

Sound

Lesson 1b: Soundmakers

Grade 1	Length of lesson: 40 minutes	Placement of lesson in unit: 1b of 7 lessons on sound
Unit central question: Why do we hear sound?		Lesson focus question: How can we tell if something is making a sound?
Main learning goal: To produce sound, objects must move back and forth quickly (vibrate).		
Science content storyline: An object or some other kind of material must vibrate to make a sound we can detect with our senses. <i>Vibrate</i> means “to move back and forth quickly.” In addition to hearing the sound an object makes, we may also be able to see and feel the object vibrating. We heard a ruler and a rubber band make sounds, but we also saw and felt them vibrate. Seeing and feeling vibrations, as well as hearing sounds, are evidence that an object is making a sound.		
Ideal student response to the focus question: Other than hearing the sound, we can tell that something is making a sound because it vibrates. We may be able to see and feel the vibrations.		

Preparation

Materials Needed

- Science notebooks
- Chart paper and markers
- Rubber bands (for small plastic containers)
- Small plastic containers (1 per pair)
- Circle map (from lesson 1a)

Student Handouts

- 1.1 Soundmakers, Part 1 (from lesson 1a)
- 1.2 Soundmakers, Part 2 (1 per student)

Ahead of Time

- Review the Sound Content Background Document.
- **ELL support:** Meet with ELL students in advance and introduce them to the lesson content, structure, materials, and activities so they know what’s expected of them and can participate more fully in the lesson. Give students time to experiment with the new soundmaker (the container with a rubber band around it) so they can figure out how it works and understand what they’re expected to do with it. Orient students to the handout and revisit the table format at needed. Review the words *evidence*, *data*, *vibrate/vibrating/vibrations*, *columns*, and *rows*. Introduce the word *predict*.

Lesson 1b General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
1 min	Unit central question: The teacher reviews the unit central question, <i>Why do we hear sound?</i>	
4 min	Lesson focus question: The teacher reviews the focus question from the previous lesson, <i>How can we tell if something is making a sound?</i> Then students share what they've learned so far about sound.	<ul style="list-style-type: none"> • In science, <i>evidence</i> is what we find out or understand that helps us know something. • We can use our senses to find evidence that an object is making a sound. In addition to hearing a sound, we may be able to see or feel an object vibrating.
5 min	Setup for activity: The teacher introduces a new soundmaker (a rubber band stretched across a container). Then students make predictions about the kinds of evidence they'll find when they make a sound with the new soundmaker.	<ul style="list-style-type: none"> • <i>Vibrate</i> means "to move back and forth quickly." • We can use our senses to find evidence that an object is making a sound. In addition to hearing a sound, we may be able to see or feel an object vibrating.
15 min	Activity: Students experiment with the new soundmaker and gather evidence of sounds they hear, as well as vibrations they can see and/or feel. Then they record their evidence on their data tables.	<ul style="list-style-type: none"> • We can use our senses to find evidence that an object is making a sound. In addition to hearing a sound, we may be able to see or feel an object vibrating.
10 min	Follow-up to activity: Students share the evidence of sound they gathered from the rubber-band investigation.	
4 min	Synthesize/summarize today's lesson: To answer the focus question, students pair up and compare the evidence of sound they gathered from the ruler and rubber-band investigations.	<ul style="list-style-type: none"> • An object or some other kind of material must vibrate to make a sound we can detect with our senses. • When an object makes a sound we can hear, we may also see and feel the object vibrating. All of this is evidence that an object is making a sound.
1 min	Link to next lesson: The teacher announces that in the next lesson, students will consider whether all soundmakers vibrate when they make sounds. Then the teacher elicits ideas about whether students themselves vibrate when they make sounds.	

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1 min	<p>Unit Central Question</p> <p>Synopsis: The teacher reviews the unit central question, <i>Why do we hear sound?</i></p>		<p>Show slides 1 and 2.</p> <p>Who remembers the unit central question we talked about last time? Can someone read it for us from the slide or the board?</p> <p>We haven't answered this question yet, but in our first lesson on sound, we gathered some important evidence as by exploring some different ways we can tell whether an object is making a sound.</p>	<p>Why do we hear sound?</p>	
4 min	<p>Lesson Focus Question</p> <p>Synopsis: The teacher reviews the focus question from the previous lesson, <i>How can we tell if something is making a sound?</i> Then students share what they've learned so far about sound.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • In science, <i>evidence</i> is what we find out or understand that helps us know something. • We can use our senses to find evidence that an object is making a sound. In addition to hearing a sound, we may be able to see or feel an object vibrating. 	<p>Set the purpose with a <u>focus question</u> or goal statement.</p> <p>Ask questions to elicit student ideas and predictions.</p> <p>Summarize key science ideas.</p> <p>Engage students in analyzing and interpreting data and observations.</p>	<p>Show slide 3.</p> <p>Today we'll continue thinking about our focus question from last time: <i>How can we tell if something is making a sound?</i></p> <p>Who can share something we learned about sound in our last lesson that can help us answer this question?</p> <p>NOTE TO TEACHER: <i>As students share their ideas, add any new ideas to the circle map you started in the previous lesson.</i></p>	<p>We learned that objects vibrate when they make sounds.</p> <p>It means that objects move back and forth really fast.</p> <p>I'm not sure!</p>	<p>What does <i>vibrate</i> mean?</p> <p>Do you think all objects vibrate when they make sound?</p>

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			<p>What did we use as a soundmaker in our investigation?</p> <p>How could you tell that the ruler was making a sound when you plucked it?</p> <p>So we used three of our senses to help us find evidence that the ruler was making a sound.</p> <p>Who can tell me what the word <i>evidence</i> means?</p> <p>Show slide 4.</p> <p>That's right! Evidence is what we find out or understand that helps us know something. Hearing a sound is one kind of evidence or clue that something is making a sound.</p>	<p>We used a ruler.</p> <p>I could tell the ruler was making a sound because I could see it moving up and down and vibrating.</p> <p>I could feel it vibrating too!</p> <p>I could hear it vibrating!</p> <p>It means, like, what we find out that tells us something.</p> <p>It's a clue that something is making a sound.</p>	<p>Does anyone else have other evidence to share?</p>

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		<p>Highlight key science ideas and focus question throughout.</p>	<p>Last time we talked about how scientists are like detectives because they use evidence to figure out how the world works. We're detectives, too, because we're gathering evidence to figure out why we hear sound.</p> <p>What three senses did we use to gather evidence that our rulers were making sounds? Think about this question for a moment.</p> <p>Individual think time.</p> <p>NOTE TO TEACHER: <i>Use equity sticks to call on students to answer the question.</i></p> <p>Whole-class share-out: What three senses did we use to gather evidence that our rulers were making sounds?</p>	<p>Hearing, seeing, and feeling.</p>	
5 min	<p>Setup for Activity</p> <p>Synopsis: The teacher introduces a new soundmaker (a rubber band stretched across a container). Then students make predictions about the kinds of evidence they'll find when they make a sound with the new soundmaker.</p>	<p>Make explicit links between science ideas and activities before the activity.</p> <p>Select content representations and models</p>	<p>Show slide 5.</p> <p>Today we'll gather more evidence to help us figure out whether an object is making a sound. But this time, we'll use a new soundmaker.</p> <p>How would you describe this soundmaker?</p> <p>NOTE TO TEACHER: <i>Show students the new soundmaker—a square plastic container with a rubber band stretched across the top—but don't pluck the rubber band yet.</i></p>	<p>It's a container.</p> <p>It's plastic.</p> <p>It has a rubber band stretched across the</p>	

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	<p>Main science idea(s):</p> <ul style="list-style-type: none"> • <i>Vibrate</i> means “to move back and forth quickly.” • We can use our senses to find evidence that an object is making a sound. In addition to hearing a sound, we may be able to see or feel an object vibrating. 	<p>matched to the learning goal and engage students in their use.</p>	<div data-bbox="961 305 1312 462" data-label="Image"> </div> <p style="text-align: right; font-size: small;">Courtesy of BSCS</p> <p>Do you think this container with a rubber band across the top can make a sound? If your answer is yes, how do you think you can get it to make a sound?</p> <p>That’s exactly what you’ll do in today’s investigation. Using your finger, you’ll pull on the rubber band and then quickly let go to see if it makes a sound. Watch carefully as I demonstrate.</p> <p>NOTE TO TEACHER: <i>Hold the container firmly with one hand and pluck the rubber band with the finger of your other hand. Make sure that students can clearly see what you’re doing. When you release the rubber band, it should make a twanging or vibrating sound students can hear. Demonstrate this several times.</i></p> <p>Show slide 6.</p>	<p>top.</p> <p>If I pluck the rubber band, I think it will make a sound.</p> <p>I can pull on the rubber band.</p>	<p>What do you mean by “pluck”?</p>
		<p>Highlight key</p>	<p>The evidence we gather during this investigation</p>		

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		<p>science ideas and focus question throughout.</p> <p>Ask questions to elicit student ideas and predictions.</p>	<p>will help us answer our focus question, <i>How can we tell if something is making a sound?</i></p> <p>How will you know if our new soundmaker is making a sound? What evidence do you think you'll find?</p> <p>Turn and Talk: Share your ideas with an elbow partner and then write them in your science notebooks. Be prepared to share your predictions with the class.</p> <p>Whole-class share-out: What ideas did you come up with? What evidence of sound do you predict you'll find when you pluck the rubber band?</p> <p>Show slide 7.</p>	<p>We think we'll hear it go <i>boing-boing</i>, or maybe it will go <i>snap</i> if it breaks.</p> <p>The rubber band.</p> <p>Maybe we'll see or feel the rubber band vibrate like the ruler did.</p> <p>Like, the rubber band will move back and forth really fast.</p>	<p>What do you mean by "it"?</p> <p>Any other ideas?</p> <p>What do you mean by "vibrate"?</p>

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		<p>Highlight key science ideas and focus question throughout.</p>	<p><i>Vibrate</i> is an important science word that we learned last time. If something is moving back and forth quickly, we say that it's <i>vibrating</i>.</p> <p>During today's investigation, I want you to look for evidence of something vibrating. Then you'll record your evidence on a data table like you did with the ruler evidence.</p> <p>NOTE TO TEACHER: <i>Distribute handout 1.2 (Soundmakers, Part 2) and have students use their glue sticks to glue the handout into their science notebooks. Then orient students to the data table on the handout.</i></p> <p>Before we talk about the handout, I'd like you to glue it into your science notebooks using your glue sticks.</p> <p>Show slide 8.</p> <p>Now look at the data table on this handout. It looks a lot like the table we used in our last lesson, doesn't it? There's a picture of the soundmaker in the left-hand column, along with instructions telling you what to do. Then across the top of the table are columns. The first column shows the sentence starter "My evidence of sound is that" And the next three columns show an ear, an eye, and a hand, with words underneath.</p> <p>In the blank space below each column, you'll write</p>		

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			<p>down the evidence of sound that you hear, see, and feel as you use your soundmaker.</p> <p>If you <i>hear</i> something when you pluck the rubber band, write or draw what you heard in the space below the ear column. If you <i>see</i> something when the soundmaker is making a sound, write or draw it under the eye column. And if you <i>feel</i> something when the soundmaker is making a sound, write or draw it under the hand column.</p>		
15 min	<p>Activity</p> <p>Synopsis: Students experiment with the new soundmaker and gather evidence of sounds they hear, as well as vibrations they can see and/or feel. Then they record their evidence on their data tables.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> We can use our senses to find evidence that an object is making a sound. In addition to hearing a sound, we may be able to see or feel an object vibrating. 	<p>Make explicit links between science ideas and activities during the activity.</p> <p>Select content representations and models matched to the learning goal and engage students in their use.</p> <p>Engage students in using and applying new science ideas</p>	<p>Show slide 9.</p> <p>Like last time, you'll pair up with an elbow partner for this investigation and take turns making a sound with your rubber-band soundmakers just like I did. Use your ears, eyes, and hands to see if you can find evidence that the soundmaker is making a sound. Make sure to use all three of your senses.</p> <p>Talk with your partner about what you hear, see, and feel. Don't just focus on the rubber band. See if you can find any evidence of sound coming from the plastic container, too.</p> <p>Then I want you to write or draw the evidence you heard, saw, and felt under each matching column on the data table.</p> <p>NOTE TO TEACHER: <i>Have students pair up. Then give each pair a rubber-band soundmaker and direct students to take turns making sounds. Circulate around the room during the activity and encourage students to talk about the evidence of</i></p>		

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		in a variety of ways and contexts.	<p><i>sound they're finding and the senses they're using. Ask them how they might draw what they hear, see, or feel. Remind students to record their evidence on their handouts.</i></p> <p>ELL support: Have ELL students share some of their evidence with another pair of students sitting nearby. This is good language practice for ELL students and will benefit other students as well.</p>		
10 min	<p>Follow-Up to Activity</p> <p>Synopsis: Students share the evidence of sound they gathered from the rubber-band investigation.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> We can use our senses to find evidence that an object is making a sound. In addition to hearing a sound, we may be able to see or feel an object vibrating. 	<p>Make explicit links between science ideas and activity after the activity.</p> <p>Engage students in analyzing and interpreting data and observations.</p>	<p>NOTE TO TEACHER: <i>Have students put away their soundmakers and review the evidence on their data tables. Let them know they'll have an opportunity to revise their writings and/or drawings following the class discussion.</i></p> <p>Show slide 10.</p> <p>So what did you hear, see, or feel when you plucked the rubber band?</p> <p>First, let's talk about what you heard.</p> <p>Can someone else describe the sound you heard?</p> <p>What did you see or feel?</p>	<p>We heard a twangy sound!</p> <p>It went <i>boing-boing!</i></p> <p>The rubber band went <i>thunky-thunky.</i></p> <p>We saw the rubber</p>	<p>What do you mean by "it"?</p>

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		Engage students in communicating in scientific ways.	<p>Show slide 11.</p> <p>Now let’s talk about the evidence of sound you recorded on your data tables. I’d like several pairs to read what you wrote and describe your drawings. I’ll display your tables on a document reader while you share. Listeners should be ready to ask questions, agree or disagree, and add other ideas.</p> <p>As you share your evidence, use the sentence starter “Our evidence of sound is that”</p> <p>NOTE TO TEACHER: <i>Select several pairs of students to share their evidence with the class. Invite one pair at a time to come to the front of the class and report out. Display one of each pair’s data tables on a document reader during the share-out.</i></p>	<p>band move back and forth.</p> <p>We saw the rubber band vibrate.</p> <p>The rubber band felt buzzy.</p> <p>Our evidence of sound is that we could hear it twang, we could see it shake, and we could feel it going buzzy on our fingers.</p> <p>The rubber band.</p>	<p>Can you use the word <i>vibrate</i> in your description?</p> <p>What do you mean by “it”?</p> <p>Did both the rubber band and the plastic</p>

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			<p>Thank you for sharing your evidence!</p> <p>Did everyone notice how I asked questions and told our presenters that I liked how they used the word <i>vibrating</i>? As our next pair shares their evidence, I want listeners to ask all of the questions and make comments.</p> <p>Who has a question for our presenters? Does anyone agree or disagree with what they shared? Do you have any ideas to add?</p> <p>NOTE TO TEACHER: <i>If you feel it's productive, have as many pairs as possible present their evidence in the allotted time.</i></p>	<p>No. Just the rubber band.</p> <p>The container wasn't vibrating.</p> <p>Our evidence of sound is that we heard vibrations, and we saw and felt them too.</p> <p>I liked the way you said "vibrations."</p> <p>What are those squiggly lines you drew?</p> <p>How did you know you were hearing vibrations?</p>	<p>container make sounds?</p> <p>How do you know?</p> <p>I like how you used the word <i>vibrating</i>.</p>

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				What did you mean by “it”?	
4 min	<p>Synthesize/Summarize Today’s Lesson</p> <p>Synopsis: To answer the focus question, students pair up and compare the evidence of sound they gathered from the ruler and rubber-band investigations.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • An object or some other kind of material must vibrate to make a sound we can detect with our senses. • When an object makes a sound we can hear, we may also see and feel the object vibrating. All of this is evidence that an object is making a sound. 	<p>Highlight key science ideas and focus question throughout.</p> <p>Engage students in making connections by synthesizing and summarizing key ideas.</p> <p>Engage students in analyzing and interpreting data and observations.</p> <p>Engage students in constructing explanations and arguments.</p>	<p>Show slide 12.</p> <p>Let’s revisit our focus question, <i>How can we tell if something is making a sound?</i></p> <p>Think about our investigations with the ruler and the rubber band.</p> <p>What are some ways we can tell whether something is making a sound?</p> <p>Show slide 13.</p> <p>Now let’s compare the evidence we recorded on our data tables and think about how both soundmakers are the same or different.</p> <p>NOTE TO TEACHER: <i>Have students locate handout 1.1 (Soundmakers, Part 1) in their science notebooks and compare the evidence on this handout with the evidence they recorded on handout 1.2 (Soundmakers, Part 2).</i></p> <p>What evidence of sound did you find for both soundmakers using your <i>ears</i>? Think about how the</p>	<p>We can use our senses.</p> <p>Hearing, seeing, and feeling.</p>	<p>What senses can we use to find evidence of sound?</p>

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			<p>soundmakers are the same or different.</p> <p>Turn and Talk: Talk about these questions with your partner and be prepared to share your ideas and evidence with the class.</p> <p>Whole-class share-out: What evidence of sound did you find with your ears for both soundmakers? Were the sounds the same or different?</p> <p>Turn and Talk: Now talk with your partner about the evidence of sound you found with your <i>eyes</i> for both soundmakers. Think about how the soundmakers are the same or different.</p> <p>Whole-class share-out: What evidence of sound did you find with your eyes? Did the ruler and the rubber band look the same or different when they made a sound?</p>	<p>Our evidence of sound is that we could hear the sounds both soundmakers were making. But each soundmaker made a different sound.</p> <p>The ruler made a <i>bouncy</i> sound, and the rubber band made a <i>twangy</i> sound.</p> <p>We saw both soundmakers shake back and forth</p>	<p>How were the sounds different?</p>

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			<p>Turn and Talk: Now talk with your partner about the evidence of sound you found with your <i>hands</i>. Did the ruler and the rubber band feel the same or different?</p> <p>Whole-class share-out: What evidence of sound did you feel with your hands? Did the ruler and the rubber band feel the same or different?</p> <p>Turn and Talk: Now I'd like you and your partner to summarize how both soundmakers were the same. Use the sentence starter "Both soundmakers" And be ready to share your statements with the</p>	<p>when they made a sound.</p> <p>Both soundmakers vibrated.</p> <p>We felt both soundmakers moving.</p> <p>We felt both soundmakers vibrating.</p> <p>They both felt buzzy.</p>	<p>Can you use the word <i>vibrate</i> in your sentence?</p> <p>How do you know that both soundmakers were vibrating?</p> <p>Can you use the word <i>vibrate</i> in your sentence?</p>

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		Summarize key science ideas.	<p>class.</p> <p>Whole-class share-out: Let’s hear your summary statements! Make sure to begin with the words “Both soundmakers ...”</p> <p>NOTE TO TEACHER: <i>Invite as many pairs to share their summary statements as time allows.</i></p> <p>Show slide 14.</p> <p>So our senses help us find evidence that objects are making sounds. We can hear sounds with our ears. We can see vibrations with our eyes, and we can feel vibrations with our hands.</p>	<p>Both soundmakers make sounds we can hear and vibrations that we can see and feel.</p> <p>Both soundmakers shake back and forth quickly. That’s called <i>vibrating</i>.</p>	
1 min	<p>Link to Next Lesson</p> <p>Synopsis: The teacher announces that in the next lesson, students will consider whether all soundmakers vibrate when they make sounds. Then the teacher elicits ideas about whether students themselves vibrate when they make sounds.</p>	<p>Link science ideas to other science ideas.</p> <p>Ask questions</p>	<p>Show slide 15.</p> <p>In our investigations with the ruler and the rubber band, we learned that some objects <i>vibrate</i> when they make sounds.</p> <p>Do you think all soundmakers vibrate?</p> <p>We’ll find out next time when we explore some new soundmakers. One of these new soundmakers is <i>you!</i></p> <p>Do you think you vibrate when you make a sound?</p>	I make sounds	

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		to elicit student ideas and predictions.	NOTE TO TEACHER: <i>Elicit a variety of ideas, but keep this discussion brief. Don't ask probe or challenge questions at this point.</i>	when I talk, but I don't vibrate. I can vibrate by moving back and forth quickly like this [<i>student waves arms in air</i>], but I don't make any sound.	