Classroom Teacher Preparation

Physics 10: Sound

Please use the following to prepare for the next SfS lesson.

Description:

This lesson provides an introduction to sound, a form of energy transmitted as a longitudinal wave with a wavelength, frequency, and amplitude. A series of workstations allows students to explore how the pitch (frequency) and volume (amplitude) of sound waves can be changed in different homemade musical instruments.

Lesson Objectives – SWBAT ("Students Will Be Able To…"):

3rd-8th

- Identify that a sound is a vibration and that it needs to travel through matter
- Demonstrate and explain how to change the pitch and volume of a sound

Disciplinary Core Idea (DCI):

PS4 Waves and their Applications in Technologies for Information Transfer – PS4.A Wave Properties

- (3rd-5th) Waves are regular patterns of motion, which can be made in water by disturbing the surface. Waves of the same type can differ in amplitude and wavelength. Waves can make objects move.
- (6th-8th) A simple wave model has a repeating pattern with a specific wavelength, frequency, and amplitude, and mechanical waves need a medium through which they are transmitted. This model can explain many phenomena including sound and light. Waves can transmit energy.

Science & Engineering Practice (SEP)

Planning and Carrying Out Investigations

- (3rd-5th) Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- (6th-8th) Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.

Crosscutting Concept (CCC)

Energy and Matter: Flows, Cycles, and Conservation

- (3rd-5th) Energy can be transferred in various ways and between objects.
- (6th-8th) The transfer of energy can be tracked as energy flows through a designed or natural system.

Preparation:

The lesson is an introduction to sound, which is a form of energy. If you feel that background information on the topic of energy would be helpful, then we suggest teaching *Physics 16: Energy* prior to this lesson.

Room Set Up for Activities:

The activity consists of 4-5 stations, one of which uses water. A table or cluster of desks will be needed for each station.

Teachers should understand that because of the nature of the subject material, the activity period will be noisy. Schools often prefer that this lesson be scheduled to avoid standardized testing periods, to avoid disturbing other classrooms.

Safety:

There are no safety concerns for this lesson.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on forms of **Energy** and **Waves**. Modules include:

Physics 16: Energy – This station-based module explores the different forms of energy, and the conversions from one form to another.

Physics 13: Light Reflection, Transmission, & Absorption – This lesson can be an introduction to light. Students work in small groups through three activities demonstrating how light interacts with objects and how light is absorbed or transmitted by filters.

Earth Science 15: Seismic Waves – This module introduces students to the seismic waves, mechanical waves that occur in both transverse and longitudinal forms, and are responsible for earthquakes.

For other module sequences and groups, look here: www.sciencefromscientists.org/sequences

Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: http://www.sciencefromscientists.org/standards/

Lessons are matched to both national NGSS and local state standards.

After Our Visit:

Extend this lesson by creating a head harp that only you can hear.

Access this Extension activity by visiting the Classroom Post found on our website at sciencefromscientists.org/cohorts. Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at sciencefromscientists.org/open-response-questions. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

Additional Resources:

- SciShow Kids has a quick video that reviews the basics of sound production for the younger crowd (3:57): https://www.youtube.com/watch?v=3-xKZKxXuu0
- A short video on sound, with definitions of the features of waves (2:50): http://mass.pbslearningmedia.org/resource/ba1c1421-6d54-4044-98b7-496f325cccb7/sound/