MP3b-Waves and Light

Content Area: **Science**
Course(s): **Science 4**
Time Period: **Marking Period 3**
Length: **MP3**
Status: **Published**

Essential Questions

- What are waves, what are they caused by, and how do scientists describe waves?
- How does light allow us to see and why do we see colors?
- How do plane mirrors reflect light and how is light refracted?

Big Ideas

- Waves are regular patterns of motion, which can be made in water by disturbing the surface.
- Waves of the same type can differ in amplitude and wavelength.
- Waves can make objects move.
- Objects can be seen when light reflected from their surface enters our eyes.

Cross-Curricular Integration

Integration Area: ELA

RI.CR.4.1. Refer to details and examples as textual evidence when explaining what an informational text says explicitly and make relevant connections when drawing inferences from the text.

Activity:

Students will use text evidence/facts to draw conclusions about the sun's role on Earth and how objects absorb light

Science and Engineering Practices

Using Mathematics and Computational Thinking:

- Organize simple data sets to reveal patterns that suggest relationships.

Enduring Understandings

Wave Properties

4-PS4.A Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across 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.

4-PS4.A Waves of the same type can differ in amplitude (height of the wave) and wavelength (distance between wave crests).

Electromagnetic Radiation

4-PS4.B An object can be seen when light reflected from its surface enters the eyes.

Focus Areas

Knowledge

- Waves are regular patterns of motion caused by a disturbance.
- In longitudinal waves, particles move in the same or opposite direction of the wave.
- In transverse waves, particles move up or down as the wave moves right or left.
- In order for us to see, light must reflect off of objects.
- We see colors when they are reflected and other colors are absorbed. When we see white, we are seeing all the colors reflected. When we see black, all the colors were absorbed.
- A plane mirror reflects light at the same angle it hits it and reflects an object the same distance away as it is from the mirror.
- Light bends as it passes from one material to another.

Skills

- Create a wave and explain how to manipulate various characteristics of the wave (like amplitude or wavelength)
- Create a simple device to transfer sound waves and explain why it can do so.
- Relate amplitude and wavelength to volume and pitch.
- Model changes in amplitude and wavelength on a one-string guitar.
- Explain how mirrors reflect objects and light.
- Use patterns to create a code to transfer information.

Understanding

- Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

- Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

Resources

Primary Resource

Pearson Interactive Science, 2016

- Chapter 1: Energy and Heat

Secondary Resources

Pearson Leveled Readers

- *Energy and Heat*
- *What is Light?*
- *Electricity's Power*

Scientific Inquiry

Core

- Transverse and Longitudinal Waves Lab
- Reflection and Refraction Lab