Unit 2: Heat, Light, and Sound

Content Area: **Science**
Course(s): **Science**
Time Period: **Generic Time Period**
Length: **Weeks**
Status: **Published**

Unit Overview

In the *Heat, Light, and Sound* unit, the students will learn how these three forms of energy can be observed in everyday life. They will explore the flow of heat, and how it can be transferred from one place to another. They will experiment with the properties of light and find out what happens when light passes through water. Finally, they will discover how sound is produced and how pitch and volume can be changed.

Standards

SCI.3-4.5.1.4.A.1	Demonstrate understanding of the interrelationships among fundamental concepts in the physical, life, and Earth systems sciences.
SCI.3-4.5.1.4.A.2	Use outcomes of investigations to build and refine questions, models, and explanations.
SCI.3-4.5.1.4.A.3	Use scientific facts, measurements, observations, and patterns in nature to build and critique scientific arguments.
SCI.3-4.5.1.4.B.1	Design and follow simple plans using systematic observations to explore questions and predictions.
SCI.3-4.5.1.4.B.2	Measure, gather, evaluate, and share evidence using tools and technologies.
SCI.3-4.5.1.4.B.3	Formulate explanations from evidence.
SCI.3-4.5.1.4.B.4	Communicate and justify explanations with reasonable and logical arguments.
SCI.3-4.5.1.4.C.1	Monitor and reflect on one's own knowledge regarding how ideas change over time.
SCI.3-4.5.1.4.C.2	Revise predictions or explanations on the basis of learning new information.
SCI.3-4.5.1.4.C.3	Present evidence to interpret and/or predict cause-and-effect outcomes of investigations.
SCI.3-4.5.1.4.D.1	Actively participate in discussions about student data, questions, and understandings.
SCI.3-4.5.1.4.D.2	Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories.
SCI.3-4.5.1.4.D.3	Demonstrate how to safely use tools, instruments, and supplies.
SCI.3-4.5.4.4.E.1	Develop a general set of rules to predict temperature changes of Earth materials, such as water, soil, and sand, when placed in the Sun and in the shade.

Essential Questions

1. How are heat, light, and sound different forms of energy?
2. How is energy observed and used in everyday life?

Application of Knowledge and Skills...

Students will know that...

- 1. Students will know that heat, light and sound are forms of energy found in our everyday lives.
- 10. Students will know that as the amount of energy increases so does the volume of the sound.
- 11. Students will know that the pitch of a sound can be high or low.
- 2. Students will know that most of Earth's energy comes from the sun.
- 3. Students will know that heat, light and sound can travel through matter.
- 4. Students will know that heat can be transferred from one place to another.
- 5. Students will know that heat is conducted through metals and nonmetals.
- 6. Students will know that light can be blocked, reflected or refracted.
- 7. Students will know what happens when light travels from air into water.
- 8. Students will know that light travels faster than sound.
- 9. Students will know that sound is produced when matter vibrates.

Students will be skilled at...

- A. identify heat, light and sound as three forms of energy found in our everyday lives;
- B. describe examples of heat, light and sound in our everyday life;
- C. explain how the energy for heat and light comes from the sun;
- D. demonstrate how heat, light and sound can travel through matter;
- E. explain how heat can be transferred from one place to another;
- F. explain how heat can be conducted through metals and nonmetals;
- G. show how heat follows cold;
- H. demonstrate and explain how light can be blocked and reflected;
- I. demonstrate and explain how light bends, or refracts, when it passes through water;
- J. give an example of how light travels faster than sound;
- K. demonstrate how sound is produced when matter vibrates;
- L. demonstrate how the volume of a sound increases when more energy is used;
- M. demonstrate and explain how the pitch of a sound can be changed.

Assessments

Diagnostic: Other written assessments
Heat, Light and Sound splash activity 5.2.4.C.1; 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1

Formative: Other written assessments
"What is Heat?" reading selection and lab activity assessment 5.2.4.C.1; 5.2.4.C.2; 5.2.4.C.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1 ; 5.1.4.C.2 ; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3; 5.4.4.E.1

Formative: Other written assessments
Lesson 26: Heat Transfer assessment activity 5.2.4.C.1; 5.2.4.C.2; 5.2.4.C.3; 5.1.4.B.1; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1 ; 5.1.4.C.2 ; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3; 5.4.4.E.1

Formative: Other written assessments
"What is Light?" reading selection and lab activity assessments 5.2.4.C.1; 5.2.4.C.4; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1 ; 5.1.4.C.2 ; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3

Formative: Other written assessments
Lesson 28: "Light" reading selection activities and assessments 5.2.4.C.1; 5.2.4.C.4; 5.1.4.B.1; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1 ; 5.1.4.C.2 ; 5.1.4.C.3; 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3

Formative: Other written assessments
"Light" Assessment Questions 5.2.4.C.1; 5.2.4.C.4; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1 ; 5.1.4.C.2 ; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3

Formative: Other written assessments
Assessment questions to accompany sound lab activities (Animal Babble, What Is Sound, Volume and Pitch, How Sound Travels, Tension and Pitch) 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3; 5.2.4.C.1; 5.2.4.C.3;

Formative: Other written assessments
"Physics of Sound" assessment 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.2.4.C.1; 5.2.4.C.3;

Formative: Other written assessments
Tension and Pitch Assessment Questions 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.2.4.C.1; 5.2.4.C.3;

Summative: Other written assessments
Grade 3 Benchmark Test: "Heat, Light and Sound" Unit 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3; 5.2.4.C.1; 5.2.4.C.2; 5.2.4.C.3; 5.2.4.C.4

Activities

*Heat, Light and Sound splash activity

A. HEAT

- "Going Up" activity
- "What Is Heat?" reading selection
- "Getting Warmer" lab experiment (Teacher Information)
- *"What is Heat?" lab activity assessment

- Lesson 26: Heat Transfer reading selection
- "Heat Chases Cold" reading selection and assessment experiment
- *Heat Transfer Follow-Up Discussion and Assessment Question

B. LIGHT

- "What Is Light?" reading selection, HSP text pp 562-568
- *"Where's The Light?" lab experiment and assessment
- Lesson 28: Light reading selection and activities
    - "How Light Travels"
    - *"Light Can Be Reflected" activity and assessment question
    - *"Which Will Soak Up Heat Faster?" Lab Activity and assessment question
- *"Light" Assessment Questions
- Read, Thundercake by Patricia Polacco

C. SOUND

- "Animal Babble" reading selection
- What Is Sound lab activity choices
    1. "Can You Guess the Sound? lab activity
    2. "How Is Sound Made" lab activity, reading selection and assessment questions
    3. "Sound and Vibration" lab activity and assessment questions (Door Fiddle)
    4. "Sound and Vibration" lab activity and assessment questions (Cluck a Chicken)
    5. "Long Gong" lab activity and assessment questions
- "Volume and Pitch" reading selection
- Volume and Pitch lab activity choices
    1. "Glasses of Water" lab activity (pitch)
    2. "What is Pitch?" straw lab activity
- "How Sound Travels (Sound Moving Through Matter)" reading selection
- *Physics of Sound assessment
- How Sound Travels lab activities
    1. Sound Through Air
    2. Sound Through Water
    3. Sound Through Solids, wood and/or string
- Tension and Pitch lab activities
    1. Minigutbucket
    2. Fossulele
    3. Stringbeam
- * Grade 3 Benchmark Test: "Heat, Light and Sound" Unit

Activities to Differentiate Instruction

Provide vocabulary cards/lists

Study Guides for assessments

Preprinted worksheets

Visual Aids for Instruction

Assigned lab partners/lab groups

Instruction for using measurement tools

Read tests aloud

Resource supplements (i.e. books from library) available for further research

Computer websites for further research

Blank booklets provided for student research

Integrated/Cross-Disciplinary Instruction

Thunder Cake, by Patricia Polacco

Resources

HSP New Jersey Science, Harcourt School Publishers, 2009

Discover the Wonder, Scott Foresman Science

Physics of Sound module, Delta Education, 2003