Sound
Lesson 3: Sound on the Move

Grade 1	**Length of lesson: 43 min**	**Placement of lesson in unit:** 3 of 8 lessons on Sound
Unit Central Question: Why do we hear sound?		**Lesson Focus Question:** How does sound move?
Main learning goal: Vibrating objects can make other objects vibrate.		
Science content storyline: Vibrations of a sound maker can make objects around it vibrate. This sets up a repeating pattern of waves. These waves can be represented by a sine wave to show this repeating pattern.		
Ideal student response to the focus questions: Sound moves as a wave from the sound maker that is vibrating to our ear.		

Preparation

Materials needed: **Per class:** • Android device with the app, Sound Wave, installed (by Synaptik OR Apple device with the app, Physics Oscilloscope by Rytech Apps • 3.1handout, *Sound on the Move* • 1 extra long slinky. • 1 tuning fork	**AHEAD OF TIME:** Review the Introduction and information about sound in the Content Background document. Install the Sound Wave app by Synaptik on an Android device or the Physics Oscilloscope by Rytech Apps on an iPhone or iPad..

Lesson 3 General Outline

Time	Phase of lesson	How the Science Content Storyline Develops
3 min	**Unit Central Question and Lesson review** Teacher introduces Unit Central Questions and elicits student ideas and evidence for why we hear sound.	
2 min	**Lesson Focus Questions:** Teacher introduces Lesson Focus Question: *How does sound move?*	Sound moves from place to place.
6 min	**Set up for Activity 1:** Teacher elicits student ideas about how sound moves from a tuning fork to the ear. Students share and draw their ideas.	
20 min	**Activity 1:** Teacher elicits student ideas about how sound moves from a tuning fork to the ear. Students share and draw their ideas.	Sound moves as vibrations move through matter. Sound moves as a wave and can be represented as a wave.
10 min	**Follow-up Activity 1** **Synthesize and Summarize:** Students answer the focus question by describing verbally and with a drawing how sound moves from a tuning fork to their ear.	
2 min	**Link to Next Lesson:** The teacher challenges the students to think about *how* sound gets from place to place without the slinky.	

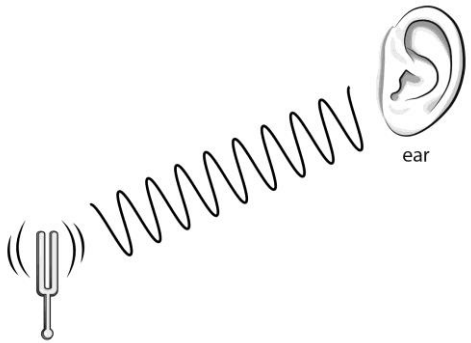
Time	Phase of Lesson and How the Science Content Storyline develops	STeLLA Strategy	Teacher talk and questions	Anticipated student responses	Possible Probe/Challenge Questions
3 min	**Unit Central Question and Lesson review** Synopsis: Teacher introduces Unit Central Questions and elicits student ideas about why we hear sound.	Ask questions to probe student ideas and predictions Ask questions to challenge student thinking	Whole class: The big question we are trying to answer is: *Why do we hear sound?* *(Show the Power Point slide with this question. Advance to the next slide when you are ready to start the next set of questions.)* We have already learned some important things to help us begin to answer that question. Who will share what they have learned? How did you find that out? What was your evidence? Did someone else have different evidence?	Sound makers vibrate. I can see the vibrations. I can feel the vibrations. I can hear the sound. I can see the sound maker make other things move when it vibrates.	Where did you see the vibrations? What was vibrating? Can you always see the vibrations? If you can't then how do you know it is vibrating? What did the vibrating sound maker do? Tell me more about what you felt.
2 min	**Lesson Focus Questions** Synopsis: Teacher introduces Lesson Focus Question: *How does sound move?*	Set the purpose with a focus question or goal statement.	Whole class: Knowing how sound gets from a sound maker to our ears will help us answer this big question. Our focus question for this lesson is, *How does sound move?* *(Show the Power Point slide with this question.)* ***Note to teacher:*** *Write this question on the board and show the PowerPoint slide*		

Time	Phase of Lesson and How the Science Content Storyline develops	STeLLA Strategy	Teacher talk and questions	Anticipated student responses	Possible Probe/Challenge Questions
			with the focus question. Refer to it often during the lesson to remind students the purpose of the activity.		
6 min	**Set up for Activity 1** Synopsis: Teacher elicits student ideas about how sound moves from a tuning fork to the ear. Students share and draw their ideas. Main Science Ideas: Sound moves from place to place.	Ask questions to elicit student ideas and predictions Make explicit links between science ideas and activities (before the activity)	Whole class: Boys and girls, I'd like you to help me understand how the sound gets from a vibrating tuning fork to my ear. So when I do this…(*make tuning fork vibrate*)…how am I able to hear the sound? *(Show the slide "Make a Prediction")* Turn and talk: Please talk to your elbow partner and explain what you think happens. ***Note to teacher:*** *Allow 1-2 minutes for students to talk to their elbow partner and share their ideas.* Whole class: Now I want you to draw a picture in your notebook of what you and your elbow partner talked about. How did the sound get from the tuning fork to my ear? Draw the tuning fork on one side of the page and your ear on the other. Show how the sound gets from the tuning fork to the ear. ***Note to teacher:*** *Allow 2-3 minutes for students to draw their ideas. If time allows, share a couple of student drawings using the document camera and have them share their ideas.*		
20 min	**Activity 1** Synopsis: Students		Whole class demonstration and discussion: ***Note to teacher:*** *Ask a student volunteer*		

Time	Phase of Lesson and How the Science Content Storyline develops	STeLLA Strategy	Teacher talk and questions	Anticipated student responses	Possible Probe/Challenge Questions
	participate in a class demonstration using a slinky to represent a sound wave traveling through matter. They learn that sound travels as a wave and represent sound as a wave. <u>Main Science Ideas:</u> Sound moves as vibrations move through matter. Sound moves as a wave and can be represented as a wave.		*to help you with this demonstration. Have the volunteer hold one end of a slinky while you hold the other. Stretch the slinky across the floor. Tell the student that their job is to hold their end of the slinky still and not to let go. The extra-long slinkies tangle easily so it is important not to release the end once it is stretched. Stretch the slinky enough so the coils are spread apart some but not so much that the slinky stretches out of shape. This is easiest to do sitting on the floor. Have the rest of the class gather around the slinky so they can see how it behaves.* *(Show the PowerPoint slide with the slinky as you do this demonstration)* I want you to imagine that my hand is the end (one of the tines) of the tuning fork when it is making a sound. How should my hand move? OK, I will make my hand vibrate. As I do, imagine that <u>(student volunteer's name)</u> is your ear. Remember we are trying to find out how sound moves from a sound maker like a tuning fork to our ears. Watch the slinky and get ready to describe how it behaves when I vibrate on this end.		
		Make explicit links between science ideas and activities (during activity)		You should move it back and forth	What do we call this back and forth motion?

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 interpreting and reasoning about data and observations. Make explicit links between science ideas and activities (during activity)	***Note to teacher:*** *Move the slinky in and out in the direction of the slinky. This should set up a series of waves much like sound waves. This YouTube video shows how you should make the waves on the slinky:* *https://www.youtube.com/watch?v=GIkeGBXqWW0* *Move your hand back and forth as if it is vibrating and to better model how the tuning fork behaves.* Turn and talk: What do you observe? Turn to your elbow partner and describe what you saw. Whole class: Will someone share what they observed? Where did the vibrations start? Where did the vibrations go? Did the vibrations reach the ear? This moving pattern or moving vibrations through the slinky represents a wave. Sound moves as a wave. ***Note to teacher:*** *Write "Sound moves as a wave" on the board and/or show it on the PowerPoint slide.*	They started with your hand. They went down the slinky. Yes, they ended up at the ear.	Can you think how they moved down the slinky? What moved down the slinky?

Time	Phase of Lesson and How the Science Content Storyline develops	STeLLA Strategy	Teacher talk and questions	Anticipated student responses	Possible Probe/Challenge Questions
		Select content representations and models and engage students in their use.	<u>Showing sound as a wave with the app:</u> Watch this screen as I make a sound with the tuning fork. ***Note to teacher:*** *Access the app, Sound Wave by Synaptik on an Android device or download it to your computer. Project it so that the whole class can see. Strike the tuning fork on your shoe and hold it close to the microphone in your device. Students should be able to see a sine wave of the sound.* Can someone describe what they see? Can you draw what you saw on the board? This is a representation of a wave and it is one way to show how sound moves.	I see a lot of humps. It goes up and down. It looks like waves on the ocean.	Can you draw what you are describing?
		Select content representations and models and engage students in their use.	So if I have a tuning fork here *(draw a tuning fork on one side of the board)* and my ear is here *(draw an ear on the other side of the board)* we can use a wave to show how sound moves from the tuning fork to the ear. ***Note to teacher:*** *Pass out the handout, Sound on the Move, so students can glue into their notebooks and draw the wave as you do. Draw a wave from the tuning fork to the ear as shown below. This is*		

Time	Phase of Lesson and How the Science Content Storyline develops	STeLLA Strategy	Teacher talk and questions	Anticipated student responses	Possible Probe/Challenge Questions
			just for students to have a picture of what they learned today. You will add to this picture in the next lesson. Show the PowerPoint slide with the same illustrations.  		
10 min	**Follow-up Activity 1 Synthesize and Summarize** <u>Synopsis:</u> Students answer the focus question by	Engage students in making	You saw the slinky move a wave (or vibrations) from one end of the slinky to another—the vibrations move from place to place. Turn to your elbow partner and use your		

Time	Phase of Lesson and How the Science Content Storyline develops	STeLLA Strategy	Teacher talk and questions	Anticipated student responses	Possible Probe/Challenge Questions
	describing verbally and with a drawing how sound moves from a tuning fork to their ear. <u>Main Science Ideas:</u> Sound moves as vibrations move through matter. Sound moves as a wave and can be represented as a wave.	connections by synthesizing and summarizing key ideas.	sketches from handout, *Sound on the Move*, to tell your partner how sound gets from the tuning fork to your ear so you can hear it. ***Note to teacher:*** *Allow students 1-2 minutes each to share with their partners. As they share, listen to their conversations and note students using the terms vibrations and waves correctly in their stories.* <u>Whole class discussion:</u> ***Note to teacher:*** *Point to the focus question that you wrote on the board and/or show it on the PowerPoint.* Let's see if we can answer our focus question for the day.	A sound maker vibrates. The vibrations move to our ear. Then we hear the sound.	Can you use the word vibrate or vibrations to your ideas? What is your evidence? How do you know that?
		Highlight key ideas and <u>focus question</u> throughout	Your sound story should answer the question. Can someone share the first part of their sound story? *(point to the tuning fork)* What happens here? Use the word vibrates or vibrations when you share.	A sound maker vibrates.	
		Engage students in making connections by synthesizing and summarizing key ideas.	Can someone add to what _____ has said? Tell me what happens here. *(point to the space between the tuning fork and the ear)* And finally, what happens here? *(point to the ear)*	The vibrations move to our ear. Then we hear the sound.	What evidence do you have that the tuning fork vibrates? How are we showing that? What is this wiggly line?

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 we use to hear the sound?
			How does what you saw with the slinky help you understand about how sound moves?	The slinky showed how the vibrations moved. This helps me know how sound moves.	What did that look like?
2 min	**Link to Next Lesson** Synopsis: The teacher challenges the students to think about *how* sound gets from place to place without the slinky.	Link science ideas to other science ideas (links to next lesson)	It would be kind of silly for us to connect all the sound makers to our ears with a slinky. We know there are not lots of slinkies out there coming to our ears. So now let's think about the tuning fork and our ear again. How does that sound get to your ear if there is no slinky? *(Show the final slide in the Lesson 3 PowerPoint)* Do any of you have any ideas? This is what we will investigate in our next lesson.	It goes through the room. It goes through the air.	What is "it"? Do you know how that happens? Where is the air? How do you know it is there?