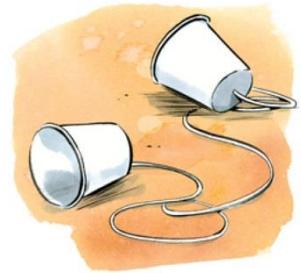


# Sound *Projects & Activities*

1. Find a book about musical instruments or look on the Internet to read about the xylophone. Where did it come from? What different types of xylophones are there? How do they make sounds?
2. Based on what you learned in your research, try making your own xylophone.
3. Sounds can travel through solids, like a string. See if a string telephone will work!



You will need about 30 feet of string and 2 paper cups. Make a tiny hole in the bottom of each cup. Thread the ends of the string through the holes and knot them inside of the bottom of the cups.

Have a partner hold one cup while you hold the other. Keep the string stretched tightly. Speak softly into the cup while your partner holds the other cup to his or her ear. Your partner should be able to hear your voice! Can you explain why this works?

Once you get your string telephone working, try it with a loose string. Will it still work? Why or why not? Try to develop some other tests for your string telephone.

4. A dog whistle makes a sound too high for people to hear, but a dog can hear the sound. How can that be? Find out how this happens.

5. What is a sonic boom and when do they occur?
6. Thomas Edison is one of the most famous American inventors. He invented the first phonograph: a machine that played records. Find out how he came up with the idea for the phonograph and how the phonograph worked. Try to locate a record. Look at it with a magnifying glass. What do you see? See if you can find someone that has a phonograph and enjoy listening to a record!
7. Can sound move through a vacuum (empty space)? Based on what you found out, if there was an explosion on the moon, would we be able to hear it on Earth?
8. How fast does sound travel? Explain if there is one answer to this question or many!



9. When you see lightning, why is the thunder's sound delayed?
10. Can you tell how far away lightning is? There are many formulas to try to predict the answer. See if you can find a scientific formula.
11. With an adult, watch a YouTube video (<http://www.youtube.com/watch?v=j-zczJXSxnw>) of the 1940 collapse of the Tacoma Narrows Bridge. Find out what the collapse of this suspension bridge had to do with sound.
12. When do we hear echoes? Why don't we always hear them? What is the science behind an echo?

13. Try to name at least 3 ways that we use echoes. (Think about navigation, aviation, chemistry, cooking, ecology, etc.) Invent a new use for echoes.
14. Some animals use echoes to hunt and/or to navigate. Research echolocation and find out which animals use sounds in these ways.
15. How does echolocation allow bats to thrive in their environments?
16. How is a bat like an airplane? How many ways can you think of?
17. How do we hear sounds? What mechanisms do humans have that allow us to hear sounds? Make a diagram that shows how we process sound.
18. What mechanisms do humans have that allow us to make such a wide range of sounds?
19. What if everyone and everything sounded the same? Tell what life might be like!
20. How does a hearing aid work? What other methods are being invented and used to help people hear?
21. Some sounds have become extinct and you have probably never heard them! Have you ever heard a rotary telephone? A film projector? Make a list of sounds that you have never heard, but once existed. You might ask a parent or grandparent for help.
22. Can sound be dangerous? How?
23. How is the sound of a sneeze made?



24. Did you know that the loud noise created by cracking a whip happens because the tip breaks the speed of sound? Create an interesting way to share other cool facts about sound with your classmates.
25. The following websites contain facts to read and activities to do:
- <http://www.sciencekids.co.nz/sound.html>
  - <http://www.smm.org/sound/nocss/activity/top.html>
  - <http://library.thinkquest.org/19537/>
  - <http://www.neok12.com/Sound.htm>
  - <http://www.brainpop.com/science/energy/sound/preview.weml>
  - <http://tlc.howstuffworks.com/family/science-projects-for-kids-producing-sounds.htm>
  - <http://pbskids.org/zoom/activities/sci/>
  - [http://www.internet4classrooms.com/science\\_lem\\_sound.htm](http://www.internet4classrooms.com/science_lem_sound.htm)
  - <http://faculty.washington.edu/chudler/chhearing.html>
  - <http://www.monstersciences.com/sound-science-experiments.html>
26. Go to Steve Spangler’s website and check out his sound experiments in the “light and sound” category. Try to watch the videos. You might try some of the experiments at school or at home with permission!
- <http://www.stevespanglerscience.com/lab/experiments/category/light-and-sound>
27. The loudness of sounds is measured in decibels. Research decibels. Work with an adult to measure sounds in your environment. Your adult can download an app to use his or her phone or tablet as a decibel meter. Make a chart that shows the decibels of 5 – 10 sounds. Make sure that you include the human voice as one of your sounds.
28. Try going to different places to take measurements, such as a quiet place (like a library) or a bus stop. Did any of these places surprise you?

29. Can you find a place with zero decibels? Find a few quiet spots in your city and see how quiet they really are. Do you get used to background noises like computers, TV, traffic hums or house creaks? What other noises are you tuning out?
30. Investigate how sounds fade with distance. Set a radio to a low volume then walk away until you can't hear it anymore. Measure the distance or count the steps. Repeat the test with increasing volumes. What do you notice? Does "twice as loud" mean you walked twice as far away?



31. Find out how a microphone works.
32. "Micro" means "small" and "phone" refers to "sounds." How does that connect to how a microphone works?
33. Think about other words that relate to sound (telephone, phonograph, sonar, echolocation, etc.) and try to figure out the meanings of the word parts.
34. How are sound waves used in the medical field? How are they used by aviators, soldiers, and sailors?
35. How did early man depend on sound?
36. Flying insects buzz and hum. Why do they make these sounds? Are these sounds at different pitches? Why?
37. Read the story of Echo in Greek mythology. Why might the Greeks have created this story?
38. Invite a musician to class to demonstrate his or her instrument and tell about how the sounds are generated.

39. What do these sounds make you think of?

- |              |             |
|--------------|-------------|
| a. croaking  | i. swishing |
| b. bellowing | j. hooting  |
| c. snoring   | k. thumping |
| d. gurgling  | l. slamming |
| e. crackling | m. clanking |
| f. squeaking | n. flapping |
| g. rattling  | o. clicking |
| h. crumpling |             |

40. Create an original animal that uses sound in a unique way.

41. Create an original plant that makes a sound that helps it to survive.

42. Beethoven started to lose his hearing when he was 32, and was totally deaf when he wrote his Ninth Symphony. How do you think he was able to "hear" his compositions?



43. Research Helen Keller and find out how she was able to graduate from college and become a public speaker, despite the fact that she was blind and deaf.

44. Laura Bridgman was the first deaf-blind person to learn language. Read more about her and her connection to Charles Dickens and Annie Sullivan (Helen Keller's teacher).

45. An onomatopoeia is a word that sounds like its meaning, such as "buzz" or "hiccup." Make a list of as many of these words as you can!

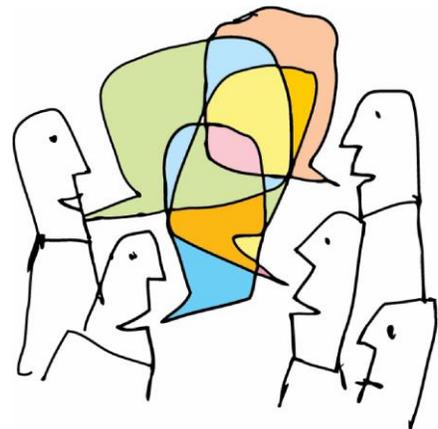
46. Learn more about American Sign Language, its history, and its use. Learn some signs and notice that some (but not all) have a connection to the meaning. Invent a new sign for a word that you use a lot.
47. Do we need both ears to hear? What advantage does hearing with both ears give us?



48. Did you know that there are hearing ear dogs that help deaf people? Try to locate someone related to this that you could interview.
49. Think of the many ear shapes that you have seen in the animal kingdom. Which shape is best for collecting sound? Try to design a better human ear! Make a model.
50. Research how elephants communicate with each other. Design a creative way to show what you learned.
51. Did you know that some animals have hearing organs in strange places on their bodies? Research how a variety of animals hear and show the class what you have found.
52. When you put a conch shell up to your ear, what are you really hearing? (No, it's not the sea!)
53. Do plants really prefer music? Conduct an experiment to find out. See pages 42- 43 in *Sound Science* by Etta Kaner.
54. What causes snoring? Create a "cure" for snoring and make a commercial for your product.

55. Create a radio play ~ complete with sound effects. See pages 72- 73 in Sound Science by Etta Kaner for ways to create sound effects. Develop your own, as well.
56. First we had records, then tapes, and now CDs. How does a compact disc work? What do you think might be the next method for capturing and playing music?
57. The telegraph was invented in 1843 by Samuel Morse. This invention allowed people to communicate over long distances. Find out about Morse code. If possible, make a telegraph and send messages to a partner. See pages 90- 93 in Sound Science by Etta Kaner.
58. What do these sayings mean?

- You could hear a pin drop.
- In one ear and out the other.
- Actions speak louder than words.
- She spoke off the cuff.
- He talked my ear off.
- You took the words right out of my mouth.
- Your advice is falling on deaf ears.
- Empty vessels make the most sound.
- You sound like a broken record.



59. There is some discussion about sounds that children and teens can hear, but adults can't. Research this fascinating topic and see if you can conduct an experiment to see if it is true.
60. Check out Sound Science by Etta Kaner for more sound experiments and activities!
61. What is the relationship between electricity and acoustics?

62. Sounds occur naturally in our world, but the following people have helped us to understand the science of sounds. Pick one of these sound pioneers and discover what he did to further our knowledge of electricity.

- Hermann von Helmholtz
- Robert Boyle
- Guglielmo Marconi
- Heinrich Hertz
- John Tyndall
- James West
- Aristotle
- Vitruvius
- Galileo
- Marin Mersenne
- Sir Isaac Newton
- Lord Rayleigh

63. Pythagoras was one of the earliest mathematicians, but also made discoveries related to sound. What were his discoveries?

64. Why aren't there any women listed above? What does that reveal about the times in which many of these men lived?

65. How can you find out more about the scientific contributions of women? Do some investigating and try to research a female scientist.

66. Simon and Garfunkel sang about "The Sounds of Silence." Can silence have a sound? Locate the lyrics to this song and try to decide what you think they were trying to express.

67. Do you have an idea for a project? Talk to your teacher!

