mystery science

Grades K-5
Mini-Lesson: “How do cicadas make so much noise?”

VIDEO TRANSCRIPT

VIDEO 1

Hey, it's Esther. Growing up, I would hear this chirping sound outside. Maybe you've heard it too. I knew it was made by insects like crickets, but I never thought much about it. Then one spring, grown ups started making a big deal about something called a cicada. There were going to be lots of cicadas that summer, and sure enough, I heard them. They made a sound so loud, it filled my entire neighborhood. But the strange thing is I never saw the cicadas. I was so curious about them, and someone named Elvia is too. Let's give Elvia a call now.

[Video Call]

- Hi Esther.
- Hey, Elvia.
- I have a question for you. How do cicadas make so much noise?
- That's a great question.

Once I finally found out that cicadas look like this, I wanted to know the same thing. How does this small insect make such a huge noise? I mean, people can just open their mouths and let sound out. We can also make sound by snapping our fingers, or clapping our hands, or stomping our feet. But insects' bodies are very different from ours. They have parts like antennae, six legs, and sometimes wings. Some insects have mouthparts shaped like pinchers or curled-up tubes. If we can use our bodies to shout and snap and clap, what do insects do to

make sound? To figure this out, let's listen and watch as two insects make sound. First, here's a grasshopper. And second, here's a cricket. Now, I'll play them both at the same time without sound. I'm curious what you notice. How do you think these insects make noise?

VIDEO 2

I'm not sure how you answered, but maybe you noticed that these insects are moving parts of their bodies, like this grasshopper's legs. They start moving up and down really fast. The cricket's legs don't seem to move much, but its wings move really fast. And when the wings stop moving, the sound stops too. Grasshoppers and crickets move body parts back and forth to make sound, but they use different body parts, legs and wings. And take a close look here at the inside of this grasshopper's leg. It's got this bumpy ridge. There's something similar on this cricket's wing. Let's look closely here. Up close, you can see it's actually lots of tiny ridges. Grasshoppers and crickets rub these bumpy ridges back and forth against other body parts to make noise. It's kind of like the ridges on this instrument. When you rub a stick across them, it makes a noise too. Only these insects move their body parts even faster. Now, see what you notice about this cicada as it makes noise. I don't see its legs moving, and its wings don't move much either. But do you notice how its body is moving? When this person gently lifts the cicada's wing, being careful not to hurt it, you can get a better look. Watch this part here. See how it shakes back and forth? This is a special body part called a tymbal. There's a tymbal under the other wing too. The tymbal is making sound as it moves. But unlike the grasshopper's legs or the cricket's wings, the cicada isn't rubbing anything against it. Instead, a timbal works more like a metal cap from a container. When you push down on the flexible center and let it spring back, it makes clicking sounds.

When you saw the cicada's body moving, it was flexing muscles that move its tymbals back and forth. That makes part of the tymbals bend and spring back like the metal cap. Imagine for a moment that you have tymbals on the sides of your belly. See how fast you can flex your belly muscles to make your tymbals move. Kind of tiring, right? Well, a cicada can move its tymbals back and forth super fast, fast enough to make three hundred to four hundred clicks in one second. All those clicks blend together into one big buzzing noise. Cicadas are amongst the loudest insects on earth, and we usually don't hear just one. That sound on a warm summer afternoon is dozens and dozens of cicadas. They sync up the rhythm of their clicks to make an even bigger sound. It's like how the crowd in a stadium can clap and stomp together to make a thunderous beat, or how the singers in a chorus can fill a room with music. A group of cicadas clicking in sync can make a sound that fills a forest or your neighborhood. Scientists even call a group of cicadas a chorus. So in summary, cicadas and some other insects use different body parts than we do to make sound. Grasshoppers use their legs, and crickets use their wings, and cicadas use special body parts called tymbals. These insects move their body parts back and forth really fast to make sounds. That's all for this week's question. Thanks, Elvia, for asking it.