



Unit 1: Sound, Waves, & Communication

Subject Area: Science	Course: 4th Grade Science		
Unit Title: Sound, Waves & Communication	Grade(s): 4	Start: September	End: November
Unit Summary: In this unit, students investigate the science of sound. Students construct physical devices to feel the vibrations that allow us to communicate across distances. Students also use digital devices to visualize the characteristics of different sound waves that cause us to hear different things.			

Stage 1: Desired Results

Massachusetts Learning Standards

- **4-PS4-1.** Develop a model of a simple mechanical wave (including sound) to communicate that waves: a. are regular patterns of motion along which energy travels, and b. can cause objects to move.
- **4-PS4-2.** Develop a model to describe that light must reflect off an object and enter the eye for the object to be seen.
- **4-PS4-3.** Develop and compare multiple ways to transfer information through encoding, sending, receiving, and decoding a pattern.*
- **Practices:**
 - 2.Developing and using models
 - 6.Constructing explanations (for science) and designing solutions (for engineering)

Transfer (Authentic, relevant application of learning to new situations)

Students will be able to independently use their learning to...

- Argue for and act on the importance of energy to life. (Is)



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- Use principles of the physical world to assess designed products and systems based on social needs and wants. (t/e)

Meaning

Enduring Understandings

Students will understand that...

- Waves are a way that energy travels and are used to send and receive information.
- Technology solves a problem and is driven by human wants and needs.
- Technology changes the way people live and interact with one another.

Essential Questions

Students will consider...

- How can waves differ from one another?
- How are waves used to send and receive information?
- How can humans use waves to improve their lives?

Acquisition

Knowledge

Students will know...

- waves are regular patterns of motion along which energy travels.
- waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).
- high-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form (pulses of energy)) to voice—and vice versa.

Skills

Students will be skilled at...

- developing a model using an analogy, example, or abstract representation to describe waves and their patterns. (4-PS4-1)
- developing a model to describe light must bounce off an object and enter the eye for the object to be seen. (4-PS4-2)
- generating and comparing multiple solutions to transfer information through encoding, sending, receiving, and decoding a pattern.* (4-PS4-3)



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| <ul style="list-style-type: none">• technological products or devices are made up of parts• light must bounce off an object and enter the eye for the object to be seen (light travels in a wave)• humans can choose different ways to transfer information (ie, using sound waves such as drums or Morse code or image patterns such as using a grid of 1's and 0's representing a black and white picture)• Vocabulary: wave, wavelength, amplitude, pitch, code, encoding, decoding, pattern | |
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