

Sound

Lesson 6b: Vibrating Drums

Grade 1	Length of lesson: 40 minutes	Placement of lesson in unit: 6b of 7 lessons on sound
Unit central question: Why do we hear sound?		Lesson focus question: How do our ears help us hear sound?
Main learning goal: Vibrating air (sound) can make other objects vibrate. When vibrating air makes our eardrums vibrate, we hear sound.		
Science content storyline: When a soundmaker vibrates, it causes the air around it to vibrate. These vibrations move through the air away from the soundmaker. Some of the vibrations reach our ears and make our eardrums vibrate. Our eardrums send a message to our brains that these vibrations are sound.		
Ideal student response to the focus question: Vibrating air hits my eardrums and makes them vibrate. When my eardrums vibrate, they send a message to my brain so I can hear sound.		

Preparation

<p>Materials Needed</p> <ul style="list-style-type: none"> • Science notebooks • Chart paper and markers • Yarn or string • Class drawing on chart paper from lessons 5b and 6a (“Where Did the Sound Go Today?”) <p>Student Handouts and Teacher Masters</p> <ul style="list-style-type: none"> • 6.1 The Ear (from lesson 6a) • 6.2 Dingy Is Heard! (optional: 1 per student) • 6.3 Dingy’s Story Cards (Teacher Master) (laminated, 1 card per student) 	<p>Ahead of Time</p> <ul style="list-style-type: none"> • Review the Sound Content Background Document. • Print copies of handout 6.3 (Dingy’s Story Cards). You’ll need 1 Brain card, 1 Bell card, 4 Eardrum cards, 4 Ding-dong cards, and 18 Air cards. Cut the cards apart and laminate them. Punch holes through the hole guides at the top of the story cards. Then place string or yarn through the holes and tie the ends together so that students can wear the cards around their necks. (Note: Don’t hole-punch the Ding-dong message cards. Students won’t wear these.) • 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. In particular, have students predict whether sound is present if no one is there to hear it and then discuss their ideas. Also read through Dingy’s story (handout 6.2). Walk students through the different roles and how to act them out. The onomatopoeic phrase <i>ding-dong</i> isn’t universal, but some students may be familiar with other phrases that carry this meaning. Introduce this term during the preview and explain as explicitly as possible why the story is called “Dingy Is Heard!” Identify vocabulary terms in the lesson plan to review with students in advance, including <i>role</i> and <i>role-play</i>. Also review the words <i>eardrum</i>, <i>vibrate/vibrations</i>, and <i>sound detector</i>.
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Lesson 6b General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
5 min	Link to previous lesson: The teacher engages students in reviewing what they learned in the previous lesson about what happens when sound reaches their eardrums.	<ul style="list-style-type: none"> Vibrating air (sound) can make other objects vibrate, including our eardrums.
1 min	Lesson focus question: The teacher reviews the focus question from the previous lesson: <i>How do our ears help us hear sound?</i>	
6 min	Setup for activity: Students consider whether a bell would make a sound if no one was there to hear it. Then they share their predictions with a partner.	<ul style="list-style-type: none"> Vibrating air (sound) can make other objects vibrate, including our eardrums.
12 min	Activity: Students listen to a story about Dingy the bell and act out different parts to show how their ears help them hear sound.	<ul style="list-style-type: none"> Vibrating air (sound) can make other objects vibrate, including our eardrums. Sound vibrations travel through the air to our ears and make our eardrums vibrate. Then our eardrums send a message to the brain that these vibrations are sound.
8 min	Follow-up to activity: Students revisit their predictions about what happens to sound when no one is there to hear it. Then they draw pictures to illustrate their ideas and explain in writing why they think there is or isn't a sound.	
6 min	Synthesize/summarize today's lesson: The teacher engages students in reviewing and revising their class drawing from the previous lesson. Then the teacher reviews the focus question, and students share their ideas for answering it.	
2 min	Link to next lesson: The teacher announces that in the next lesson, students will explore different kinds of materials they could use to build their own soundmakers.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
5 min	<p>Link to Previous Lesson</p> <p>Synopsis: The teacher engages students in reviewing what they learned in the previous lesson about what happens when sound reaches their eardrums.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Vibrating air (sound) can make other objects vibrate, including our eardrums. 	Summarize key science ideas.	<p>Show slides 1 and 2.</p> <p>In our last lesson we talked about the different parts of our ears. We also used a new soundmaker called a <i>kazoo</i> to investigate what happens when sound vibrations travel through the air and reach our ears.</p> <p>What did we discover about our ears?</p> <p>What did we learn from our kazoo model? How is the model like our ears?</p>	<p>We found out that our ears have eardrums.</p> <p>The vibrating air makes our eardrums vibrate, and we can hear sound.</p> <p>The tube in our model is like our ear canals that carry the sound vibrations in the air to our eardrums.</p> <p>The wax paper on the end of the kazoo is like our eardrums</p>	<p>And what happens to our eardrums when sound vibrations in the air reach them?</p>

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			<p>Our ears are pretty amazing, aren't they?</p> <p>So today we're going to use what we've learned to help a little soundmaker who is very sad.</p>	<p>because it covers the opening and vibrates when sound vibrations in the air reach it.</p>	
1 min	<p>Lesson Focus Question</p> <p>Synopsis: The teacher reviews the focus question from the previous lesson: <i>How do our ears help us hear sound?</i></p>	<p>Set the purpose with a <u>focus question</u> or goal statement.</p>	<p>Show slide 3.</p> <p>Our focus question for this lesson is the same as our last lesson: <i>How do our ears help us hear sound?</i></p> <p>Today we'll gather more evidence to help us answer this question.</p>		
6 min	<p>Setup for Activity</p> <p>Synopsis: Students consider whether a bell would make a sound if no one was there to hear it. Then they share their predictions with a partner.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Vibrating air (sound) can make other objects vibrate, including our eardrums. 	<p>Make explicit links between science ideas and activities before the activity.</p>	<p>Show slide 4.</p> <p>Today we're going to read a story about a little bell named Dingy and find out more about how our ears help us hear sound.</p> <p>In our last investigation, who could hear the bell ring?</p>	<p>All of us could!</p> <p>The vibrations from the bell made the air vibrate. Then the</p>	<p>And how did the sound of the bell get to our ears?</p>

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		Ask questions to elicit student ideas and predictions.	<p>Who could hear the sound of the bell?</p> <p>Could you hear the bell no matter where you were in the room?</p> <p>But what if the bell rang and we weren't in the room? Would anyone hear the sound?</p> <p>What if there was a bell way out in the forest where nobody lived? If the bell rang, would anyone hear the sound?</p> <p>Show slide 5.</p> <p>Do you think a bell would make a sound if no one was there to hear it?</p> <p>Turn and Talk (2–3 min): Talk about this question with an elbow partner and share your predictions. Be prepared to share your ideas and reasons with the class.</p>	<p>vibrations traveled through the air to our ears and made our eardrums vibrate.</p> <p>Everyone!</p> <p>Yes.</p> <p>No, because there would be no ears to hear it!</p> <p>No.</p> <p>Because the sound vibrations would have to travel too far to reach our ears.</p>	<p>Why do you think so?</p>

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			<p>Whole-class share-out: So do you think the bell would make a sound if no one was there to hear it? What did you predict?</p> <p>NOTE TO TEACHER: <i>As students share their predictions, record them on chart paper.</i></p> <p>Now let's find out what happens when no one is around to hear a soundmaker.</p>		
12 min	<p>Activity</p> <p>Synopsis: Students listen to a story about Dingy the bell and act out different parts to show how their ears help them hear sound.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Vibrating air (sound) can make other objects vibrate, including our eardrums. • Sound vibrations travel through the air to our ears and make our eardrums vibrate. Then our eardrums send a message to the brain that these vibrations are sound. 	<p>Select content representations and models matched to the learning goal and engage students in their use.</p> <p>Make explicit links between science ideas and activities during the activity.</p>	<p>Show slide 6.</p> <p>Today's story about Dingy the bell will help us understand more about how our ears help us hear sound.</p> <p>As I read the story, you're going to help me illustrate it by acting out different roles.</p> <p>ELL support: During the lesson preview, read Dingy's story to ELL students and explain what each role involves so they know what to expect.</p> <p>NOTE TO TEACHER: <i>If time allows, read the story aloud to students before assigning parts and then read it again for the role-play. Divide the class into four groups and assign the following roles:</i></p> <ul style="list-style-type: none"> • Group 1: Bell (one student) 		

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			<ul style="list-style-type: none"> • Group 2: <i>Air (all students not assigned to other groups)</i> • Group 3: <i>Eardrum (four students) (Each student will have a Ding-dong message card.)</i> • Group 4: <i>Brain (one student) (This student will read what is on the message cards.)</i> <p>Each group will be responsible for acting out one part of the story.</p> <p>NOTE TO TEACHER: <i>Distribute the laminated story cards from handout 6.3 (Dingy’s Story Cards). Then direct students to hang the cards around their necks (except for the message cards). Give the message cards to the Eardrum group and instruct these students to keep the cards facedown. Tell them they’ll pass the cards to the Brain at the end of the story, so they need to listen carefully for their cue.</i></p> <p>I’ve given each of you a role card to wear. Look at the word on your card and then hang the card around your neck.</p> <p>Raise your hand if you’re wearing the Bell card. You’ll sit in the center of the room.</p> <p>NOTE TO TEACHER: <i>Arrange other groups around the bell and make sure each group knows what to do. Position the</i></p>		

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			<p><i>Air group so they're scattered all around the bell. Students in the Eardrum group should sit side by side inside the Air-group space. Place the Brain student near the Eardrum group. Then position some of the Air-group members beyond the Eardrums and Brain.</i></p> <p>The word on your card tells you what role you play in helping a person hear sound. Think about how you'll play this role in the story.</p> <p>Raise your hand if you think your role will involve vibrating.</p> <p>So the Bell, the Air, and the Eardrums will all vibrate at some point in the story. Stand up if you're playing these roles.</p> <p>Who can tell me what it means to vibrate?</p> <p>Should you make big movements or small movements when you vibrate?</p> <p>OK, I'd like the Bell, the Air, and the Eardrums to practice vibrating. When I give the signal, I want you to start vibrating in place. When you hear me clap, stop vibrating.</p>	<p><i>[The Bell, the Air, and the Eardrums should all raise their hands.]</i></p> <p>It means you move back and forth quickly.</p> <p>Small movements.</p>	

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			<p>OK, start vibrating.</p> <p>NOTE TO TEACHER: <i>Have the Bell, the Air, and the Eardrums vibrate for about 15 seconds or so. Then clap to let them know when to stop vibrating.</i></p> <p>Show slide 7.</p> <p>As I read the story, listen carefully for the word on your card. When you hear me read your word, stand up and be ready to act out what the story tells you to do. For example, if you're the Bell, when you hear me say the word <i>bell</i>, stand up. Then listen carefully to what the story tells you to do. If the story says that "Dingy the <i>bell</i> began to ring and ring," start vibrating back and forth.</p> <p>There are some places in the story where everyone will help me fill in the words.</p> <p>Show slide 8.</p> <p>The name of our story is "Dingy Is Heard!" As you'll see, Dingy is a sad little bell. Let's find out why Dingy is so sad and what will make her happy again!</p> <p>NOTE TO TEACHER: <i>Project handout 6.2 (Dingy Is Heard!) on a document reader so that students can follow along</i></p>		

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			<p><i>as you read the story. You may also want to give each student a copy of the handout.</i></p> <p><i>Story-card words appear in boldface type throughout the handout, and the role-play instructions for students to follow are shown in brackets. When you read a story-card word, make sure that members of the corresponding group stand up and prepare to act out their part. After you read the sentence that tells students what to do, give groups a cue so they know it's time to perform their role-play.</i></p> <p><i>When you encounter an underline in the story, ask students to help you fill in the correct word.</i></p> <p><i>Decide whether you want the Bell, the Air, and the Eardrum groups to keep vibrating after their part begins (more realistic) or have them vibrate and then stop. The latter option would be less hectic and would help students concentrate better on the story.</i></p> <p>ELL support: The onomatopoeic phrase <i>ding-dong</i> isn't universal, but some ELL students may be familiar with other phrases that carry this meaning. Introduce this term during the lesson preview and explain as explicitly as possible why the story is called "Dingy Is Heard!"</p>		

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			That's the end of our story about Dingy the soundmaker and how we made her happy by hearing her bell ring.		
8 min	<p>Follow-Up to Activity</p> <p>Synopsis: Students revisit their predictions about what happens to sound when no one is there to hear it. Then they draw pictures to illustrate their ideas and explain in writing why they think there is or isn't a sound.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Vibrating air (sound) can make other objects vibrate, including our eardrums. • Sound vibrations travel through the air to our ears and make our eardrums vibrate. Then our eardrums send a message to the brain that these vibrations are sound. 	<p>Make explicit links between science ideas and activities after the activity.</p> <p>Ask questions to elicit student ideas and predictions.</p> <p>Engage students in analyzing and interpreting data and observations.</p> <p>Engage students in communicating in scientific ways.</p>	<p>Show slide 9.</p> <p>Remember the predictions you made earlier about whether a bell would make a sound if no one was there to hear it?</p> <p>NOTE TO TEACHER: <i>Display the predictions you recorded on chart paper.</i></p> <p>ELL support: <i>ELL students will benefit from a preview of this part of the lesson in particular.</i></p> <p>What do you think after hearing Dingy's story?</p> <p>Does anyone have a different idea?</p>	<p>I don't think there's a sound if no one is there to hear it.</p> <p>Because the vibrations in the air just keep going.</p> <p>I think that if the bell is vibrating, there would be a sound.</p>	<p>Why do you think that?</p> <p>What evidence do you have?</p>

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		<p>Engage students in constructing explanations and arguments.</p> <p>Engage students in using and applying new science ideas in a variety of ways and contexts.</p>	<p>So we have some very interesting and different ideas about whether the bell would make a sound if no one was there to hear it.</p> <p>Show slide 10.</p> <p>Now I'd like you to open your notebooks and draw a picture of Dingy the bell. Show what you think happens when Dingy rings her bell in the forest, but no one is around to hear her. Next to your picture, explain why you think there is or isn't a sound when Dingy rings her bell.</p> <p>NOTE TO TEACHER: <i>Give students a few minutes to draw their pictures and write down their explanations.</i></p>	<p>We know from our investigations that if the bell is vibrating, the air around it is vibrating too. Even if no one is there, there's still a sound because of the vibrations.</p>	
6 min	<p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: The teacher engages students in reviewing and revising</p>	<p>Select content representations and models matched to the</p>	<p>Show slide 11.</p> <p>Let's use what we learned from our story about Dingy to help us revise our class drawing from last time.</p>		

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	<p>their class drawing from the previous lesson. Then the teacher reviews the focus question, and students share their ideas for answering it.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Vibrating air (sound) can make other objects vibrate, including our eardrums. • Sound vibrations travel through the air to our ears and make our eardrums vibrate. Then our eardrums send a message to the brain that these vibrations are sound. 	<p>learning goal and engage students in their use.</p> <p>Engage students in making connections by synthesizing and summarizing key ideas.</p> <p>Engage students in constructing explanations and arguments.</p>	<p>NOTE TO TEACHER: <i>Display the class drawing on chart paper from the previous lesson (“Where did the Sound God Today?”) and review with students what happens when sound vibrations reach their ears.</i></p> <p>Much like our story about Dingy, our drawing shows how sound moves when a bell rings and how our ears hear the sound. In our last lesson, we added an ear, an ear canal, and an eardrum to our class drawing to show what happens when sound reaches our ears.</p> <p>What’s the first thing that happens when vibrating air reaches our ears?</p> <p>What happens next?</p> <p>Then what happens?</p> <p>OK. Let’s add a brain to our drawing.</p> <p>NOTE TO TEACHER: <i>Near the edge of the drawing where you added the ear, the</i></p>	<p>The sound vibrations go down the ear canal.</p> <p>The vibrations reach our eardrums and make them vibrate.</p> <p>Our eardrums send a message to our brains, and we hear the vibrations as sound.</p>	

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		Highlight key science ideas and focus question throughout.	<p><i>ear canal, and the eardrum last time, sketch a picture of a brain.</i></p> <p>How could we show the eardrum sending a message to the brain?</p> <p>Show slide 12.</p> <p>Today's focus question is <i>How do our ears help us hear sound?</i></p> <p>Turn and Talk: Share your ideas with an elbow partner using the sentence starter on the slide.</p> <p><i>Our ears help us hear sound by _____.</i> <i>My evidence is _____.</i></p> <p>Make sure to include evidence from our story about Dingy and our investigations in previous lessons.</p> <p>Whole-class share-out: Who would like to share your answers to our focus question?</p>	<p>We could add little lines going from the eardrum to the brain.</p> <p>We could write the word <i>message</i> and draw an arrow from the eardrum to the brain.</p>	
2 min	Link to Next Lesson		Show slide 13.		

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			<p>How could we test your ideas?</p> <p>See if you can come up with any other ideas before our next lesson.</p>	<p>We could use rice and see if it jumps when we make a sound with our soundmakers.</p>	