



Grade 4

3.2.4.E Physical Science: Waves and Their Applications in Technologies for Information Transfer

Students who demonstrate understanding can *develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.*

Clarifying Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.

Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
<p>Developing and Using Models</p> <p>Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> Develop a model using an analogy, example, or abstract representation to describe a scientific principle. <hr/> <p style="text-align: center;">Connections to Nature of Science</p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Science findings are based on recognizing patterns. 	<p>PS4.A: Wave Properties</p> <ul style="list-style-type: none"> Waves, which are regular patterns of motion, can be made in water by disturbing the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). 	<p>Patterns</p> <ul style="list-style-type: none"> Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.

Pennsylvania Context: N/A

PA Career Ready Skills: Identify one’s own strengths, needs, and preferences.

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.
Science, Environmental Literacy and Sustainability (NAAEE)	K-4 Strand 1.F. Working with models and simulations: Learners use models to represent environmental relationships, patterns, and processes.



Standard Source	Possible Connections to Other Standard(s) or Practice(s)
PA Core Standards: ELA	CC.1.5.4.A: Engage effectively in a range of collaborative discussions on grade-level topics and texts, building on others' ideas and expressing their own clearly.
PA Core Standards and Practices: Math	MP.4: Model with mathematics. CC.2.3.4.A.1: Draw lines and angles and identify these in two-dimensional figures. CC.2.4.4.A.2: Translate information from one type of data display to another.
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-2F: Describe how a subsystem is a system that operates as part of another, larger system.