Unit 1 Energy (Sunlight)

Content Area: **Science**
Course(s): **Science K**
Time Period: **Marking Period 1**
Length: **MP 1**
Status: **Published**

Essential Questions

- What are characteristics of the sun?
- Can structures reduce the warming effect of sunlight on Earth's surface?
- How does the sun make things hot?
- How does shade keep you cool?
- Why does it get cold in winter?
- Why do some surfaces get hot and how can we make them less hot?

Big Ideas

In this unit, students make observations to explore how sunlight warms the Earth's surface. The Sun's energy heats up pavement, keeps us warm, and can even melt marshmallows. Using what they learn, students think about ways shade and structures can reduce the warming effect of the Sun.

Science and Society

Horace-Bénédict de Saussure

A physicist and environmentalist from Switzerland who invented the first successful solar cooker, though at the time he called it a "solar collector. "

Diversity Integration

Objective: Students will be able to relate how snowflakes are unique to how people are unique.

Activity: The students will listen to Snowflake Bentley on Bookflix. The teacher will lead a discussion about

how people, like snowflakes, are all different but special in their own way. The students will create their own paper snowflakes and share them with the class.

CSDT Technology Integration

8.2.2.C.1: Brainstorm ideas on how to solve a problem or build a product.

8.2.2.D.1: Collaborate and apply a design process to solve a simple problem from everyday experiences.

8.2.2.ITH.3: Identify how technology impacts or improves life.

Science and Engineering Practices

Planning and Carrying Out Investigations-

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons.

Constructing Explanations and Designing Solutions-

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.

Asking Questions and Defining Problems-

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions

- Ask questions based on observations to find more information about the natural and/or designed world(s).

- Define a simple problem that can be solved through the development of a new or improved object or tool.

Analyzing and Interpreting Data-

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

STEAM Activity: An Engineering Challenge- A Place in the Shade

- Objective- Students will demonstrate knowledge of the engineering and design process by creating a structure that provides shade.

Enduring Understandings

Next Generation Science Standards

K-PS3-Energy (Climate Change Standards)

- K-PS3-1: Make observations to determine the effect of sunlight on Earth's surface.
- K-PS3-2: Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

K-2-ETS-1- Engineering Design

- K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- Disciplinary Core Ideas (Climate Change Core Ideas)

  PS3.B- Conservation of Energy and Energy Transfer

  - Sunlight warms Earth's surface. (K-PS3-1), (K-PS3-2)

  ETS1.A: Defining and Delimiting an Engineering Problem

  - A situation that people want to change or create can be approached as a problem to be solved through engineering.
  - Asking questions, making observations, and gathering information are helpful in thinking about problems.
  - Before beginning to design a solution, it is important to clearly understand the problem.
- Cross-Cutting Concepts

Cause and Effect

- Events have causes that generate observable patterns.

Focus Areas

Knowledge

- How sunlight affects different surfaces on Earth. Use the terms warm, cool, and hot.

Skills

- Describe the sun's characteristics
- Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. They will choose materials for their design that will create shade.
- Experiment with different types of materials (opaque, transparent, and reflective) to figure out how to reflect light.
- Compare the warmth of Earth materials placed in sunlight and the same Earth materials placed in shade.
- Observe the sun's path in the summer and winter.

Understandings

- Make observations to determine the effect of sunlight on Earth's surface.
- Understand that people use shade to keep cool.
- Realizing light from the sun keeps the earth warm.
- Determine the effect of sunlight on Earth materials by identifying patterns of relative warmth of materials in sunlight and shade (i.e, qualitative measures of temperature: e.g., hotter, warmer, colder).

Climate Change

K-PS3-1: Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2: Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area

- Activity: In this unit, students make observations to explore how sunlight warms the Earth's surface. The Sun's energy heats up pavement, keeps us warm, and can even melt marshmallows. Using what they learn, students think about ways shade and structures can reduce the warming effect of the Sun.

Resources

Primary Resources

- BrainPop, Jr.
- Mystery Science

Core Instructional Materials

- Mystery Science Anchor Phenomenon: Solar Sizzle
- Mystery Science "How Can You Warm Up a Frozen Playground?"
- Mystery Science "How Can You Walk Barefoot Across Hot Pavement Without Burning Your Feet?"
- Mystery Science “Why Does it Get Cold in Winter?”
- Mystery Science “Can You Use the Sun to Cook Food?”

Supplemental Instructional Materials

- Sun’s Effect on Sand vs. Grass Lab
- Sun's Effect Hard Surfaces Lab
- Sun’s Effect on Ocean’s Surface Lab
- Sun’s Effect on Water vs. Sand Lab
- Build a Solar Stove Lab
- Make Solar S’Mores Lab (Mystery Science)
- Where is it Warmer? Activity (Mystery Science)
- Can Animals Get a Sunburn Mini Lesson (Mystery Science)
- Black, White or Silver Activity (Mystery Science)