HANDS-ON ACTIVITY

Engineer It

Designing a Listening Device

Design your own hearing-enhancing device to use during an outdoor hike. Your device should not have a battery and should not go in your ear. Be safe—don't put *anything* in your ears.

Form a question What question do you have about the hearing-enhancing device?

Did you know?

Ear trumpets are believed to be the first hearing-enhancing devices. They were first described by Jean Leurechon in 1634.

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POSSIBLE MATERIALS

- ☐ plastic cups
- ☐ paper cups
- ☐ cloth scraps
- ☐ duct tape
- ☐ masking tape
- ☐ string
- ☐ scissors
- ☐ rubber tubing

Explore

STEP 1 **Investigate your question** Handle and examine the materials available to you. Brainstorm ideas with your team. Choose the best idea. Then make a rough sketch of how you think your device will look and work.

What are your criteria?

What are your constraints?

STEP 2 **Identify** Choose the materials you will use to construct your device. Write your list in the box below. Explain how the materials you have chosen will help you meet the criteria and constraints.

First Design Notes

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Make and Test

STEP 3 With your team, make and test your device. Make sure you don't put anything in your ears.

Improve and Test

STEP 4 Use the test results to improve your device. In the space below, keep a record of the design changes you make. Include a reason for each change. Stop testing and improving when you are satisfied that your device meets the criteria and constraints.

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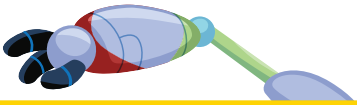
STEP 5 When you are satisfied that the device meets the criteria and constraints, think of a different design that might work even better. If there is time, build and test this second device. You may choose to replan, rebuild, and retest many small improvements, or you may choose to return to an earlier phase.

Make sure that you communicate with others to share information and learn more. At the end of the process, you should have the best solution possible, given the constraints. Your solution is now ready to use and share with others.

Does your design meet the goals of this activity? Support your **claim** with **evidence** and **reasoning.**

Explain why you chose two of your materials.

Draw conclusions If other students looked at your final design, what improvements might they suggest? Why?



Making Sense

How does your work in this investigation help you explain how to design and build a lightweight, nonelectric listening device that can enhance a nature walk?

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