

Grade 6: Waves and Electromagnetic Radiation

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> - Nature of Science- Students will work collaboratively and individually to generate testable questions or define problems in terms of given constraints and criteria; plan and conduct investigations or apply engineering design practices to analyze and interpret data, and construct and communicate evidence-based explanations or possible optimal solutions. - Patterns- Students will observe, predict, and analyze patterns in order to support evidence-based claims about relationships (e.g., cause and effect, structure and function, macroscopic and microscopic). - Structure and Function- Students will analyze the relationship among structure and function of natural or human designed objects, using evidence to redesign or support claims about survival and/or improved performance - Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. - Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. - Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> - MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. - MS-PS4-2. Develop and use a model to describe that		
	<i>Transfer</i>	
	<i>Students will be able to independently use their learning to interpret and respond to sensory information produced by sound and light waves.</i>	
	<i>Meaning</i>	
	ENDURING UNDERSTANDINGS <i>Students will understand that...</i> - graphs and charts can be used to identify patterns in data. - structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. - structures can be designed to serve particular functions.	ESSENTIAL QUESTIONS - Which has contributed more to today's world: light energy or sound energy?

waves are reflected, absorbed, or transmitted through various materials - MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	Acquisition	
	<i>Students will know...</i> - that a sound wave needs a medium through which it is transmitted. - that when light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object’s material and the frequency (color) of the light. - that the path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. - that because light can travel through space, it cannot be a matter wave, like sound or water waves. - that digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information. <u>vocabulary</u>: compression, rarefaction, crest, trough, wavelength, amplitude, frequency, refraction, reflection, digital, analog, opaque, transparent, translucent	<i>Students will be skilled at...</i> - using mathematical representations. - developing and using models. - integrating qualitative scientific and technical information to support claims.

Content Area Literacy Standards	21st Century Skills
RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 6-8 texts and topics</i>. RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually. RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. WHST.6-8.1 Write arguments focused on <i>discipline-specific content</i>. WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.6-8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently. WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.	• <i>reason effectively</i> • <i>adapt to change</i> • <i>access and evaluate information</i> • <i>use systems thinking</i>

Stage 2 - Evidence	
Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan

Summary of Key Learning Events and Instruction

Science and Engineering Practices

- S&EP 1 Asking questions and defining problems
- S&EP 4 Analyzing and interpreting data
- S&EP 7 Engaging in argument from evidence
- S&EP 8 Obtaining, evaluating and communicating information

Mathematics Integration

- MP.2 Reason abstractly and quantitatively.
- MP.4 Model with mathematics.
- 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- 6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems. • 7.RP.A.2 Recognize and represent proportional relationships between quantities. • 8.F.A.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

Technology Integration

District Materials