mystery science

Grades K-5
Mini-Lesson: “How do bats find things in the dark?”

VIDEO TRANSCRIPT

VIDEO 1

Hey, it's Jay! I'll never forget the first time I saw a bat in real life. My family was staying at a campsite when these campers near us started pointing and shouting bat. At first, I was scared. I thought it would be some creepy vampire thing. But when I actually saw the bat, it was so small and fuzzy and even kind of cute. Definitely not as scary as I expected. Someone named Nolan is curious about bats. Let's give Nolan a call now.

[Video Call]

- Hi, Jay.
- Hi, Nolan.
- I have a question for you. How do bats find things in the dark?
- That's a great question.

You probably know that many bats are active at night. Nighttime is when they find the foods they eat. For some bats, that means insects, like this moth. This video has special lighting so that we can see what's happening. But really, this bat is making that amazing midair catch in the dark. There's no way I could do that. It's hard enough to catch a fly in daylight, let alone in the dark. It reminds me of the darkest place I've ever been, inside a cave. My group needed headlamps to get around. And when we turned them off, woah, I couldn't see anything. But the bats that live there have no problem coming and going in the dark. So how do they do it? Well, as I stood

there in total darkness, I started to notice things around me with my other senses. Think about all the senses you use. How could you use different senses to find things in the dark?

VIDEO 2

Standing there in the dark cave, one sense I used was touch. With my foot, I could feel a rock nearby. Wouldn't want to trip on that. With my sense of hearing, I listened for my friend's voice and realized they were off to my side. And from the other side, I noticed a trickling sound and a unique smell. It was the stream inside the cave. Every day we use a variety of senses to explore the world, and so do bats. When it's dark, many bats rely on their sense of hearing to find things. Some bats even have extra big ears that help them capture sounds from all around, even quiet ones like the flutter of an insect's wings. But some things don't make much noise, including things bats need to avoid bumping into, like tree trunks. But what if you could make those things make noise? Believe it or not, that's easier to do than you might think. This person is going to shout at a mountain on the other side of this lake. Ready? Did you hear that? It's like the mountain shouted back. Let's listen again. Isn't that cool? When this person shouts, the sound they make travels out through the air like ripples. You can call those sound waves. When the sound waves run into something, like the mountain, they bounce off and travel back. And when they reach our ears, we can hear the sounds that have bounced back. You might already know that's called an echo. An echo is when a sound bounces back so you can hear it again. I'll play it one more time, and this time notice when you hear the echo. It comes a second or two after the person shouts, right? That's because it takes time for sound to travel. It takes more time for sound to travel out and bounce back from something far and less time from something close. Bats use echoes like these to find things in the dark. A bat will make a sound, then listen for how long it takes the echoes from that sound to bounce back. That way, it can tell how near

or far something is. A bat can also notice if an echo bounces back more to its left ear or to its right. That tells the bat if something is more this way or that. You may have heard that this is called echolocation. Bats use an echo to figure out the location of things. But echolocation isn't just about the location of things. Bats can tell so much more about what's around them. Most bats send out lots of sounds and listen to lots of echoes. Depending on an object's shape, say a bumpy rock compared to smooth water, sounds will bounce off differently. And from the way echoes bounce back, a bat can tell things apart. That's how it knows where to take a drink in the dark or pluck an insect off a leaf. When bats are echolocating, the sky is filled with sounds. The sounds bats make and all the echoes of those sounds. But to human ears, it usually sounds like this. Nothing. That's because most bats can make and hear sounds that human ears can't hear. Remember the bat sounds I played before? Those calls were changed by a computer so that humans can hear them. Other bats sound like this. Or this. So in summary, many bats use their sense of hearing to find things in the dark. Bats make sounds that bounce off things around them and travel back as echoes that they can hear. The way echoes bounce back can give bats lots of information, so they're able to find food and avoid bumping into things. By using echolocation, bats can hear the world in detail. You know, the more I learn about bats, the more amazing they are and the less scary they seem. That's all for this week's question. Thanks, Nolan, for asking it.