

WEEK 3 Lesson 1

Science and Engineering: Sound Receivers
Exploring Sound

S & E Big Ideas	Vibrating materials make sound. Sound makes materials vibrate. Light and sound travel. Humans and other animals communicate with light and sound. People innovate and invent to solve problems.
S & E Guiding Question	How does sound travel from the source to the receiver?
Content Objective	I can conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. (1-PS4-1)
Vocabulary	<p>sound receiver: something that detects sound</p> <p>sound source: an object or material that vibrates in a way that makes sound</p> <p>travel: to move from place to place</p>
Materials and Preparation	<ul style="list-style-type: none"> ● The Science of a String Phone video (https://www.youtube.com/watch?v=3yqB2KFwJCo&feature=youtu.be) ● paper or styrofoam cups, 2 for each pair of children ● string (cotton or nylon thread), enough for each pair of children to have around 10 feet ● heavy gauge fishing line, optional, used for multiple stations to test different transmitting materials ● yarn, optional, used for multiple stations to test different transmitting materials ● small sharp device to poke holes in the cups Poke 1 hole at the bottom of each cup.
Opening 10 minutes	<p>Review the important concepts of sound that have been covered thus far:</p> <ul style="list-style-type: none"> ● Sound is vibration. ● Sound travel in waves. ● Sounds can be different volumes and pitches based on these

	<p>vibrations.</p> <ul style="list-style-type: none"> ● Sound can be stopped when the vibrations are stopped or limited. <p>Explain that today’s experiment will test what they know about sound. Review the terms sound source and sound receiver. Provide an example to reinforce these terms.</p> <p><i>Imagine a bird is chirping in the tree and you hear it. The bird is the sound source and your ears are the receiver.</i></p> <p>Share that they will make paper telephones.</p> <p>Show the Sci-Show video to the children.</p>
Investigation 10 minutes	Place the children into pairs to make the cup telephone. Then one child will speak into the cup while the other child holds the cup to their ear. The string (or transmitting material) should be stretched tight between the two cups in order for the best sound transmission. Tell the children to speak loudly but do not yell. Travel between groups to help them troubleshoot.
Discussion 5 minutes	Ask the children: <ul style="list-style-type: none"> ● <i>What did you notice?</i> ● <i>What do you wonder?</i> ● <i>How do you think the sound moved from the sound source to the receiver?</i> ● <i>If the sound was not reaching the receiver, how did you fix it?</i>
Closing 5 minutes	Gather children in a circle on the rug. Ask children what new evidence they have that supports the ideas below. <ul style="list-style-type: none"> ● Vibration is a kind of motion. It is a fast back-and-forth motion. ● Objects that vibrate make sounds. Sound always comes from a sound source (object) that is vibrating. ● Objects can be made to vibrate in many different ways, including hitting, plucking, and dropping.
Standards	1-PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
Ongoing assessment	Check for understanding in the children’s responses.

Notes

WEEK 3 Lesson 2

Science and Engineering: Echolocation
Exploring Sound

S & E Big Ideas	Vibrating materials make sound. Sound makes materials vibrate.
S & E Guiding Question	What can we learn about sound using a tuning fork?
Content Objective	I can conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. (1-PS4-1)
Vocabulary	echolocation: using echoes to locate or find objects
Materials and Preparation	<ul style="list-style-type: none"> ● How do Bats See with Sound? video (https://www.youtube.com/watch?v=fSIFU8OTwrg) ● clipboard, one for each group ● crayons ● Echolocation in Action sheet, 1 copy for each child ● Echolocation in Action Bar Graph, 1 copy for each child
Opening 10 minutes	<p><i>We have been talking about sound waves. We will watch a video about how animals use sound waves to "see" underwater or in the dark.</i></p> <p>Show the video.</p> <p><i>Engineers developed a technology based on the natural echolocation that animals use. It works pretty much the same way, but we call it something different. SONAR works like echolocation. Scientists and the military use SONAR to map underwater and to look for things that are in the ocean. SONAR is a great example of how engineers can learn from the world around us and use ideas from nature to create new ways to help people.</i></p> <p><i>Today you will have a chance to try out echolocation. We will break</i></p>

	<i>up into teams of two. Then, one person will close their eyes tight and guess where the sound is coming from as the other person makes snapping or clapping noises in front of them, behind them or to their side. It is a fun challenge to learn about echolocation.</i>
Investigation 10 minutes	<p>Process:</p> <ul style="list-style-type: none"> • For each team, have one child sit in a chair and the other stand nearby with the Echolocation in Action sheet. • Have the seated child close their eyes. Remind them not to peek! • The other child will snap or clap their fingers while the sitting child guesses the location from where the snap came. • Partners should record their partner's response on the Echolocation in Action sheet after each snap/clap. • Have partners follow the Echolocation in Action sheet for all nine snaps or claps, and record all responses. They should put a check mark if their partner guessed correctly and an X if they guessed incorrectly. • Ask the partners to write down the number of times they guessed correctly for each location (side, behind or in front). • Have partners switch places and repeat the procedures. Once both children have guessed, have them give each other their worksheets, so they can use them to create their own bar graphs.
Discussion 6 minutes	Have the children color in their Echolocation Bar Graph with the number of times that they guessed correctly for each location. Discuss why some locations may be harder to guess than others. Be aware that noise from other teams will likely be a contributing factor to erroneous guesses.
Closing 4 minutes	Invite a few children share their bar graphs. Talk about the results, and discuss why some locations were perhaps harder to guess than others. Encourage the children to think about why noise from other teams may have made it harder to guess the location of the snaps or claps.
Standards	1-PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
Ongoing assessment	Check for understanding in the children's responses.

Lesson Credit:

https://www.teachengineering.org/activities/view/cub_soundandlight_lesson4_activity1

Notes



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