Unit 6 - Light Waves

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

Unit Overview

Students use a digital model, obtain information from articles, and conduct hands-on investigations to discover how different types of light interact with different types of matter (energy and matter). They use these ideas and analyze data to construct explanations about the cause of Australia's high rate of skin cancer (cause and effect).

Enduring Understandings

The movement of energy can be tracked by observing the changes the energy causes to matter.
Light carries energy that causes materials to change. When light hits a material, the material can absorb energy from the light. When a material absorbs energy from light, the energy causes the material to change.
A light source can emit more than one type of light. Different types of light have different wavelengths. A material absorbs energy from some types of light and not others.
Light travels in a straight line. When a light wave hits a material, the light can be absorbed by the material, transmitted through the material, or reflected off the material. A material transmits or reflects some types of light and not others.
When light is transmitted through or reflected off a material, the energy is not absorbed, so the material does not change.

Essential Questions

How does light interact with materials?
Why can light cause materials to change?
Is all light the same?
What makes types of light different?
What can happen to light as it travels?
What happens to energy when light is transmitted through or reflected off a material?

Learning Objectives

The movement of energy can be tracked by observing the changes the energy causes to matter.
Light carries energy that causes materials to change.
When light hits a material, the material can absorb energy from the light.
When a material absorbs energy from light, the energy causes the material to change.
There are different types of light that can change a material in different ways.
A light source can emit more than one type of light.

Different types of light have different wavelengths.
A material absorbs energy from some types of light and not others.
Light travels in a straight line.
When a light wave hits a material, the light can be absorbed by the material, transmitted through the material, or reflected off the material.
A material transmits or reflects some types of light and not others.
When light is transmitted through or reflected off a material, the energy is not absorbed, so the material does not change.
Investigate the effect of light on water, a solar-powered toy, and a material that changes color when exposed to light.
Test which materials are affected by sunlight in the Sim.
Create visual models showing their understanding of how light causes skin cancer.
Investigate the effects of light from a normal flashlight and a UV flashlight on material.
Analyze and write about evidence related to melanin and skin cancer.
Investigate absorption, transmission and reflection in the Sim.
Analyze evidence about how light interacts with different gases in the atmosphere and model the effect of the ozone hole on light reaching Australia.
Science Innovators Scrapbook Project. (Lessons satisfy the following legislative requirements: DEI, LGBTQIA+ & People w/ Disabilities, AAPI, Climate Change, and Amistad.

Standards: Content

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 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.

Standards: Interdisciplinary

Assessment Evidence

Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Warm Ups, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research
Summative	In correlation with the NJSLS, students must demonstrate the following as summative assessments: 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 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. Other summative assessments will include but are not limited to: projects, summative tests, lab skills demonstrations, vocabulary quizzes, and Science Fair projects.
Alternative & Benchmark	Alternative assessments as required by student IEP/504/I&RS- Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments
Assessment Evidence Resource	

Instructional Resources

Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Amplify Digital Curriculum, Generation Genius, BrainPop, Microsoft 365, Primary and Secondary Source Documents, Lab Materials as needed, Amplify Readings, Labs, Simulations

Instructional Resource List

Curricular Mandates

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

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

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

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

X	Self-Management		

21st Century Skills & Themes

X	Global and Cultural Awareness	X	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		