

POWERHOUSE SCIENCE CENTER

3615 Auburn Blvd., Sacramento 95821 (916) 674-5000

Topics

Physical Sciences

Grades

3-5

Duration

60 minutes

Vocabulary

waves, wavelength, amplitude, wave propagation, molecule

Next Generation

Science Standards

Practices

Developing and Using Models

Core Ideas

PS4.A: Wave Properties

PS4.B: Electromagnetic Radiation

Crosscutting Concepts

Patterns: Similarities and differences in patterns can be used to sort, classify designed products.

Cause and effect: Cause and effect relationships are routinely identified

Fantastic Physics

Overview

In this introduction to waves, students observe and demonstrate wave propagation using a wave machine and metal slinky. They construct a model of a wave and label the parts. Students then work on generating sound waves using tuning forks and the relationship between what they hear and the wave amplitude. They plan an experiment where they use sound waves to move objects and displace water. They record the information in their lab journal.

Students work with flashlights, mirrors and diffraction grating to understand the properties of light waves.

Objectives

- Students observe wave propagation.
- Students use models to generate wave motion.
- Students construct a wave model and label the parts.
- Students use tuning forks to generate different sound waves and understand the relation between amplitude and what a wave sounds like.
- Students use sound waves to move objects.
- Students describe how objects are visible only because of the light reflecting from them.

Teacher Preparation

- Please arrive at Powerhouse with enough time to allow students and chaperones to use the restroom before the program begins.
- If program starts late, content will be altered to fit available time.
- The teacher is required to remain in the lab throughout the presentation.
- Students will work in pairs. Be sure to assign pairs who will work well together.

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Next Generation Science Standards

Performance Expectations

4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can move objects

4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen

Vocabulary

Wave: a disturbance that travels through space and matter transferring energy from one place to another

Wavelength: distance between two crests (peaks) or troughs (valleys)

Amplitude: the vertical distance between a peak or a valley and the equilibrium point

Wave propagation: the movement of spreading of waves

Molecule: the particles that move in a sound wave. Sound needs molecules to move

Fantastic Physics

Extended Learning Activity

-Teach Engineering STEM Curriculum K-12

Hands-on Activity: Simon Says Big Amplitude, Small Wavelength!

https://www.teachengineering.org/activities/view/cub_soundandlight_lesson2_activity1

-RAFT

Spectrum Bracelet:

<http://raft.education/wp-content/uploads/2018/07/136-Spectrum-Bracelet.pdf>

Resources

-American Museum Of Natural History

<https://www.amnh.org/explore/ology/physics#hands-on>

-Exploratorium

<https://www.exploratorium.edu/snacks/subject/waves>