



Properties of Waves on Water: Lesson Plan

Properties of Mechanical Waves on Water



Summary

Waves on a body of water are caused by air moving across the surface of the water. Waves in deep water transfer energy, not the water molecules. Amplitude, wavelength, and the patterns of the motion of waves are all affected by the amount of energy involved in the interaction between the water and the wind.

Engineering Connections

Use evidence to construct an explanation. Make observations to produce data to serve as the basis for evidence for an explanation of a phenomena or test a design solution. Frame a hypothesis based on observations and scientific principles. Develop a model to describe unobservable mechanisms. Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon.

Objectives

After completing the lesson activity, students will be able to:

- Describe the pattern of the water molecules in a deep water wave.
- Explain the pattern of water molecules near the shore.
- Define amplitude, wavelength, crest, trough, and waves.

Standards

Oklahoma Academic Standards: Science

4-PS4-1 Waves and their Applications in Technologies for Information Transfer – Develop a model of waves to describe patterns in terms of amplitude and wavelength and to show the waves can cause objects to move.

Materials List (per group or individual completing an experiment)

- Slinky
- Ruler or tape measure
- Shallow pan to hold water
- Rock
- Cup to transfer water
- Water
- Toothpick



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Worksheets and Attachments

Student sheets

- Water Wave Basics (background information for students)
- Exploration: Wavelength and Amplitude (experiment #1)
- Exploration: The Movement of Energy (experiment #2)
- Exploration: The Motion of the Ocean (experiment #3)
- Design a Model Shoreline (Extension)
- Vocabulary

Engagement

Ask students what they know about waves. What experiences might they have had with waves while visiting a beach. How did the waves make them feel? What did they see? Or hear? Write students' comments on the board.

Share video with the students. Example:

<https://oceanservice.noaa.gov/facts/wavesinocean.html>

<https://www.youtube.com/watch?v=uJDuziVWMaE>

Extension and Engagement

The following video is more advanced and includes the additional vocabulary words, sound waves, waves on water, transverse waves, longitudinal waves, frequency, speed equals frequency X wavelength

<https://www.youtube.com/watch?v=RVyHkV3wlyk>

Create a wave machine with duct tape and jelly babies.

https://www.youtube.com/watch?v=VE520z_uqcU