

Physics - Unit 6 - Waves and Harmonic Motion

Unit Focus

Students will explore the anatomy of waves, types of waves, and wave interactions. Students will begin with analyzing common oscillators, objects which make repetitive motions (such as pendulums and springs). Through this analysis, students will uncover the periodic motion of oscillators and waves, as well as what factors dictate their motion. Ultimately, students will analyze how information can be transmitted on waves.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
<p>Next Generation Science <i>High School Physical Sciences: 9 - 12</i></p> <ul style="list-style-type: none"> Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. <i>HS-PS4-1</i> Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. <i>HS-PS4-5</i> <p>Student Growth and Development 21st Century Capacities Matrix <i>Creative Thinking</i></p> <ul style="list-style-type: none"> Imagining: Students will be able to conceive of a novel approach to create a text, performance, solution, application, or inquiry. <i>MM.2.2</i> Design: Students will be able to engage in an appropriate process to refine their product. <i>MM.2.3</i> 	T1 Use the scientific process to generate evidence that addresses the original questions.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<p>U1 When waves encounter objects they can reflect, refract, diffract or absorb depending on the property of material.</p> <p>U2 Two or more waves that occupy the same space at the same time may interfere constructively or destructively.</p>	<p>Q1 How are standing waves created?</p> <p>Q2 How do the fundamental forces of the universe explain the behavior and interactions of objects? (e.g. particles, people, stars, planets)</p> <p>Q3 How are waves beneficial?</p>
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<p>K1 Students will understand that the cause of every wave is a vibrating source</p> <p>K2 Students will be able to define the word medium and be able to identify the mediums of common waves.</p> <p>K3 Students will be able to diagram a wave by identifying features (amplitude, wavelength, frequency etc)</p> <p>K4 Students will be able to define simple harmonic motion and identify the force(s) creating this motion in pendula, springs and other situations</p>	<p>S1 solve spring and pendulum problems for period, frequency or force</p> <p>S2 calculate the period and frequency for an object in SHM</p> <p>S3 draw standing waves and identify wavelength, amplitude and calculate velocity of the wave</p> <p>S4 describe how the spring constant affects the period of a spring in SHM</p>