

Sound

Lesson 2: More Sound Makers: Do they vibrate?

Grade 1	Length of lesson: 47 min	Placement of lesson in unit: 2 of 8 lessons on sound
Unit Central Question: Why do we hear sound?		Lesson Focus Question: Do sound makers always vibrate? How can we tell?
Main learning goal: To produce sound, object must move back and forth quickly (vibrate).		
Science content storyline: All objects that produce a sound vibrate. Sometimes you cannot see these vibrations but there is other evidence that the object is vibrating. You may be able to feel the vibrations or see other objects move because of the vibrations.		
Ideal student response to the focus questions: If something makes a sound it must be vibrating. Even if we cannot see the vibrations, we can detect the vibrations by feeling them. We may also be able to see the vibrations make water splash or see the vibrations move another object.		

Preparation

<p>Materials needed:</p> <p>For each group of 4 students</p> <ul style="list-style-type: none"> 1 tuning fork 1 clucker small cup of rice small cup of water paper towels 2.1 Do they vibrate? handout 	<p>AHEAD OF TIME:</p> <ul style="list-style-type: none"> • Review the Introduction and information about Sound in the Content Background document. • Assemble one clucker for each team of 4 students. <ul style="list-style-type: none"> • string • sponge • plastic cup • paper clip or small stick <p>Assemble as shown in the picture.</p> 
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Lesson 2 General Outline

Time	Phase of lesson	How the Science Content Storyline Develops
2 min	Review of Previous Lesson: Teacher reviews what they learned in the previous lesson and reinforces the idea of evidence.	
8 min	Set up for Activity 1: Teacher has students think about evidence they could collect to know if something is vibrating but you cannot see the vibrations. Teacher introduces the focus question for the activity.	You can see the vibrations in some sound makers and some sound makers you cannot see the vibrations. To know if these sound makers vibrate, you need additional evidence.
30 min	Activity 1: Students make predictions and gather evidence to test their prediction about if all sound makers vibrate. The sound makers are ones that you cannot see the vibrations.	You can collect evidence that a sound maker is vibrating even though you cannot see the vibrations. You may be able to feel the vibrations or see other objects move or vibrate when the sound makers touches them.
5 min	Follow-up to Activity 1, Synthesize/Summarize: Students consider all sound makers they have used and think of evidence that the sound makers are vibrating.	
2 min	Link to Next Lesson: Students return to the Unit Central question and begin to answer it with sound makers vibrate. They share their ideas about how the sound gets from the sound maker to the ear.	If an object produces a sound, it must be vibrating even if you cannot see the vibrations.

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2 min	<p>Review of Previous Lesson</p> <p><u>Synopsis:</u> Teacher reviews what they learned in the previous lesson and reinforces the idea of evidence.</p>	Ask questions to probe student ideas and predictions	<p>Yesterday we looked at two different sound makers (show the class the two sound makers).</p> <p>How did you know the sound maker was making a sound? What was your evidence? Turn to your elbow partner and tell them one piece of evidence that the sound maker was making a sound.</p> <p>Can someone share your evidence?</p> <p><i>Note to teacher: As students share, record their ideas on the board. Probe their answers and ask for evidence for what they know.</i></p> <p><i>Note to teacher: Make sure that students agree that they could see vibrations in both sound makers by holding up each sound maker and asking:</i></p> <p>How many agree that you could see this one vibrating? How many agree that you could see this sound maker vibrating?</p>	<p>I can hear the sound.</p> <p>I can see the vibrations.</p> <p>I can feel the vibrations.(This response may not come up and if it doesn't do not press students for this response—they will use feeling vibrations as evidence in this lesson.)</p>	<p>What did it sound like?</p> <p>What did they look like?</p> <p>What did it feel like?</p> <p>Is this true for both of the sound makers you used? (ask this each time there is a different response)</p>

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		Highlight key science ideas	<i>Summarize:</i> You saw vibrations in the two sound makers we used in the last lesson.		
8 min	<p>Set up for Activity 1 and Focus Question</p> <p><u>Synopsis:</u> Teacher has students think about evidence they could collect to know if something is vibrating but you cannot see the vibrations. Teacher introduces the focus question for the activity.</p> <p><u>Main Science Ideas:</u> You can see the vibrations in some sound makers and some sound makers you cannot see the vibrations. To know if these sound makers vibrate, you need additional evidence.</p>	<p>Ask questions to elicit student ideas and predictions</p> <p>Make explicit links between science ideas and activities (before</p>	<p>Do you think you can always see vibrations when sounds are made?</p> <p><i>Note to teacher:</i> Just have students think about this question. Don't ask for responses to this yet</p> <p>What if you walk into your house and you don't see your mom or dad when you first walk in. Does that mean they aren't there?</p> <p>What evidence might you get to know they are at home even if you don't see them?</p> <p>We will look for evidence today that these sound makers are vibrating.</p>	<p>I might hear them in another room.</p> <p>I could call out to them and see if they answer me.</p> <p>I might see their things on the table and the car out front.</p> <p>My after school snack is on the table.</p>	

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		<p>the activity)</p> <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>Make explicit links between science ideas and activities (before the activity)</p>	<p>Today’s focus questions are Do sound makers always vibrate? How can we tell?</p> <p><i>Note to teacher: Write the focus questions on the board for students to see. You will also have it in the PowerPoint.</i></p> <p>We will look at new sound makers today. (These are pictured on the PowerPoint slide) Again, we will look for evidence that the sound maker is or is not vibrating so we can answer the focus questions. That is our goal for today.</p> <p>Does anyone have any ideas of what evidence we can gather to know if these sound makers vibrate?</p> <p><i>Note to teacher: Students may come up with feeling the vibrations or other ways to test. Allow them to try out their ideas in the activity but make sure they try to feel the vibrations on each sound maker.</i></p> <p>Look at this handout that we will use today. (Show the handout on the</p>	<p>We can listen to the sound.</p> <p>We can look for vibrations.</p> <p>We can touch the sound maker. (This may not come up and you do not need to bring it up – students will figure out during their investigation.)</p>	<p>Can you describe what you would hear/feel?</p> <p>What would you feel? How would that tell you it vibrated or not?</p>

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		Ask questions to elicit student ideas and predictions	<p><i>PowerPoint slide</i>) Notice the first column (column A) has pictures of three sound makers. Do you recognize any of them?</p> <p>Let me show you the sound makers that are pictured in the handout. <i>(Show them the clucker and have them find it on their handout. Show the tuning fork and tell them what it is called. Have them find it on their handout.)</i></p> <p>You are also a very important sound maker and that is the first picture.</p> <p>When each of these is making a sound, do you think it will vibrate? I want you to make a prediction.</p> <p>In the second column labeled B you will make a prediction. <i>(Show the correct column on the PowerPoint slide)</i> Who knows what it means to make a prediction?</p> <p>A prediction is what you think will happen. You will predict if you think the sound maker vibrates. If you think it will vibrate, you will put the word YES next to the picture in column B. If you think it will not vibrate when it makes a sound, you will put the word NO next to the picture in column B.</p>	<p>That's a picture of a kid.</p> <p>The second picture is a clucker.</p> <p>I don't know what the last picture is.</p> <p>Predict is when you guess about something.</p>	

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		Ask questions to probe student ideas and predictions	<p><i>(Show the handout on the PowerPoint slide and point to the correct column)</i></p> <p>Note to teacher: Hold up one sound maker at a time and let the students predict if they will vibrate when making a sound. You be the sound maker for the child that is pictured in the first row.</p> <p>You don't have to have the same prediction for each sound maker. Remember, you cannot be "wrong" on a prediction but you should have reasons for your prediction. So think about your ideas and make a prediction. I may ask you to explain why you predicted the way that you did, so be ready to answer.</p> <p>Who will share their prediction? Please use a complete sentence when you share. You can say something like, I predict that I do or do not vibrate when I make a sound.</p> <p>Note to teacher: Show the sentence starter on the PowerPoint slide as students share.</p> <p>Why did you make that prediction?</p>	<p>I think the clucker will vibrate because yesterday I thought I saw the cup moving.</p> <p>I don't think the clucker will vibrate because it's just a string and a cup.</p> <p>Strings and cups don't make noises.</p>	<p>Tell me why you think it won't vibrate because it's a string and a cup.</p> <p>What is your reason? Why don't you think you are vibrating? Why do you think</p>

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		Ask questions to probe student ideas and predictions	Did someone else have a different prediction or a different reason?	I think the tuning will vibrate. I think the tuning fork will not vibrate.	something is vibrating? Why do you think that?
30 min	<p align="center">Activity 1</p> <p><u>Synopsis:</u> Students make predictions and gather evidence to test their prediction about if all sound makers vibrate. The sound makers are ones that you cannot see the vibrations.</p> <p><u>Main Science Ideas:</u> You can collect evidence that a sound maker is vibrating even though you cannot see the vibrations. You may be able to feel the vibrations or see other objects move or vibrate when the sound makers touches them.</p>	Make explicit links between science ideas and activities (during activity)	<p><u>Whole Class— You as a sound maker (7 min)</u></p> <p>We will investigate a very important sound maker to get us started today--you! You will be the sound maker.</p> <p>I want everyone to face a partner and hum. Watch your partner and see if you see vibrations.</p> <p><i>Turn and observe time.</i> Give students a minute to take turns humming and observing each other. Show the PowerPoint slide with the instructions and the picture of the two children facing each other.</p> <p>Can you see vibrations when you and your partner were the sound maker?</p> <p>Do you have any ideas for collecting more evidence that there are</p>	<p>I see vibrations. I don't see vibrations.</p> <p>Maybe we can feel the vibrations.</p>	<p>What do the vibrations look like? How is it moving?</p> <p>Can you say more about what your partner's throat</p>

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			<p>vibrations?</p> <p><i>Note to teacher: We're expecting that they can't see the vibrations in any of the sound makers in this lesson but some students may say that they can. Challenge them by asking how did the throat move? and ask if that movement is like our definition for vibration. It is important for the students to know that they don't have to see the vibrations to be "correct". There are other pieces of evidence we can gather. Some students will predict that the objects vibrate and be reluctant to admit that you cannot see the vibrations. Encourage them that if they cannot see the vibrations, we will have to be scientists and find other evidence with some of our other senses.</i></p> <p>Place your hand on your throat while you are humming. <i>(Show the PowerPoint slide with these instructions and the picture of children)</i> What do you feel? Is this evidence that your throat is vibrating?</p> <p>We should record this in our evidence column—column C on your handout. <i>(Show the slide from the PowerPoint that has the handout pictured. Point to the correct column.)</i></p>	<p>Her throat is moving.</p> <p>I feel humming. I feel buzzing. I feel my throat moving.</p> <p>Yes, it is evidence that my throat is vibrating.</p>	<p>was doing? Describe how it was vibrating.</p> <p>Does this match what we know vibrate means? When you say her throat moves, how does it move?</p> <p>How does the way her throat moves compare to the way the rubber band moved in the last lesson?</p> <p>What word have we learned to describe what you are feeling?</p>

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			<p><i>Note to teacher: Give students time to write the evidence in their handout. They should have some evidence that they could hear sound and feel vibrations.</i></p> <p><u>Students in groups of 4 and working in pairs:</u> <u>Testing the Clucker: (10 min)</u> Now it is time to gather evidence from another sound maker—the clucker.</p> <p>This is how you use the clucker to make a sound. <i>(Show the picture of the girl using the clucker on the PowerPoint slide)</i> <p style="color: red;">(picture of Klaire using clucker—add to PPT too)</p> <p><i>Note to teacher: Demonstrate the clucker showing them they should squeeze the sponge and their fingers should press together with the string in between their fingers. Distribute the cluckers or have them on the desks for each group of 4. Pre moisten the sponges. Give students the opportunity to “play” with the clucker. Use this opportunity to see if they are using the clucker properly. Allow 3-4 minutes for them to play with the clucker. You may want to stop them periodically by turning the room light on and off to make sure they are sharing the clucker with their partner.</i></p> </p>		

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		<p>Make explicit links between science ideas and activities (during activity)</p>	<p>You said earlier that you may be able to feel the vibrations or see something that happens because of the vibrations.</p> <p>You will record your evidence (what you see and what you feel) in column C.</p> <p>Now it is time for you to test your predictions—gather evidence to find out if the clucker is vibrating or not.</p> <p>You will try to see if you can feel vibrations like we did on our throat. When you do this, touch the clucker when it is making a sound. Touch it gently. Touch the cup and feel the string when you pull down on it. You and your partner may need to work together—one person make the sound and the other feel the cup. Then switch jobs.</p> <p><u>Working in Pairs: Observe time.</u> Give students a minute to take turns using the clucker and looking for evidence of vibrations.</p> <p>As you monitor the teams, ask questions such as: Did you find evidence that the clucker is vibrating?</p>	<p>Yes I hear the clucker. I feel the clucker vibrating. I cannot see the clucker vibrating.</p>	<p>What do you feel? Can you describe it?</p>

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			<p><i>Note to teacher: Allow students 4 minutes to use the clucker and look for evidence that it is vibrating when it is making a sound. Then stop the students and give them quiet time to record their evidence in column C on their handout.</i></p> <p><u>Students in groups of 4 and working in pairs:</u> <u>Testing the Tuning Fork: (10 min)</u> Now it is time to gather evidence from another sound maker—a tuning fork.</p> <p>This is how you use the tuning fork to make a sound.</p> <p><i>Note to teacher: Show the PowerPoint slide with the child using the tuning fork. Strike the tuning fork on the bottom of your shoe. Do not strike the tuning fork on hard surfaces as this will damage the tuning fork. Allow the students to hear the sound. You may have to ask groups to come near you to hear the sound. As you do, question them about seeing the vibrations. Students should not be able to see the vibrations.</i></p> <p>Now let's take a few minutes to practice making sounds with the tuning fork. Share your materials—everyone should get to try to make sounds with the tuning fork. Remember to pass the</p>		<p>Where were you touching the clucker when you felt that?</p>

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		<p>Make explicit links between science ideas and activities (during activity)</p>	<p>tuning fork around your group once you have made a sound. When you see the room light blink, stop making sounds and lay the tuning forks on your desks.</p> <p><i>Note to teacher: Allow 3-4 minutes for them to play with and make sounds with the tuning fork. Stop them periodically by turning the room light on and off to make sure they are sharing the clucker with their partner.</i></p> <p>Now it is time for you to test your predictions—gather evidence to find out if the tuning fork is vibrating or not.</p> <p>You will try to see if you can feel vibrations like we did on our throat and with the clucker. When you do this, touch the ends of the tuning fork very gently when it is making a sound. You and your partner may need to work together—one person make the sound with the tuning fork and the other gently touch the tuning fork. Then switch jobs.</p> <p><i>Note to teacher: Allow students 2-3 minutes to use the tuning fork and look for evidence that it is vibrating when it is making a sound. Then stop the</i></p>		

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		<p>Make explicit links between science ideas and activities (during activity)</p>	<p><i>students and give them quiet time to record their evidence in column C on their handout.</i></p> <p><i>As you monitor the teams, ask questions such as:</i></p> <p>Did you find evidence that the tuning fork is vibrating?</p> <p>What did you feel when you touched the tuning fork?</p> <p><i>Note to teacher: Allow students time to write or sketch their evidence in Column C for the sound maker.</i></p> <p><u>Optional:</u> additional evidence for the tuning fork and the clucker vibrating (use if students are not convinced that the sound makers are vibrating or if there is additional time): (7 min)</p> <p><u>Whole Class:</u></p> <p>How many of you think the tuning fork and clucker were vibrating?</p> <p>Should we get some more evidence?</p> <p>Even though we could not see the clucker and tuning fork vibrate we could feel it vibrate. Watch for additional evidence that they are</p>	<p>I found evidence. It made a sound. I heard it with my ears. It felt like it was vibrating. It tickled my fingers. It was vibrating.</p>	<p>What did you feel?</p> <p>Where were you touching the tuning fork?</p>

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			<p>vibrating as I demonstrate.</p> <p>Note to teacher: <u>Demonstrating with the clucker:</u> Place a few grains (10-12) of rice in the clucker (cup opened at the top) and make a sound with the clucker. The students should be able to see the rice move and vibrate. With really loud sounds, rice will jump out of the cup. Students will experience this and compare loud and quiet sounds in a later lesson.</p> <p>What do you see happening?</p> <p>Is this evidence that the clucker is vibrating?</p> <p>Note to teacher: <u>Demonstrating with the tuning fork:</u> Strike the tuning fork to make a sound and immediately place it on the surface of a cup of rice. Students should be able to see the rice move. You may want groups of students to come near you and observe so that they can see better. Alternately, you can place the tuning fork (after it is struck) into a shallow pan of water. Water will splash out all around.</p> <p>What do you see happening?</p>	<p>I see the rice moving in the cup.</p> <p>Yes, this is evidence.</p> <p>I see the rice moving in</p>	<p>How was the rice moving?</p> <p>What do you think caused the rice to move?</p> <p>How was the rice moving?</p>

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		Engage students in constructing explanations and arguments.	<p>did or did not vibrate?</p> <p>Can you show me what you did?</p> <p>What did you learn from doing that?</p>	<p>The rice bounced around in the cup when I made a sound with the clucker.</p> <p>The tuning fork splashed me!</p> <p>The tuning fork moved the rice around.</p>	<p>Why do you think the rice was bouncing around—any ideas?</p> <p>Do you think the tuning fork would splash if it wasn't making a sound?</p>
5 min	<p>Follow-up Activity 1</p> <p>Synthesize and Summarize</p> <p><u>Synopsis:</u> Students consider all sound makers they have used and think of evidence that the sound makers are vibrating.</p> <p><u>Main Science Ideas:</u> If an object is producing sound, it must be vibrating even if you cannot see the vibrations.</p>	<p>Make explicit links between science ideas and activities (after activity)</p> <p>Engage students in interpreting and reasoning about data and observations.</p> <p>Engage students in constructing explanations and arguments.</p>	<p>Who will share what they marked in the last column?</p> <p>Why did you mark that?</p> <p>How did you know the sound maker vibrated/didn't vibrate?</p> <p>What evidence did you have for your decision?</p> <p><i>Note to teacher: Students should have evidence supporting that each sound maker was vibrating. If some students are not convinced, do the optional section to give them additional evidence. Ask challenge questions to help these students understand that all sound makers vibrate even though we may not be able to see the vibrations. Think about what we did today and in the previous lesson. We made sounds</i></p>	<p>I put yes.</p> <p>I put no.</p> <p>Because it vibrated.</p> <p>I felt the vibrations.</p> <p>I saw the water and the rice move. <i>(for those that did the optional section)</i></p>	<p>What were you thinking about when you wrote yes?</p> <p>Why did you write no?</p>

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		Engage students in making connections by synthesizing and summarizing key ideas	<p>with</p> <ul style="list-style-type: none"> • a cup and rubber band • a ruler and a book • your voice • a clucker • a tuning fork <p>How many of these sound makers made vibrations? Hold up your fingers to show me 0, 1, 2, 3, 4, or 5.</p> <p><i>NOTE to teacher: Use this strategy to get a quick assessment of whether students are getting the idea that all of the sound makers vibrate. Show the pictures of the sound makers from the PowerPoint as you talk about them.</i></p> <p>What was your evidence that there was something moving back and forth with the clucker?</p> <p>With the rubber band and cup?</p> <p>With your voice?</p> <p>With the tuning fork?</p>	<p>(Students should respond that all sound makers make vibrations)</p> <p>I felt the cup and string vibrate. I saw the rice move in the cup.</p> <p>I felt my throat vibrate.</p> <p>I felt the tuning fork vibrate. I saw the rice move and</p>	<p><u>Challenging student ideas:</u> Which sound maker do you think didn't vibrate? What was your evidence? How does what you feel relate to vibrations? What did others find?</p>

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		Engage students in using and applying new science ideas in a variety of ways and contexts.	<p>What about other sound makers that we have not seen, do you think they vibrate? Like a horn, a whistle, or a cell phone?</p> <p><i>Note to teacher: Show the PowerPoint slide with additional sound makers.</i></p> <p>Do all sound makers vibrate? Let's name a bunch of things that make sound. Do you think all of these vibrate?</p>	<p>the water splash. Yes Just because you can't see vibrations doesn't mean they are not there.</p> <p>To make sound—the object has to vibrate.</p>	
2 min	<p>Link to Next Lesson</p> <p><u>Synopsis:</u> Students return to the Unit Central question and begin to answer it with sound makers vibrate. They share their ideas about how the sound gets from the sound maker to the ear.</p>	<p>Link science ideas to other science ideas (links to next lesson)</p> <p>Ask questions to elicit student ideas and predictions</p>	<p>We are going to learn more about sound tomorrow. Remember our Unit Central Question: Why do we hear sound? (<i>Show the last PowerPoint slide</i>)</p> <p>Do you have some ideas now?</p> <p>We know that we hear sound because something vibrates but how does that sound get to us? To our ears?</p>	<p>We hear sound because it vibrates.</p> <p>The sound moves to your ears. The air carries the sound.</p>	<p>What vibrates? What is the "it"?</p> <p>Do you know how that happens?</p>