

Physical Science Frameworks Curriculum Guide

Patterns in Waves

Crosscutting Concepts: Patterns; Energy and Matter

Topics: Electromagnetic and Mechanical Waves; Reflection, refraction, interference and diffraction; Sound and Light; Doppler Effect

4-week Instructional Segment

Anchoring Phenomenon	GSE	Sample Lessons	Disciplinary Core Ideas	Science and Engineering Practices	Instructional Notes
<p>Overall: Car or rockets and how they stop, start and/or change direction.</p> <p>Lesson Level: Sound changes as a car passes you. (Doppler Effect)</p>	<p>SPS9a, b, c, d, e; SPS7a</p>	<p>Doppler Effect, Can You Hear That?</p>	<p>Frameworks of K-12 Science Education: <i>By the end of grade 12</i></p> <ul style="list-style-type: none"> • The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. • The reflection, refraction, and transmission of waves at an interface between two media can be modeled on the basis of these properties. 	<p>Analyzing and interpreting data</p> <p>Asking questions and defining problems</p> <p>Developing and using models</p> <p>Constructing explanations</p>	<p>Additional topic, focus, and Phenomena notes can be found within instructional segment.</p> <p>Safety When using sources of light (such as lasers) careful protection of vision is important. Also, hearing precautions should be used if loud sounds will be analyzed.</p> <p>By the end of this unit, students are using the following language in their speaking and writing during EXPLAIN or ELABORATE.</p> <ul style="list-style-type: none"> -Waves -Electromagnetic waves -Mechanical waves -Wavelength -Frequency -Amplitude

					<ul style="list-style-type: none">-Reflection-Interference-Diffraction-Sound and Light waves-Doppler Effect
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This instructional segment will connect to all other instructional segments of this course. The creation of waves would not be possible without the displacement of matter, and the principles of force and motion, to a large effect, govern the properties and motion of waves. Understanding of atomic and molecular movements as well as the properties of solids, liquids, gases and plasma, are essential to the understanding of how waves behave. As with all other segments, direct connections to the overarching phenomena of cars and/or rockets should be made during instruction. Using sonic booms in rockets, or the doppler effect as a car passes are examples of ways in which to make these connections.