

Unit 4 - Waves and their Application in Technologies for Information Transfer

Content Area: **Science**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

Unit Overview

In this unit of study, students use a model of waves to describe patterns of waves in terms of amplitude and wavelength and to show that waves can cause objects to move. The crosscutting concepts of patterns; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, and constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate their understanding of the core ideas.

Enduring Understandings

Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).

An object can be seen when light reflected from its surface enters the eyes.

Digitized information can be transmitted over long distances without significant degradation.

Sound can be natural or artificial. Both of which can be measured using pitch and volume.

Sound is reflected and/or absorbed by different materials. The nature of materials that sound travels through affects the transmission and absorption of sound.

The structure of the human ear and sound devices can enhance the quality of hearing.

Technology has influenced sound and how our society uses sound for communication.

Essential Questions

What are waves?

How does light reflect?

How is information transferred from place to place?

Learning Objectives

Complete investigations and hands-on activities to explore the effects of motion.

Discover the different parts of waves.

Explore how light can be reflected.

Examine and describe how information is transferred from place to place.

Model the way programs store and manipulate data by using numbers or other symbols to represent

information.

Explore careers related to computer science and physics.

Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

Standards: Content

SCI.3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
SCI.3-5.ETS1.C	Optimizing the Design Solution
SCI.4-PS4-1	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
SCI.4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
SCI.4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.

Standards: Interdisciplinary

Assessment Evidence

Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Science Starter's/Do Nows, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research, Lab Activities, Vocabulary Responses, Exit Questions, Interactive Digital Assessments embedded in Exploring Science Digital Book
Summative	Projects, Tests, Quizzes, lab skills demonstrations, projects, and vocabulary quizzes.
Alternative & Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments
<u>Assessment Evidence Resource</u>	

Instructional Resources

Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Brain Pop, Middle School Science, Generation Genius Digital Curriculum, Mystery Science Digital Curriculum, Amplify Digital Curriculum, Microsoft 365, Primary and Secondary Source Documents,

Assorted lab materials

[Instructional Resource List](#)

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

Amistad	Diversity, Equity, and Inclusion
Holocaust	LGBT and Disabilities (Grades 6-12)
Climate Change	Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

[NJ Social and Emotional Learning Competencies & Sub-Competencies](#)

	Self-Awareness	X	Relationship Skills
X	Responsible Decision-Making		Social Awareness
	Self-Management		

21st Century Skills & Themes

	Global and Cultural Awareness	Technology Literacy	Planning and Budgeting
X	Creativity and Innovation	Financial Institutions	Risk Management and Insurance
X	Information and Media Literacy	Digital Citizenship	Economic and Government Influences
X	Critical Thinking and Problem Solving	Credit Profile	Career Awareness and Planning
	Civic Financial Responsibility	Financial Psychology	

