Sound
Lesson 5b: Where Does Sound Go?

Grade 1	**Length of lesson:** 40 minutes	**Placement of lesson in unit:** 5b of 7 lessons on sound
Unit central question: Why do we hear sound?		**Lesson focus questions:** When something makes a sound, where does the sound go? What is our evidence?
Main learning goal: Sound moves in all directions away from the source.		
Science content storyline: When something makes a sound, the sound moves away from the soundmaker in all directions. The sound doesn't stop moving when we detect it.		
Ideal student response to the focus questions: When something makes a sound, the sound moves away from the soundmaker in all directions. The sound doesn't stop moving when a person hears it.		

Preparation

Materials Needed
- Science notebooks
- Chart paper and markers
- Bell
- Stepladder

Student Handouts
- 5.2 Which Way Will the Sound Move Now? (1 per student)

Ahead of Time
- Review the Sound Content Background Document.
- On chart paper, create a chart titled "Where Did the Sound Go Today?" Then draw a bell in the middle with stick figures representing students positioned at different distances around the bell.
- Ask the school custodian (or principal) to join in the investigation by standing on a stepladder to see whether sound travels up high.
- **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 students to the handout and how to complete it. Reinforce the concept that air plays an important role in our ability to hear sound. Review vocabulary words as needed.

Lesson 5b General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
3 min	**Link to previous lesson:** The teacher engages students in reviewing what happened when the bell rang in the previous investigation and where the sound went.	• Sound begins at a soundmaker and travels away from it in all directions.
1 min	**Lesson focus questions:** The teacher reviews the focus questions from the previous lesson: *When something makes a sound, where does the sound go? What is our evidence?*	
8 min	**Setup for activity:** The teacher introduces a new handout, and students draw pictures to predict where they think the sound will go this time when the bill rings.	• Sound begins at a soundmaker and travels away from it in all directions.
10 min	**Activity:** Students test their predictions in a large room. When the teacher rings the bell, students consider where the sound goes, including up and down.	
8 min	**Follow-up to activity:** After a brief discussion about what happened when the bell rang, students revise the drawings they made earlier to show their predictions. Then students share their ideas about where sound goes and support their claims with evidence from the bell investigation.	
8 min	**Synthesize/summarize today's lesson:** Students share their discoveries from the bell investigation, and the teacher illustrates them on a class drawing. Then students answer the focus questions based on their new understandings about the movement of sound.	• Sound begins at a soundmaker and travels away from it in all directions. • We can draw vibrations in the air to show that sound moves away from a soundmaker in all directions.
2 min	**Link to next lesson:** The teacher summarizes key science ideas from the lesson and announces that next time, students will investigate how their ears help them hear sound. Then the teacher elicits initial ideas from students.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
3 min	**Link to Previous Lesson** **Synopsis:** The teacher engages students in reviewing what happened when the bell rang in the previous investigation and where the sound went. **Main science idea(s):** • Sound begins at a soundmaker and travels away from it in all directions.	Ask questions to elicit student ideas and predictions. Ask questions to probe student ideas and predictions. Ask questions to challenge student thinking.	**Show slide 1.** What soundmaker did we use to investigate sound in our last lesson? That's right! We used a bell to learn about where sound goes. **NOTE TO TEACHER:** *Hold up the bell so students can see it.* **Show slide 2.** What happened when I rang the bell? Where did the sound go? Did all of us hear the sound of the bell ringing? What happened in the space between the bell and our ears? **NOTE TO TEACHERS:** *By now, students should be able to accurately describe these science ideas. If they don't, challenge their thinking and ask them to consider the evidence they collected in previous lessons.*	A bell! The sound went to each person's ears. Yes. The bell vibrated and made the air around it vibrate. The vibrations moved through the air.	How could that happen when we were all in different positions around the circle? Then what happened? Where did the

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
					vibrations go?
				They moved through the air to our ears.	What evidence do you have for that idea?
				When the bell rang, we all heard it because the air carried the vibrations to our ears.	If all of us could hear the bell, what does this tell you about sound?
				That sound moves in different directions, not just in one direction.	
			When we were in the *[gym, cafeteria, auditorium]*, did we test all of the directions sound could go?	No, we didn't test all of the places in the room, like up high or down low.	Do you think there are some places in the room where sound doesn't go?
				Yes. I don't think sound goes up by the ceiling.	
				Yes. I don't think	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
				sound goes down on the floor. I disagree. I think sound goes everywhere in the whole room.	Does anyone disagree or have an idea to add?
1 min	**Lesson Focus Questions** **Synopsis:** The teacher reviews the focus questions from the previous lesson: *When something makes a sound, where does the sound go? What is our evidence?*	Set the purpose with a focus question or goal statement.	**Show slide 3.** Our focus questions for today are the same as last time: *When something makes a sound, where else can the sound go? What is our evidence?* In our last investigation, we discovered that all of us could hear the sound of the bell, even though we were in different positions around the circle. What did that tell us? In this lesson, we'll investigate other places sound can go when the bell rings.	Sound moves in different directions, not just to one person's ears.	
8 min	**Setup for Activity** **Synopsis:** The teacher introduces a new handout, and students draw pictures to predict where they think the sound will go this time when the bill rings.		First, let's go over the handout we'll be using for our investigation. **NOTE TO TEACHER:** *Distribute handout 5.2 (Which Way Will the Sound Move Now?) and orient students to the activity.* **ELL support:** Orient ELL students to the handout in advance so they understand what		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
	Main science idea(s): • Sound begins at a soundmaker and travels away from it in all directions.	Select content representations and models matched to the learning goal and engage students in their use. Ask questions to elicit student ideas and predictions. Make explicit links between science ideas and activities **before**	the bell represents and what they're expected to do. Give them an opportunity to practice drawing their predictions on the handout. Let students know you'll be asking them to share their predictions with the class (if time permits). Then make sure to ask them to share their ideas during the actual lesson. Let students know it's OK to repeat someone else's ideas. This is good practice and will make their thinking visible. **Show slide 4.** Like our handout from last time, this handout shows a picture of a bell. But what's different about this handout? Right! This handout shows students in different locations around the bell. Some are closer to the bell, and others are farther away. What do you think will happen when the bell rings? Where will the sound go? Think about these questions. Then draw your predictions on your handouts. Show all of the places you think the sound might go. You can use wavy or curvy lines, dots, or anything else you can think of to represent the sound vibrations. You may also add other objects to your pictures if you want, such as the ceiling, the floor, doors, windows, and other objects in the room.	It shows kids in different places around the bell.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
		the activity. Engage students in constructing explanations and arguments.	Be prepared to share your drawings and predictions with the class. **NOTE TO TEACHER:** *Give students 2–3 minutes to draw their predictions. Most students may draw the sound moving only to the ears of the students who are closest to the bell.* **Individual work time.** **Show slide 5.** **Whole-class share-out:** Who would like to share your prediction with us and explain your drawing? Where do you think the sound will go? First, who can tell me where the sound starts? Now where did you predict the sound will go? What did you draw on your handouts? **NOTE TO TEACHER:** *Record student predictions on chart paper for later reference. You may want to start the share-out with some simple predictions that show sound traveling only to the students who are closest to the bell on the handout. Students may think that sound can "wear out" or travel only as far as the person who hears it.*	The sound starts at the bell. I drew the sound vibrations going to the kids who were closest to the bell. Because last time, we were all the same distance from the bell.	What makes you think the sound will only go that far?

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
					Do you think the vibrations from the bell will go anywhere else in the room?
				I think the sound will go to the wall.	
					Why do you think it will go there?
				Because the wall will stop the sound.	
				I think the sound will go up to the ceiling.	
					That far? How could it go that far?
				If nobody gets in the way, the sound could travel up, too.	
			NOTE TO TEACHER: *Before leaving the classroom, collect all student drawings for use during the activity.*		
		Make explicit links between science ideas and activities **before** the activity.	Today we're going to test your predictions about sound in another large room. But first, please turn in your handouts.		
			NOTE TO TEACHER: *Take students to the gym, the cafeteria, or another large space. Make sure that no other class or group is in the room. A long hallway will work if it's relatively quiet and you won't disturb other classes. Also make sure to*		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			bring the handouts with students' predictions. For this investigation, students will listen to the sound of the bell from different distances in the room. **ELL support:** Make sure to preview this activity with ELL students so they understand what is expected of them and are equipped to participate more fully in the investigation.		
10 min	**Activity** **Synopsis:** Students test their predictions in a large room. When the teacher rings the bell, students consider where the sound goes, including up and down. **Main science idea(s):** • Sound begins at a soundmaker and travels away from it in all directions.	Highlight key science ideas and focus question throughout. Make explicit links between science ideas and activities **during** the activity.	**NOTE TO TEACHER:** *In the larger room, have students sit on the floor in a wide area around you. Position some students farther away from the bell and others closer to the bell. Then walk students through the instructions for the investigation.* As we test our predictions about what will happen when the bell rings, keep our focus questions in mind: *When something makes a sound, where does the sound go? What is our evidence?* Now let's test *[X's]* prediction that shows sound starting with the bell and traveling to the ears of the student sitting closest to the bell. Notice that it doesn't show the sound going farther away from the bell. Like in the drawing, *[X]* is sitting on the floor close to me. When I ring the bell, I'll ask *[X]* if *[he/she]* can hear the sound.		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			NOTE TO TEACHER: *Hold up the student's drawing for everyone to see. Then ring the bell and ask the student the following questions.*		
			Did you hear the sound?	Yes.	
			Did you predict this would happen?	Yes!	Why did you think you'd hear the sound?
				I knew the bell would create vibrations that my ears would hear as sound.	
			OK, if you could hear the bell, please raise your hand.		
			NOTE TO TEACHER: *Most, if not all, students should indicate that they heard the bell.*		
		Engage students in analyzing and interpreting data and observations.	What does that mean?	The sound didn't just go to *[X's]* ears.	How do you know?
				Because the sound went to my ears, too, and I was sitting farther away!	
			Is that what you predicted?	No. I thought the sound would only	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
				go to the students sitting closest to the bell.	
			Why didn't the sound stop when it reached the closest students? How could it move past the students sitting closer to the bell to the students sitting farther away?	Maybe when the bell vibrated, it made the air over there vibrate too.	
			So our first test showed that the sound of the bell went to everyone in the room, not just those who were sitting closest to the bell.		
		Ask questions to elicit student ideas and predictions.	Let's test another prediction that said the sound of the bell would stop at the wall. What do you think will happen?	I think the person by the wall will hear the bell ring.	Does anyone have a different idea?
				I don't think the sound will go that far.	
			OK, let's have three volunteers move over by the wall. Then I'll ring the bell.		
			NOTE TO TEACHER: *Select three student volunteers and have them position themselves in different locations along the wall. Then ring the bell.*		
			Who could hear the bell this time? Raise your hand if you heard it.		

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 in analyzing and interpreting data and observations.	**NOTE TO TEACHER:** *Everyone, including the students by the wall, should indicate that they heard the sound.* How could our three volunteers hear the sound if they were all the way over by the wall?	I guess the air was vibrating in between the bell and the students by the wall, too.	
			Another prediction was that the sound would go down to the floor. Let's test that prediction, too. Everyone lean over and put your ears close to the floor. Then I'll ring the bell. **NOTE TO TEACHER:** *Make sure that everyone is in position with their ears close to the floor before you ring the bell.* Did anyone hear the bell with your ears close to the floor?	Yes!	
		Engage students in analyzing and interpreting data and observations.	What does that tell you?	The sound must go in that direction, too. There must be air down there.	How could that happen? And what happened to that

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
				I guess when the bell rang, that air vibrated too and moved down to the floor.	air?
			Somebody else predicted that the sound of the bell could go up high, maybe even as high as *[the basketball hoop, the ceiling]*. I don't think anyone can jump that high to test this prediction, so I've asked our custodian, *[name of custodian]*, to help us with our investigation by climbing up on a stepladder and seeing if *[he/she]* can hear the bell ring.		
		Ask questions to elicit student ideas and predictions.	Do you think *[X]* will hear the sound up on the stepladder?	Yes!	Why do you think so?
				Because if we could hear the sound down by the floor, maybe the sound goes up high, too.	
			NOTE TO TEACHER: *Ask the custodian to climb up on the stepladder. Then ring the bell and ask whether he/she heard it.*		
		Engage students in analyzing and interpreting data and observations.	So our custodian heard the bell up on the stepladder. What does that tell us?	There's air up there, too!	What happened to that air?
				It vibrated.	

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.	Here's another question: If our custodian rings the bell from way up on the ladder, will we be able to hear it?	The vibrations moved through the air to the top of the stepladder! No! The sound won't be able to get to us. I think that when the bell vibrates, the vibrations will move through the air to our ears.	How did the sound of the bell move that far up? Does anyone have a different idea?
			NOTE TO TEACHER: *Hand the bell to the custodian and ask him/her to ring it while standing on the stepladder.* Who heard the bell this time? Raise your hands. **NOTE TO TEACHER:** *All students should indicate that they heard the sound.*		
		Engage students in analyzing and interpreting data and observations.	How can that be? The bell was way up there on the stepladder, and we're way down here? How could the sound of the bell go that far?	When the bell rang, it vibrated and made the air around	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			What do you think happened in the space between the bell up high on the stepladder and our ears way down here?	it vibrate too. The air carried the vibrations from the bell all the way to our ears.	
		Make explicit links between science ideas and activities **during** the activity.	Imagine that! The vibrations from the bell could travel through the air all the way to our ears. Great job, everyone! Let's return to our classroom so we can talk more about where the sound went.		
8 min	**Follow-Up to Activity** **Synopsis:** After a brief discussion about what happened when the bell rang, students revise the drawings they made earlier to show their predictions. Then students share their ideas about where sound goes and support their claims with evidence from the bell investigation. **Main science idea(s):** • Sound begins at a soundmaker and travels away from it in all directions.	Engage students in analyzing and interpreting data and observations. Make explicit links between science ideas and activities **after** the activity.	**Show slide 6.** So did everyone hear the bell ring? Where could you hear the sound this time? Where did it go? So if we could hear the sound in all of these places, what does that tell you about where sound can go?	Yes! We heard the sound by the wall. We heard the sound near the floor. We heard the sound when it came from the top of the stepladder. It can go everywhere in the room, even up high	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			Show slide 7. Next, let's compare your predictions to what happened when the bell rang. Look at your drawings. What do you think is missing? What would you change or add to make them better? Take a minute or two and make changes to your drawings to show all the places we heard the bell today. **Individual work time.**	and down low! I'd show sound going to the wall. I'd add a stepladder and show the sound vibrations going from the bell to the top of the ladder. I'd show the sound going from the stepladder to our ears. I'd draw sound vibrations down near the floor and all of us leaning over to hear them.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			Show slide 8. **Turn and Talk:** Now turn to an elbow partner and share your drawings. Talk about all of the places where you could hear the sound of the bell. Use the sentence starter on the slide when you share your ideas. *When something makes a sound, the sound goes_____. My evidence is _____.* Be prepared to share your ideas and evidence with the class. **NOTE TO TEACHER:** *As pairs discuss their ideas, circulate around the room and listen to their conversations. Make sure that students recognize that the sound moves in all directions, not just to their own ears.* **Whole-group share-out:** How did you explain where sound goes? Let's hear your ideas and evidence. Try to use the sentence starter when you share: *When something makes a sound, the sound goes_____. My evidence is _____.*	When something makes a sound, the sound goes all over the room. Because no matter where we were in the room, we could all hear the bell.	How do you know? What's your evidence? Does anyone

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
					disagree or have another idea to add?
8 min	**Synthesize/Summarize Today's Lesson** **Synopsis:** Students share their discoveries from the bell investigation, and the teacher illustrates them on a class drawing. Then students answer the focus questions based on their new understandings about the movement of sound. **Main science idea(s):** • Sound begins at a soundmaker and travels away from it in all directions. • We can draw vibrations in the air to show that sound moves away from a soundmaker in all directions.	Select content representations and models matched to the learning goal and engage students in their use. Engage students in making connections by synthesizing and summarizing key science ideas.	**NOTE TO TEACHER:** *Display the chart ("Where Did the Sound Go Today?") that you made in advance, showing a bell in the middle and students at different distances from the bell. During the following discussion, add the floor, the walls, and the stepladder to the drawing if you tested those predictions.* **Show slide 9.** We started with a bell and all of you sitting around it. Some of you sat farther away from the bell, and others sat up close. What did you and your partner say about all of the places we could hear the bell? Did sitting up close or farther away make a difference? So if everyone heard the bell, even if they were farther away, what does that tell you about the vibrations? **NOTE TO TEACHER:** *On the chart, draw vibrations moving from the bell to all of the*	We said it didn't matter if someone was close up or far away because everyone could hear the bell no matter where they were. The sound vibrations from the bell traveled through the air to	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			students in the picture.) Where else did the sound go? Did it stop here? **NOTE TO TEACHER:** *Point toward a student in the drawing.* Where else did the sound go? Did the sound go anywhere else?	everyone, no matter where they were. No. The sound went to the floor, too. We need to add the floor and show that we could hear the sound with our ears next to the floor. It went all the way to the wall. The air carried it over there. Yes! It went to the top of the stepladder!	So what do we need to add to our drawing to show this? Can you come up and draw that on our picture? And how did the sound get all the way over there? Who can come up and draw that on our picture? How do you know? What's 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
				[X], our custodian, said *[he/she]* could hear it. The air must have carried the sound vibrations from the bell up to the top of the stepladder.	How do you think that was possible? Can someone come up and draw the sound going to the top of the stepladder?
		Highlight key science ideas and focus question throughout. Engage students	Did the sound go anywhere else? **NOTE TO TEACHER:** *Add vibrations to the class drawing to show that sound travels in all directions. It's difficult to show on paper that sound moves in three dimensions, but point out to students that sound can move in a direction that would go out of the paper or into the paper. You could also draw up and down arrows to show this.* **Show slide 10.** Let's revisit our focus questions, *When something makes a sound, where does the sound go? What is our evidence?* What did we discover today about where sound can go?	Sound can travel	

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 making connections by synthesizing and summarizing key science ideas.		through the air in all directions. It can go up high, down low, and over to the wall. Everyone could hear the sound of the bell, no matter where they were.	How do you know? What's your evidence?
2 min	**Link to Next Lesson** **Synopsis:** The teacher summarizes key science ideas from the lesson and announces that next time, students will investigate how their ears help them hear sound. Then the teacher elicits initial ideas from students.	Summarize key science ideas. Link science ideas to other science ideas.	**Show slide 11.** So far in this unit on sound, we've learned that all soundmakers vibrate and cause the air around them to vibrate. These vibrations move in waves through the air to our ears. Our eardrums send a message to our brains, and we hear sound. Last time, we discovered that sound travels in all directions. It doesn't just travel from a soundmaker to one person's ears. It travels in all directions. That's why everyone could hear the bell ring. Today we discovered that sounds can travel up, down, and farther away. **Show slide 12.** In our next lesson, we'll explore how our ears help us hear sound.		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			Do you have any ideas? How do you think our ears help us hear sound?	Our ears grab the sound from the soundmaker. Our ears help make the sound. Our ears vibrate like the air does.	