Grades 6–8

3.2.6-8.Q Physical Science: Waves and Electromagnetic Radiation

Students who demonstrate understanding can *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.*

Clarifying Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.

Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
Using Mathematics and Computational Thinking Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments. • Use mathematical representations to describe and/or support scientific conclusions and design solutions. ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** • Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**Wave Properties** • A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude.	**Patterns** • Graphs and charts can be used to identify patterns in data.

Pennsylvania Context: N/A

PA Career Ready Skills: Explain to others one's own strengths, needs, and preferences specific to a context.

Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
Agriculture (AFNR)	CS.01.02.01.a: Research technologies used in AFNR systems.

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
Science, Environmental Literacy and Sustainability (NAAEE)	5-8 Strand 1.F. Working with models and simulations: Learners use models to analyze information that support their environmental investigations. They explain the purposes and limitations of these models.
PA Core Standards: ELA	CC.3.5.6-8.G: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
PA Core Standards and Practices: Math	MP.2: Reason abstractly and quantitatively. MP.4: Model with mathematics. CC.2.4.6.B.1: Demonstrate an understanding of statistical variability by displaying, analyzing, and summarizing distributions. CC.2.4.8.B.1: Analyze and/or interpret bivariate data displayed in multiple representations. CC.2.4.8.B.2: Understand that patterns of association can be seen in bivariate data utilizing frequencies.
PA Standards: Social Studies	N/A
Educational Technology (ISTE)	1.6. Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
Technology and Engineering (ITEEA)	STEL-1K: Compare and contrast the contributions of science, engineering, mathematics, and technology in the development of technological systems.