

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 2: Describe the nature of electromagnetic radiation and visible light (Unit 7B: Light).

Student-Friendly Learning Target Statements

Know	<p>Knowledge Targets</p> <p><i>"What I need to know"</i></p>	<p>I know that the energy of an electromagnetic wave is related to its frequency.</p> <p>I know the different types of waves that make up the electromagnetic spectrum.</p> <p>I know that electromagnetic waves do not require a medium to travel through.</p> <p>I know that all electromagnetic waves travel at the same speed through empty space.</p> <p>I know that colors seen are different wavelengths of visible light reflecting off a surface or transmitted through when others are absorbed.</p> <p>I know why the sky is blue during the day and what produces colorful sunsets and rainbows.</p> <p>I know that light waves can be approximated using rays.</p> <p>I know that electromagnetic waves slow down and refract when entering different media.</p> <p>I know that refraction of light rays produces mirages.</p> <p>I know that total internal reflection occurs when light waves traveling through a medium of high index of refraction to a medium of low index of refraction are sent at or beyond the critical angle and that this is the basis for fiber optics.</p> <p>I know that the Doppler shift affects the frequency of electromagnetic waves when there is relative motion between the source and the observer.</p> <p>I know that mirrors and lenses can produce real and virtual images and that only real images can be projected onto a screen.</p> <p>I know that waves diffract around edges or corners.</p> <p>I know that laser light is coherent and monochromatic, and what the acronym stands "laser" stands for.</p> <p>I know that light waves can interfere with one another.</p>
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Do	Reasoning Targets <i>"What I can do with what I know."</i>	<p>I can relate the wave speed to the wavelength and frequency of a wave.</p> <p>I can differentiate between the different types of electromagnetic radiation.</p> <p>I can determine what color is produced by mixing colors of light and pigment.</p> <p>I can describe wave motion upon reflection and refraction.</p> <p>I can distinguish between diffuse and specular reflection.</p> <p>I can explain what happens to light waves that travel through a polarizer.</p> <p>I can determine whether a diverging lens or a converging lens is necessary to correct vision problems.</p> <p>I can describe patterns of interference of light waves and diffraction.</p>
	Skill Targets <i>"What I can demonstrate."</i>	<p>I can calculate the energy, velocity, frequency, period, and wavelength of a wave.</p> <p>I can label waves on the electromagnetic spectrum and describe applications of each type.</p>
	Product Targets <i>"What I can make to show my learning."</i>	<p>I can draw color wheels to show the mixing of colored light and pigment.</p> <p>I can draw ray diagrams to determine image position, height, and whether it is a real or a virtual image for plane mirrors, convex mirrors, and concave mirrors.</p> <p>I can draw ray diagrams to determine image position, height, and whether it is a real or a virtual image for convex lenses and concave lenses.</p> <p>I can make a periscope or a telescope to show understanding of reflection and refraction of light.</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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