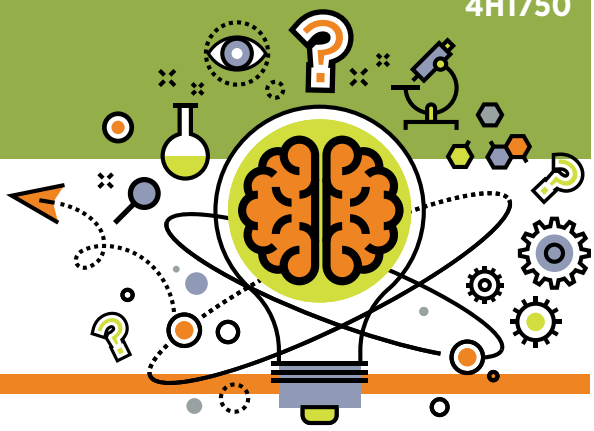
TEACHING SCIENCE
...when you don't know diddly-squat



Can you hear better with paper ears?

Purpose:

The purpose is **not** to teach specific content, but to teach the process of science – asking questions and discovering answers. This activity encourages young people to try to figure things out for themselves rather than just read an answer on the internet or in a book. As a leader, try not to express your opinion, but let the youth engage in arguments based on evidence.

Time required:

20 minutes or multiple days depending on the interest and questions the youth have

Materials:

- ❏ Paper
- ❏ Scissors
- ❏ Tape

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Science Practice:
Asking questions and defining problems

1. *Do animals hear differently than humans? Why do you think that is? Do some animals hear better than others? Do you think ear shape or size has anything to do with how well an animal can hear? What animals do you think hear the best? How do you know what animal hears the best?*

Science Practice:
Developing and using models

2. *Ask youth to make ears shaped like animal ears out of paper and tape. Try upright ears, floppy ears, elephant ears, all kinds of ears. How is each ear you made like an animal's ear? How would you adjust the ear size to account for the difference in size between your head and the animal's head?*

Science Practice:
Planning and carrying out investigations

3. Have the youth stand a set distance apart and whisper to each other. Ask: *How well do you hear? Repeat the experiment holding the animal-shaped ears around their ears. Did the animal-shaped ears change your hearing? Is there a way to measure how it changes your hearing?*

Science Practice:
Using mathematics and computational thinking

4. *Did you adjust the ear size to account for differences in head size between a human's head and an animal's head? How would you determine how big the ear should be? How do you measure a head? How do you compare heads' and ears' sizes when the shapes are so different?*

Science Practice:
Constructing explanations and designing solutions

5. *Would you recommend someone who is hard of hearing use an artificial ear like the ones you designed? Why or why not?*

Science Practice:
Engaging in argument from evidence

6. *Does ear size make a difference in hearing? Does ear shape make a difference in hearing? Could you predict how well an animal can hear by looking at its ears? Why or why not?*

Other thoughts:

- With goats, some breeds have floppy ears, some have upright ears and some have almost no ears at all. *Does this affect their ability to hear? How could you test an animal's ability to hear?*
- *Could you do a similar experiment with noses and the ability to smell?*

You do not need all the answers to teach science. You simply need an inquisitive mind and to be willing to carry out an investigation.

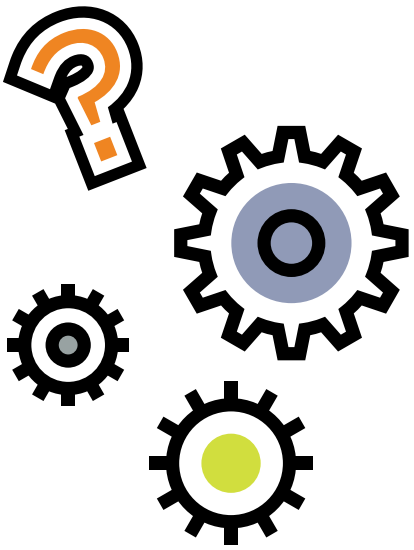
Science & Engineering Practices:

These eight Science and Engineering Practices come from *A Framework for K–12 Science Education* (National Research Council, 2012, p. 42). These research-based best practices for engaging youth in science are connected to in-school science standards that all children must meet.

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Reference:

National Research Council. (2012). *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. Washington, DC: National Academies Press.



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