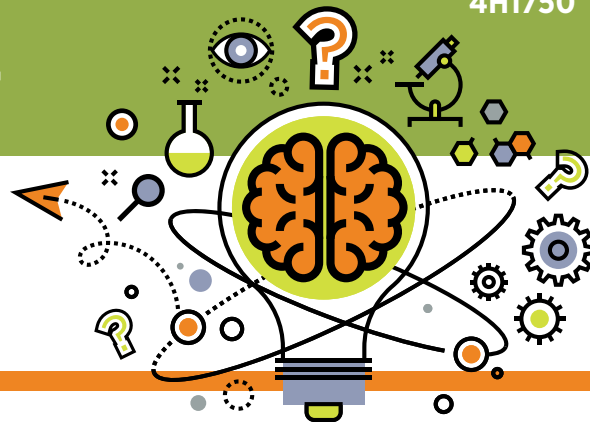


# TEACHING SCIENCE

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



## Can kids hear things that adults can't?

### 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:

- A smartphone or computer that can play audio files



Photo © istock.com/Rantalmages

### SCIENCE PRACTICE:

#### Asking questions and defining problems

1. Are there sounds that young people can hear that older people cannot? Why might that be? At what age does hearing diminish?

### SCIENCE PRACTICE:

#### Planning and carrying out investigations

2. Play the sounds available at <http://www.noiseaddicts.com/2009/03/can-you-hear-this-hearing-test/> (NoiseAddicts, 2006-2018). See who can hear them and who cannot. Sound frequency is measured in kilohertz (kHz). Start with a low volume and slowly turn up to avoid discomfort.

### SCIENCE PRACTICE:

#### Using mathematics and computational thinking

3. Create a chart like the one following. In the notes column, include information that you think might affect a person's hearing (for example, the person used a chainsaw a lot or were in a rock-n-roll band and did not use any hearing protection).

#### Audible Hearing Frequencies Data

Person	Age	Can they hear the frequency? (in kHz)											Notes	
		8	10	12	14	15	16	17	18	19	20	21		22

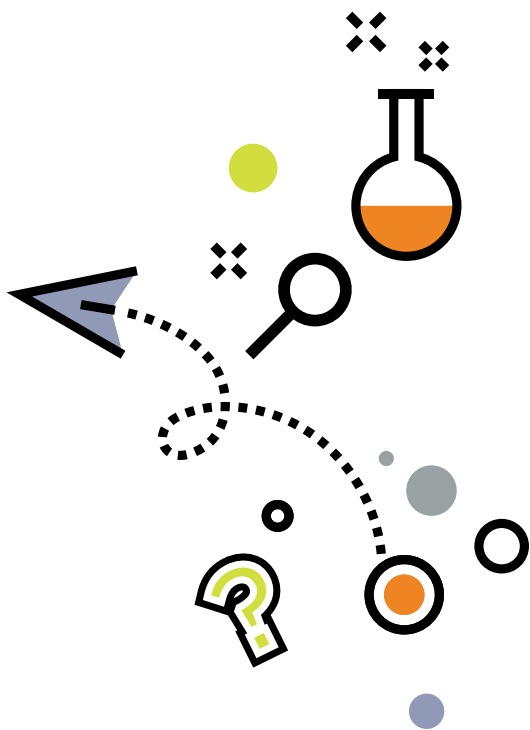
### SCIENCE PRACTICE:

#### Engaging in argument from evidence

4. Did age make a difference in how well people could hear different frequencies? What evidence makes you think that way? Are there other factors that have a larger impact than age?



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.



## MICHIGAN STATE UNIVERSITY | Extension

MSU is an affirmative-action, equal-opportunity employer, committed to achieving excellence through a diverse workforce and inclusive culture that encourages all people to reach their full potential. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status. Issued in furtherance of MSU Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Jeffrey W. Dwyer, Director, MSU Extension, East Lansing, MI 48824. This information is for educational purposes only. Reference to commercial products or trade names does not imply endorsement by MSU Extension or bias against those not mentioned. The 4-H Name and Emblem have special protections from Congress, protected by code 18 USC 707. 1P-Web-010:2018-PA/MR WCAG 2.0

### SCIENCE PRACTICE: Developing and using models

5. Could you use the information you have to predict at what age someone can hear a different frequency?

### Other thoughts:

- ▶ Could the information you gathered be applied in other places?
- ▶ Can you think of any careers where ability to hear different frequencies is important?
- ▶ Do you think animals might be able to hear some of the frequencies that humans can't? How might you tell if an animal can hear something you cannot? Do you think there could be sounds humans can't hear that disturb animals? Is there a way to test this without causing stress to the animal?
- ▶ Look for an ultrasonic detector application on your smartphone, and investigate if there are sounds in your environment that you cannot hear.
- ▶ There was a story on the internet that a storeowner who didn't want teenagers hanging around his store played some frequencies that young people could hear and found disturbing. Do you think this would be a good strategy? Why or why not? Is it right to treat people that way?
- ▶ Do you think seasons of the year or weather would affect how a person hears different frequencies? Would having a cold have an impact on hearing ability?
- ▶ Would the ability to hear the sound change depending on the room you are in? Would a bathroom be different from a carpeted room?

### 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

### References

- National Research Council. (2012). *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. Washington, DC: National Academies Press.
- NoiseAddicts. (2016-2018). *Hearing test: Can you hear this?* Retrieved from <http://www.noiseaddicts.com/2009/03/can-you-hear-this-hearing-test/>

