

Sound

Lesson 2a: More Soundmakers: Do They Vibrate?

| | | |
|--|-------------------------------------|---|
| Grade 1 | Length of lesson: 40 minutes | Placement of lesson in unit: 2a of 7 lessons on sound |
| Unit central question: Why do we hear sound? | | Lesson focus questions: Do soundmakers always vibrate? What is our evidence? |
| Main learning goal: To produce sound, objects must move back and forth quickly (vibrate). | | |
| Science content storyline: All objects produce sounds by vibrating or moving back and forth quickly. Sometimes we can see these vibrations, and sometimes we can't. Even if we can't see an object vibrating, we may be able to feel the vibrations or see other objects move when a vibrating soundmaker touches them. | | |
| Ideal student response to the focus questions: If something makes a sound, it must be vibrating. Even if we can't see the vibrations, we might be able to feel them or see other objects move when a vibrating soundmaker touches them. | | |

Preparation

Materials Needed

- Science notebooks
- Chart paper and markers
- Ruler, 12" (from lesson 1a)
- Rubber-band and plastic container (from lesson 1b)
- Clucker (1 per pair) (see Ahead of Time for assembly instructions)
 - 1 clear-plastic cup (9 oz) with a hole in the bottom (Solo cups work well)
 - 18" of string
 - 2 small paper clips or toothpicks
 - Small piece of sponge
 - **Optional:** feathers, googly eyes, and orange foam (to make the clucker look like a chicken)
- **Optional extension activity:** 10–12 grains of rice

Student Handouts

- 1.1 Soundmakers, Part 1 (from lesson 1a)
- 1.2 Soundmakers, Part 2 (from lesson 1b)
- 2.1 More Soundmakers: Do They Vibrate? (1 per student)

Ahead of Time

- Review the Sound Content Background Document.
- Assemble one clucker for each pair of students. (You may use another soundmaker, but the clucker will capture students' interest.)
- **Clucker assembly instructions:** Make a hole in the base of the plastic cup and thread the string through the hole. Tie a paper clip (or toothpick) to each end of the string to secure the string to the cup. The string should extend about 18 inches from the bottom of the cup. (See pictures below.) Immediately before the lesson begins, moisten the sponges.
- **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. Also orient them to the data table they'll be using. If time permits, have students assemble their own cluckers. Introduce and demonstrate the word *hum*. Review the words *evidence*, *vibrate/vibrating/vibrations*, *columns*, *rows*, and *predict/prediction*.

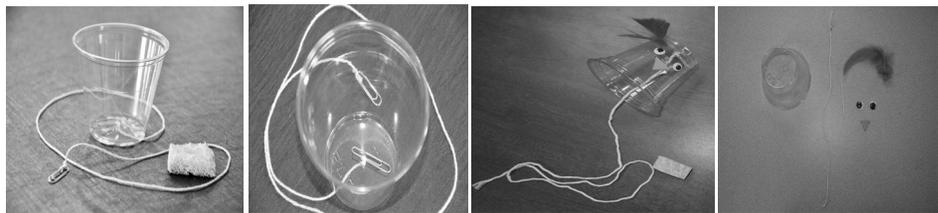


Photo courtesy of Cal Poly Pomona and BSCS

Lesson 2a General Outline

| Time | Phase of Lesson | How the Science Content Storyline Develops |
|--------|---|--|
| 4 min | Link to previous lessons: The teacher engages students in reviewing the evidence of sound they collected in previous lessons. | <ul style="list-style-type: none"> An object must vibrate to make a sound we can detect with our senses. In addition to hearing a sound, seeing and feeling vibrations are evidence that an object is making a sound. |
| 2 min | Lesson focus questions: Students consider whether they can always see vibrations when objects make sounds. Then the teacher introduces the focus questions, <i>Do soundmakers always vibrate? What is our evidence?</i> | |
| 6 min | Setup for activity: The teacher introduces two new soundmakers, and students consider the kind of evidence they could collect to help them determine whether each soundmaker is vibrating. Then they predict whether the soundmakers will vibrate when they make sounds. | <ul style="list-style-type: none"> An object must vibrate to make a sound we can detect with our senses. In addition to hearing a sound, seeing and feeling vibrations are evidence that an object is making a sound. Sometimes we aren't able to see an object vibrating when it makes a sound, so we need to look for other kinds of evidence. |
| 15 min | Activity: Working in pairs, students test their predictions by gathering evidence that tells them whether soundmakers vibrate when they make sounds. Then students record their evidence on their data tables. | <ul style="list-style-type: none"> We can collect evidence that helps us know whether a soundmaker is vibrating, even though we can't see the vibrations. For example, we may be able to feel the object vibrating or see other objects move or vibrate when the soundmaker touches them. |
| 6 min | Follow-up to activity: Students share the evidence they collected to help them determine whether soundmakers vibrate when they make sounds. | <ul style="list-style-type: none"> If an object produces a sound, it must be vibrating. We can gather evidence that tells us whether a soundmaker is vibrating, even if we can't see the vibrations. For example, we may be able to feel an object vibrate or see other objects move or vibrate when the soundmaker touches them. |
| 6 min | Synthesize/summarize today's lesson: The teacher engages students in synthesizing and summarizing key ideas from the lesson as they consider whether all soundmakers vibrate, even if the vibrations aren't visible. | |
| 1 min | Link to next lesson: The teacher previews the next lesson in which students investigate another soundmaker and collect evidence to help them answer the focus questions. | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|-------|---|--|--|-------------------------------|------------------------------------|
| 4 min | <p>Link to Previous Lessons</p> <p>Synopsis: The teacher engages students in reviewing the evidence of sound they collected in previous lessons.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> An object must vibrate to make a sound we can detect with our senses. In addition to hearing a sound, seeing and feeling vibrations are evidence that an object is making a sound. | Engage students in analyzing and interpreting data and observations. | <p>Show slides 1 and 2.</p> <p>In our last lesson, we made sounds with two different soundmakers: a ruler and a rubber band stretched across a plastic container.</p> <p>NOTE TO TEACHER: <i>Show students the ruler and the container with a rubber band stretched across it.</i></p> <p>How did you know the <i>ruler</i> was making a sound when you plucked it? What evidence did you find?</p> <p>NOTE TO TEACHER: <i>Have students locate handout 1.1 (Soundmakers, Part 1) and review the evidence they recorded.</i></p> <p>Turn and Talk: Look at the evidence you recorded on your data tables last time. Then turn to your elbow partner and share one piece of evidence you found that the ruler was making a sound when you plucked it. Be prepared to share your evidence with the class.</p> <p>ELL support: During the lesson preview, let ELL students know you'll be asking them to share their ideas with the class (if time allows). Give them an opportunity to practice answering the Turn and Talk question. Then make sure to ask them to share their ideas during the actual lesson.</p> | | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|--|--|--|---|
| | | <p>Ask questions to probe student ideas and predictions.</p> <p>Ask questions to challenge student thinking.</p> | <p>Let students know it's OK to repeat someone else's ideas. This is good practice and will make their thinking visible.</p> <p>Whole-class share-out: Who would like to share? What evidence did you find that the ruler was making a sound?</p> <p>NOTE TO TEACHER: <i>As students share their evidence, record it on chart paper. Ask probe and challenge questions to make student thinking visible.</i></p> <p>Now let's talk about the evidence we found for the rubber band stretched across the container.</p> <p>NOTE TO TEACHER: <i>Have students</i></p> | <p>I could hear the sound.</p> <p>The ruler made a thunkity sound when it was moving up and down.</p> <p>I could see the vibrations as the ruler went up and down.</p> <p>I could feel the vibrations with my hand when I was holding the ruler down on the table.</p> | <p>What did the ruler sound like?</p> <p>What did the ruler look like when it was making a sound?</p> <p>What did it feel like?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|--|--|---|---|
| | | <p>Ask questions to probe student ideas and predictions.</p> <p>Ask questions to challenge student thinking.</p> | <p><i>locate handout 1.2 (Soundmakers, Part 2) and review the evidence they recorded.</i></p> <p>How could you tell that the <i>rubber band</i> was making a sound when you plucked it? What evidence did you find?</p> <p>NOTE TO TEACHER: <i>As students share their evidence, record it on chart paper. Ask probe and challenge questions to make student thinking visible.</i></p> <p>NOTE TO TEACHER: <i>Guide students</i></p> | <p>When we plucked the rubber band, I could feel the container shake, too.</p> <p>It was bouncing up and down.</p> <p>We heard it go <i>boingy-boingy</i>.</p> <p>It was springing up and down.</p> <p>Yes, both soundmakers bounced up and down, and we could feel both of them vibrate.</p> | <p>What did the rubber band look like?</p> <p>What did you hear?</p> <p>Did you see the rubber band vibrate?</p> <p>Did this happen with both soundmakers? [Note: Ask this question each time there is a different response.]</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|-------|--|--|---|--|------------------------------------|
| | | | <p><i>toward a consensus that they could see both the ruler and the rubber band vibrating when they made sounds. Hold up each soundmaker as you ask the following questions.</i></p> <p>Let's have a show of hands.</p> <p>Who agrees that you could see the ruler vibrating when it made a sound?</p> <p>Who agrees that you could see the rubber band vibrating when it made a sound?</p> <p>So do we all agree that we could see both the ruler and the rubber band vibrate when they made sounds?</p> | | |
| 2 min | <p>Lesson Focus Questions</p> <p>Synopsis: Students consider whether they can always see vibrations when objects make sounds. Then the teacher introduces the focus questions, <i>Do soundmakers always vibrate? What is our evidence?</i></p> | Ask questions to elicit student ideas and predictions. | <p>Show slide 3.</p> <p>Can we always see vibrations when objects make sounds? Think about this for a moment.</p> <p>NOTE TO TEACHER: <i>Just have students think about this question. Don't ask for responses at this point.</i></p> <p>So what if don't see your mom and dad when you first walk into your house? Does that mean they aren't there?</p> <p>What other evidence might you find that</p> | No. They could still be there but in another room. | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|--|---|--|------------------------------------|
| | | <p>Make explicit links between science ideas and activities before the activity.</p> <p>Set the purpose with a <u>focus question</u> or goal statement.</p> | <p>tells you they're at home even if you don't see them?</p> <p>Show slide 4.</p> <p>Today we'll investigate two new soundmakers and look for evidence that they vibrate when they make sounds.</p> <p>Our focus questions are <i>Do soundmakers always vibrate? What is our evidence?</i></p> <p>Write these questions in your science notebooks and draw a box around them.</p> <p>NOTE TO TEACHER: <i>Write the focus questions on the board for students to refer to throughout the lesson.</i></p> <p>ELL support: Preview these focus questions with ELL students to make sure</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>I might find my after-school snack on the table.</p> | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|-------|--|---|---|--|--|
| | | | they understand them. | | |
| 6 min | <p>Setup for Activity</p> <p>Synopsis: The teacher introduces two new soundmakers, and students consider the kind of evidence they could collect to help them determine whether each soundmaker is vibrating. Then they predict whether the soundmakers will vibrate when they make sounds.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • An object must vibrate to make a sound we can detect with our senses. In addition to hearing a sound, seeing and feeling vibrations are evidence that an object is making a sound. • Sometimes we aren't able to see an object vibrating when it makes a sound, so we need to look for other kinds of evidence. | <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 before the activity.</p> <p>Highlight key science ideas and focus question throughout.</p> <p>Ask questions to elicit student ideas and predictions.</p> | <p>Show slide 5.</p> <p>One of the soundmakers we'll explore today is called a <i>clucker</i>. The other soundmaker is <i>you!</i></p> <p>NOTE TO TEACHER: <i>Point out the images on the slide.</i></p> <p>Our goal for today's investigation is to find evidence that tells us whether these soundmakers vibrate when they make sounds. The evidence we collect will help us answer our focus questions, <i>Do soundmakers always vibrate? What is our evidence?</i></p> <p>Show slide 6.</p> <p>What kinds of evidence could we look for that would help us know whether our two new soundmakers vibrate when they make sounds? What ideas do you have?</p> <p>ELL support: Give ELL students time to practice answering this question during the lesson preview.</p> <p>NOTE TO TEACHER: <i>Students may come up with a variety of ways to tell whether an object is vibrating. If they don't mention touching the soundmakers</i></p> | <p>We could listen to the sounds.</p> <p>We could look at the soundmakers to see if they're vibrating.</p> | <p>Can you describe what you might hear?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|---|--|--|------------------------------------|
| | | <p>Ask questions to elicit student ideas and predictions.</p> <p>Highlight key science ideas and focus question throughout.</p> | <p>As I mentioned earlier, the second picture on the handout is called a <i>clucker</i>. The clucker represents a chicken because it makes a clucking sound like a chicken.</p> <p>In a moment, you'll predict whether our soundmakers will vibrate when they make sounds. Then you'll write your predictions in column B of the handout.</p> <p>Who knows what it means to make a prediction?</p> <p>ELL support: Although you should already have introduced the words <i>predict</i> and <i>prediction</i> in the previous lesson preview, you may want to have ELL students write them in their notebooks and/or add them to a picture dictionary. You might also want to post the words and their meanings on a word wall for students to refer to throughout the unit.</p> <p>Good answer! A <i>prediction</i> is what you think will happen. So for each soundmaker on the handout, you'll predict whether it will vibrate when it makes a sound.</p> <p>If you think the soundmaker will vibrate, write the word <i>yes</i> in column B next to the picture of the soundmaker. If you think it won't vibrate, write the word <i>no</i> in column B next to the picture.</p> | <p>Making a prediction is when you use what you already know to think about something that might happen.</p> | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|--|--|-------------------------------|------------------------------------|
| | | Ask questions to elicit student ideas and predictions. | <p>NOTE TO TEACHER: <i>Highlight the correct column on the slide and emphasize that students should write their predictions for each soundmaker on the corresponding row.</i></p> <p>Your predictions for both soundmakers might be the same, or they might be different. For example, you might predict that one soundmaker will vibrate and the other won't. Or you might predict that both will vibrate. You can't make a "wrong" prediction, but you should have good reasons for your ideas. I may ask you to explain your reasons, so be ready to give them when you share your predictions.</p> <p>Now I'd like you to write your predictions for the clucker. Do you think it will vibrate when it makes a sound? Write yes or no in column B next to the picture of the clucker.</p> <p>NOTE TO TEACHER: <i>Hold up a clucker and ask students whether it will vibrate. Then direct them to write their predictions in column B next to the picture of the clucker.</i></p> <p>Next, let's think about the other soundmaker—you! Do you think you'll vibrate when you make a sound? Write</p> | | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|---|--|--|---|
| | | Ask questions to probe student ideas and predictions. | <p>yes or no in column B next to the picture of the student.</p> <p>NOTE TO TEACHER: <i>Gesture toward students and ask whether they'll vibrate when they make a sound. Then direct them to write their predictions in column B next to the picture of the student.</i></p> <p>Show slide 8.</p> <p>Whole-class share-out: Who would like to share your predictions? First, do you think you'll vibrate when you make a sound? Use the sentence starter on the slide when you share your prediction.</p> <p><i>I predict that I [will/won't] vibrate when I make a sound.</i></p> <p>NOTE TO TEACHER: <i>Display the handout on a document reader and record students' predictions on the data table. (Or record them on chart paper.) Ask students to explain the reasons for their predictions and probe their thinking.</i></p> <p>ELL support: During the lesson preview, let ELL students know you'll be asking them to share their predictions with the class (if time permits). Give them an opportunity to practice making predictions. Then make sure to ask them to share their ideas during the actual</p> | <p>I predict that I <i>won't</i> vibrate when I make a sound. I don't think a kid can vibrate!</p> <p>Because I can stand still when I make a sound.</p> | <p>Why don't you think you can vibrate?</p> <p>Does anyone have a different prediction or reason?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|---|---|--|---|
| | | Ask questions to probe student ideas and predictions. | <p>lesson. Let students know it's OK to repeat someone else's ideas. This is good practice and will make their thinking visible.</p> <p>What did you predict about the clucker? Do you think it will vibrate when it makes a sound? Use the sentence starter on the slide when you share your prediction.</p> <p><i>I predict that the clucker [will/won't] vibrate when it makes a sound.</i></p> <p>NOTE TO TEACHER: <i>As students share their predictions, record them on the data table displayed on the document reader (or on chart paper). Ask students to explain the reasons for their predictions and probe their thinking.</i></p> | <p>I predict that the clucker <i>won't</i> vibrate when it makes a sound.</p> <p>Because it's just a cup and a string.</p> <p>Strings and cups don't make noises, so they can't vibrate.</p> | <p>Why do you think the clucker won't vibrate?</p> <p>Tell me why you think it won't vibrate because it's just a cup and a string.</p> <p>Does anyone have a different prediction or reason to share?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|--------|--|---|---|-------------------------------|------------------------------------|
| 15 min | <p>Activity</p> <p>Synopsis: Working in pairs, students test their predictions by gathering evidence that tells them whether soundmakers vibrate when they make sounds. Then students record their evidence on their data tables.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> We can collect evidence that helps us know whether a soundmaker is vibrating, even though we can't see the vibrations. For example, we may be able to feel the object vibrating or see other objects move or vibrate when the soundmaker touches them. | <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 in a variety of ways and contexts.</p> | <p>Show slide 9.</p> <p>Now we'll test our predictions about these soundmakers! First, let's find out whether you vibrate when you make a sound.</p> <p>NOTE TO TEACHER: <i>Have students pair up with an elbow partner. Then walk them through the instructions on the slide. Demonstrate how to make a sound by humming with your mouth closed. Then direct students to take turns humming. While one partner hums, the other partner should look carefully for evidence of vibrations. Give pairs 1 minute to hum and observe each other before discussing their observations as a class. Allow a total of 6 minutes for the investigation and discussion.</i></p> <p>OK. I want everyone to face your partner and take turns humming. As one partner hums, the other partner should look carefully to see if something is vibrating. What part of the body is the sound coming from? Can you see any vibrations there?</p> <p>ELL support: Some ELL students may not be familiar with the English word <i>hum</i>, so make sure to introduce it during the lesson preview and demonstrate what it means.</p> | | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|---|---|--|---|
| | | <p>Ask questions to probe student ideas and thinking.</p> <p>Ask questions to challenge student thinking.</p> | <p>Whole-class share-out: Did you see any vibrations when your partner was humming? What evidence did you find?</p> <p>NOTE TO TEACHER: <i>The expectation is that students won't be able to see their partner vibrate when he or she hums. If some students insist they can see vibrations, probe and challenge their thinking by asking what part of their partner's body was moving when he or she was humming. Then ask if that movement matches the definition of vibrate (to move back and forth quickly).</i></p> <p><i>It's important that students understand that they can gather other kinds of evidence that their partner is vibrating, even if they don't see the vibrations. Students who predicted that their partner would vibrate might be reluctant to admit that they can't see the vibrations. Assure them that it's OK if they can't see anything vibrating. Then emphasize that they need to act like scientists and find other kinds of evidence.</i></p> | <p>I think I saw vibrations.</p> <p>My partner was moving around.</p> <p><i>Vibrate means "to move back and forth quickly," so I guess I didn't see any vibrations after all.</i></p> <p>I didn't see any vibrations.</p> <p>I think my partner's throat was moving.</p> | <p>What did the vibrations look like? What did you see moving?</p> <p>Did this movement match our definition for the word <i>vibrate</i>? What does <i>vibrate</i> mean?</p> <p>Does anyone else have an observation to share?</p> <p>Can you say more about your</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|-----------------|--|--|--|
| | | | <p>How could you collect more evidence that would help you figure out whether you vibrate when you hum?</p> <p>Show slide 10.</p> <p>That's a great idea! Let's see if we can feel any vibrations when we hum.</p> <p>NOTE TO TEACHER: <i>Read through the instructions on the slide. Then have students begin humming. Ask them if they can feel any vibrations. You may want to allow students to place their hands lightly on their partners' throats and see if they can feel any vibrations. This will give them a broader experience and help them gather more evidence.</i></p> | <p>She was swallowing.</p> <p>Maybe we could feel the vibrations like we did with the ruler and the rubber band.</p> | <p>partner's throat moving? Describe how it was moving.</p> <p>How does swallowing compare to the way the rubber band vibrated in our last lesson?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|-----------------|--|--|---|
| | | | <p>Whole-class share-out: So what did you feel when you hummed with your hand on your throat?</p> <p>Do you think this is evidence that your throat is vibrating?</p> <p>Show slide 11.</p> <p>OK, record this evidence on your data tables under column C for the row with the picture of the student.</p> <p>NOTE TO TEACHER: <i>Point to the correct column and row on the data table where students should record their evidence. All students should have found some evidence of vibrations when they hummed.</i></p> <p>Show slide 12.</p> | <p>I could feel my throat moving.</p> <p>I felt humming.</p> <p>I felt buzzing.</p> <p>Yes!</p> <p>Because I could feel my throat moving back and forth quickly, just like our definition of <i>vibrate</i>!</p> | <p>Why do you think this is evidence?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|-----------------|---|-------------------------------|------------------------------------|
| | | | <p>Next, let's see if we can find any evidence that our cluckers vibrate when they make a sound.</p> <p>Notice how the girl on the slide is pulling on the string to make a sound with the clucker. That's what you and your partner will take turns doing.</p>  <p>Watch me closely as I demonstrate how to make a sound with the clucker.</p> <p>NOTE TO TEACHER: <i>Demonstrate making a sound with the clucker. Show students how to squeeze their fingers around both sides of the sponge, with the string positioned in the middle. Following</i></p> | | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|-----------------|---|-------------------------------|------------------------------------|
| | | | <p><i>the demo, distribute cluckers to each pair of students. Make sure the sponges are premoistened.</i></p> <p>ELL support: Preview this investigation with ELL students so they know what's expected of them and can participate more fully during the lesson. This may give them an opportunity to help other students during the activity, a role they don't typically find themselves in.</p> <p>Show slide 13.</p> <p>In a moment, you and your partner will take turns making sounds with your clucker. Look carefully to <i>see</i> if the string and the cup are vibrating.</p> <p>If you don't see any vibrations, try touching the clucker gently while it's making a sound, like we did with our throats. Touch the cup and the string as your partner makes a sound. Then have your partner touch the cup and string while you make a sound. Do you <i>feel</i> anything vibrating?</p> <p>If you need help, just raise your hand, and I'll come to you.</p> <p>NOTE TO TEACHER: <i>Give pairs 3 or 4 minutes to make sounds with the clucker and look for evidence that it's vibrating.</i></p> | | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|---|--|---|--|
| | | Ask questions to probe student ideas and predictions. | <p><i>You may want to turn the room light on and off as a signal for students to take turns. As you circulate around the room, make sure students are using the soundmaker correctly. Remind them to touch the clucker to see if they can feel vibrations even if they can't see them. As you circulate from pair to pair, ask probe questions to make student thinking visible.</i></p> <p>Are you finding any evidence that the clucker is vibrating?</p> <p>Show slide 14.</p> <p>Now record your evidence on the data table in column C. What did you see and</p> | <p>Yes, I can hear the clucker making a sound.</p> <p>I can feel the clucker vibrating.</p> <p>I can't see the clucker vibrating.</p> | <p>What part of the clucker do you feel vibrating? Can you describe it?</p> <p>Where were you touching the clucker when you felt that?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|--|--|---|---|
| | | <p>Ask questions to probe student ideas and predictions.</p> <p>Ask questions to challenge student thinking.</p> | <p>feel that told you the clucker was vibrating? You can also make a sketch on your handout if you'd like. Be prepared to share your evidence with the class.</p> <p>NOTE TO TEACHER: <i>Point to the correct column and row on the data table where students should record their evidence. All students should have found some evidence of vibrations when they made sound with the clucker.</i></p> <p>Individual work time.</p> <p>Whole-class share-out: What evidence did you find that told you the clucker was vibrating? What senses did you use?</p> <p>NOTE TO TEACHER: <i>The expectation is that students won't be able to see their cluckers vibrate. If some students insist they can see vibrations, probe and challenge their thinking by asking if the movement they saw matches the definition of vibrate (to move back and forth quickly).</i></p> <p><i>It's important that students understand that they can gather other kinds of evidence that the clucker is vibrating, even if they don't see the vibrations. Students who predicted that their cluckers would vibrate might be reluctant to admit that they can't see the vibrations. Assure</i></p> | <p>I could feel the string move back and forth when I touched it.</p> <p>I could feel the string vibrate when I touched it.</p> | <p>Can you say this using our science word for moving back and forth?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|-----------------|--|-------------------------------|------------------------------------|
| | | | <p><i>them that it's OK if they can't see anything vibrating. Then emphasize that they need to act like scientists and find other kinds of evidence.</i></p> <p>Optional extension activity (7 min)</p> <p>NOTE TO TEACHER: <i>Engage students in the following activity if they aren't convinced that the soundmakers were vibrating, or if you have time for another activity.</i></p> <p>How many of you could see the clucker vibrating when it made a sound? How many of you felt it vibrate?</p> <p>So even though you couldn't see the clucker vibrate, several of you could feel the vibrations. Let's see if we can find more evidence that the clucker vibrates when it makes a sound.</p> <p>NOTE TO TEACHER: <i>Place 10–12 grains of rice in the cup and make a sound with the clucker by pulling on the string. Students should be able to see the rice vibrate. With really loud sounds, the rice may bounce around or jump out of the cup.</i></p> <p>What do you see happening with the rice when I make a sound with the clucker?</p> | | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|-----------------|---|--|--|
| | | Engage students | <p>Is this evidence that the clucker is vibrating?</p> <p>NOTE TO TEACHER: <i>Show students that the clucker doesn't move the rice if it isn't vibrating and making a sound. Give them time to write or sketch this additional evidence in column C of their data tables.</i></p> <p>Earlier you predicted whether our soundmakers would vibrate when they made a sound. Then you tested your predictions by using these soundmakers and collecting evidence.</p> <p>Show slide 15.</p> <p>Now let's think about what actually happened. Did you vibrate when you made a sound? Did the clucker vibrate? How do you know?</p> | <p>I can see the rice moving in the cup.</p> <p>It's jumping around and vibrating.</p> <p>The cup is vibrating and is touching the rice so it moves.</p> <p>Yes, because we can see the rice moving even if we can't see the cup moving.</p> | <p>How is the rice moving?</p> <p>What do you think is causing the rice to move?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|-------|---|--|---|-------------------------------|------------------------------------|
| | | in analyzing and interpreting data and observations. | <p>Use the evidence on your data tables to answer the question in column D for each soundmaker. If the soundmaker vibrated, write <i>yes</i> under column D on the row for that soundmaker. If it didn't vibrate, write <i>no</i>.</p> <p>It's OK if your answer in column D doesn't match your prediction in column B.</p> <p>You'll have an opportunity to share your answers with the class afterward, so be ready to explain your reasons for answering the way you did.</p> <p>ELL support: During the lesson preview, let ELL students know you'll be asking them to share their ideas with the class (if time permits). Give them an opportunity to practice answering the question on the handout. Then make sure to ask students to share their ideas during the actual lesson. Let them know it's OK to repeat someone else's ideas. This is good practice and will make their thinking visible.</p> | | |
| 6 min | <p>Follow-Up to Activity</p> <p>Synopsis: Students share the evidence they collected to help them determine whether soundmakers</p> | Engage students in analyzing and interpreting data | <p>Show slide 16.</p> <p>Who would like to share how you answered the question for each soundmaker in column D on your data</p> | | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|---|---|--|--|---|
| | <p>vibrate when they make sounds.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • If an object produces a sound, it must be vibrating. • We can gather evidence that tells us whether a soundmaker is vibrating, even if we can't see the vibrations. For example, we may be able to feel an object vibrate or see other objects move or vibrate when the soundmaker touches them. | <p>and observations.</p> <p>Engage students in constructing explanations and arguments.</p> | <p>tables?</p> <p>Let's talk about the clucker first. What did you write on your handouts?</p> <p>Did the clucker vibrate?</p> <p>How do you know?</p> <p>What evidence did you collect?</p> | <p>I said yes.</p> <p>I could feel the clucker vibrate when it made a sound.</p> <p>The clucker tickled my hand when I pulled the sponge down the string. I think those were vibrations.</p> <p>I put no for the clucker.</p> <p>Because I didn't see the string or the cup vibrating.</p> | <p>Why did you answer yes? How do you know the clucker vibrated?</p> <p>What evidence did you collect?</p> <p>Did anyone have a different answer?</p> <p>Why did you write no? How do you know the clucker didn't vibrate?</p> <p>Did you collect</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|-----------------|---|---|---|
| | | | <p>Now let's talk about you! Did you vibrate when you hummed?</p> <p>How do you know?</p> <p>What evidence did you collect?</p> | <p>I couldn't see the string or the cup vibrating either, but I wrote yes because I felt them vibrate.</p> <p>For optional activity: I saw the rice bounce around in the cup when the clucker made a sound, so I wrote yes on the handout.</p> <p>I put yes.</p> | <p>any other evidence?</p> <p>Do others agree or disagree? Do you have anything to add?</p> <p>For optional activity: Why do you think the rice was bouncing around? Any ideas?</p> <p>What evidence did you find that some part of your body was vibrating when</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|-------|---|---|--|--|------------------------------------|
| | | Ask questions to challenge student thinking. | NOTE TO TEACHER: <i>Students should have evidence that each soundmaker vibrated when it made a sound. If some students aren't convinced, engage them in the optional extension activity with the rice grains so they can collect additional evidence. Ask challenge questions to help these students understand that all soundmakers vibrate even though they may not be able to see the vibrations.</i> | I could feel the vibrations when I put my hand on my throat. | you hummed? |
| 6 min | <p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: The teacher engages students in synthesizing and summarizing key ideas from the lesson as they consider whether all soundmakers vibrate, even if the vibrations aren't visible.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • If an object produces a sound, it must be vibrating. • We can gather evidence that tells us whether a soundmaker is vibrating, even if we can't see the vibrations. For example, we may be able to feel an object vibrate or see other objects move or | <p>Highlight key science ideas and focus question throughout.</p> <p>Engage students in making connections by synthesizing and summarizing key science ideas.</p> <p>Engage students in using and applying new science ideas in a variety of ways and contexts.</p> | <p>Show slide 17.</p> <p>In this lesson, we've been thinking about the focus questions, <i>Do soundmakers always vibrate? What is our evidence?</i></p> <p>So far in this unit, we've gathered evidence that soundmakers like the ruler, the rubber band, the clucker, and you vibrate when making a sound.</p> <p>Based on this evidence, do you think all soundmakers vibrate?</p> <p>To help us answer this question, let's name some things that make sound.</p> <p>Do you think all of these things vibrate?</p> | <p>A car horn.</p> <p>An airplane.</p> <p>A train whistle.</p> <p>Yes.</p> | |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|------------------------------|---|---|------------------------------------|
| | vibrate when the soundmaker touches them. | Summarize key science ideas. | <p>Today we learned that even if we can't see an object vibrate, we can look for other kinds of evidence to help us.</p> <p>For example, you couldn't see vibrations when you hummed or when you made sounds with the clucker, so you had to look for other kinds of evidence.</p> <p>What other evidence did you find to help you figure out whether these soundmakers were vibrating when they made sounds?</p> <p>Who can summarize one key idea we've learned so far about sounds and vibrations?</p> | <p>Just because you can't see vibrations doesn't mean they aren't there. Maybe they're just too small to see.</p> <p>We felt vibrations with our fingers sometimes.</p> <p>For optional activity: We could see the vibrations making something else move, like the rice in the cup.</p> <p>To make sounds,</p> | What is your evidence? |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|-------|---|---|--|--|---|
| | | Highlight key science ideas and focus question throughout. | <p>Show slide 18.</p> <p>That’s right! One important science idea we’ve learned about is that objects make sounds by vibrating or moving back and forth quickly.</p> <p>We can detect these vibrations using our senses, like hearing seeing, or feeling. Even if we can’t see an object vibrating, we may be able to feel the vibrations or see other objects moving when the soundmaker touches them.</p> | objects vibrate. | |
| 1 min | <p>Link to Next Lesson</p> <p>Synopsis: The teacher previews the next lesson in which students investigate another soundmaker and collect evidence to help them answer the focus questions.</p> | <p>Link science ideas to other science ideas.</p> <p>Highlight key science ideas and focus question throughout.</p> <p>Ask questions to elicit student ideas and predictions.</p> | <p>Show slide 19.</p> <p>In our next lesson, we’ll investigate another soundmaker and gather more information to help us answer our focus questions, <i>Do soundmakers always vibrate? What is our evidence?</i></p> <p>Do you think this new soundmaker will vibrate when it makes a sound?</p> | <p>Yes, I think it will vibrate, because we can only hear sound when something vibrates.</p> <p>The soundmaker</p> | <p>What do you mean by “it”? What will vibrate?</p> |

| Time | Phase of Lesson and How the Science Content Storyline Develops | STeLLA Strategy | Teacher Talk and Questions | Anticipated Student Responses | Possible Probe/Challenge Questions |
|------|--|-----------------|----------------------------|-------------------------------|------------------------------------|
| | | | | will vibrate. | |