the top of each bat and attach a piece of yarn long enough that students can wear their bat around their neck.
2. Explain what a maternity roost is. Tell students that Lehman Caves, which they will be visiting, is a maternity roost. Tell students that they are going to pretend to be mother bats who have left the cave to gather and bring food to their babies. They are back in the cave now, and they need to find their babies, but they can’t see.
   1. Five students will be mother bats. The rest will be their pups. Have the pups and the mother bats give you their necklaces. Using the chapsticks, mark each of the mother bats’ necklaces with a scent. Then, divide the pups evenly and mark their necklaces with the various scents as well.
   2. Give the students their necklaces back. They may sniff them to find their own scent, but they may not discuss their scent with others.
   3. Have the pups line up with their necklaces on. Have the mother bats line up opposite them. Turn off the classroom lights so that it is dark (or dim).
   4. Have each mother bat sniff the baby bats’ necklaces, and say which pups they believe are theirs. Continue until each mother bat has found all of their pups.
   5. This activity can also be completed by splitting the class into two groups, so that each mother has fewer pups. This will speed up the activity, particularly for large classes.
3. Now, tell students that they are going to practice being bats looking for moths in the dark.
   1. Have the group form a circle and blindfold one student. This student will stand in the middle of the circle and be the “bat.”
   2. Once the bat is blindfolded, silently select three to five students to be “moths.”
   3. The “bat” will say “BAT” and each moth must respond by saying “MOTH”. This is the bat’s sound reflecting off of the moth.
   4. The bat must walk over and tap the “moths” that it hears. When a moth is tagged, it’s “eaten” and should not respond to the bat’s calls.
   5. You can repeat this activity several times so students have turns being the “bat”. This can also be sped up and made more inclusive by playing the game in two circles. If you do this, place the circles on either side of the classroom, so that the sound from the other circle doesn’t confuse the “bat”.

**Conclusion:**

1. Have the students reflect on the activities.
   1. Was it hard to find their pups using only their scent?
   2. Was it hard to find moths using only their sound?
2. Show students [this video](https://drive.google.com/file/d/14QNP1Oi0H7Bc23m3InN4MFD_mzz_bVvn/view?usp=sharing) about Lehman Caves that summarizes the geology and animals that live in Lehman Caves.
3. Think about other times that animals have adaptations. Ask students:
   1. What physical or behavioral adaptations do bats have that allow them to survive in a dark cave environment?
   2. How would other cave biota (“cave creatures”) need to adapt? You can provide students with the following examples after they’ve brainstormed.
      1. Many cave animals are entirely blind. Some don’t have any eyes at all and some have eyes that do not do anything. This saves their body energy.
      2. Most cave organisms are white or light pink colored. They don’t have color because they do not need to camouflage in the way that above-ground animals do.
      3. As this lesson demonstrated, many cave organisms have a strong sense of hearing or smell. They may also have long antennae or legs to improve their navigation.

**Sources:**

“Explore The Great Basin: Bringing the natural and cultural wonders of the region to the classroom”, Great Basin Heritage Association

**Next Generation Science Standard**

4.LS1.1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.