

Unit Learning Targets

Department: Science

Course: Physics/Physics with Technology

Instructor(s): Jessica Rodriguez

Standard V: Students will understand transfer the properties and applications of waves.

Objective 1: Demonstrate an understanding of mechanical waves in terms of general wave properties. (Unit 7A: Waves and Sound)

Student-Friendly Learning Target Statements

Know	Knowledge Targets <i>"What I need to know"</i>	<p>I know that waves are a form of periodic motion.</p> <p>I know that waves are a form of transfer of energy without transferring matter.</p> <p>I know that the frequency of a wave is the number of cycles or waves per second and is measured in Hertz.</p> <p>I know that the wavelength of a wave is the distance between two like points on a wave (crest to crest, trough to trough, compression to compression, etc.).</p> <p>I know that in transverse waves particles oscillate perpendicular to the direction of the wave.</p> <p>I know that in longitudinal waves, particles oscillate parallel to the direction of the wave.</p> <p>I know that the speed of a mechanical wave depends on the medium it travels through.</p> <p>I know that wave reflection and interference can produce standing waves.</p> <p>I know that the frequency of a sound determines its pitch.</p> <p>I know that the intensity of a sound determines its loudness.</p> <p>I know that there is relative motion between a sound source and an observer, the Doppler effect will affect the pitch of the sound heard.</p> <p>I know that interfering sound waves can produce beats and affect the timbre of a sound.</p>
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Do	Reasoning Targets <i>"What I can do with what I know."</i>	<p>I can relate simple harmonic motion to the periodic motion of waves.</p> <p>I can distinguish between the frequency and period of a wave.</p> <p>I can label properties of waves of such as the wavelength, amplitude, crest, trough, compression, and rarefaction.</p> <p>I can compare and contrast a wave pulse, transverse wave, and a longitudinal wave.</p> <p>I can relate the wave speed to the wavelength and frequency of a wave.</p> <p>I can describe what happens when a wave reaches a boundary (reflection and refraction) and how echoes are produced.</p> <p>I can describe how waves interfere with each other and describe the resulting wave.</p> <p>I can use the principle of superposition to describe resonance and standing waves.</p> <p>I can distinguish between nodes and antinodes on a standing wave.</p> <p>I can explain why sounds experience the Doppler shift and describe some of its applications.</p> <p>I can use the principle of superposition to describe how beats and timbre are produced.</p>
	Skill Targets <i>"What I can demonstrate."</i>	<p>I can calculate the velocity, frequency, period, and wavelength of a wave.</p> <p>I can determine the distance between a sound source and a barrier from an echo using the wave equation.</p> <p>I can determine the number of beats will be produced when two sound waves interfere with each other.</p>
	Product Targets <i>"What I can make to show my learning."</i>	<p>I can make waves of different frequencies and wavelength on a spring.</p> <p>I can draw transverse and longitudinal waves and label their properties.</p> <p>I can draw waves that result from interference of two other waves.</p>

Essential Learning: The critical knowledge, skills, and dispositions each student must acquire as a result of this unit of instruction.

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