Kindergarten Unit 2 - Effects of the Sun

Content Area: **Science**
Course(s): **Science Grade K**
Time Period: **MP2**
Length: **22 days**
Status: **Published**

NJSLS - Science

SCI.K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.
SCI.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.
SCI.K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
SCI.K-PS3-1	Make observations to determine the effect of sunlight on Earth's surface.
SCI.K-PS3-2	Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Science and Engineering Practices

Planning and Carrying Out Investigations

Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)

Constructing Explanations 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. (K-PS3-2)

Asking Questions and Defining Problems

Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)

Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

Developing and Using Models

Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

Analyzing and Interpreting Data

Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)

Disciplinary 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 Engineering Problems

A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)

Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)

Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

ETS1.B: Developing Possible Solutions

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)

ETS1.C: Optimizing the Design Solution

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

Crosscutting Concepts

Cause and Effect

Events have causes that generate observable patterns. (K-PS3-1, K-PS3-2)

Structure and Function

The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Scientific Investigations Use a Variety of Methods

Scientists use different ways to study the world. (K-PS3-1)

Rationale and Transfer Goals

How can we use science to keep a playground cool in the summertime?

During this unit of study, students apply an understanding of the effects of the sun on the Earth's surface. The crosscutting concepts of cause and effect and structure and function are called out as organizing concepts for this disciplinary core idea. Students are expected to demonstrate grade-appropriate proficiency in developing and using models; planning and carrying out investigations; analyzing and interpreting data; and designing solutions. Students are also expected to use these practices to demonstrate an understanding of the core ideas.

Enduring Understandings

Dark and light colored surfaces in sunlight are warmed by different amounts and at different rates.

Different materials in sunlight are warmed by different amounts and at different rates.

Structures create shade; they block sunlight.

Essential Questions

How does sunlight affect the playground?

Imagine that we have been asked to design a new playground. How would we keep the sand, soil, rocks, and water found on the playground cool during the summer?

Content - What will students know?

- Scientists use different ways to study the world.
- Events have causes that generate observable patterns.
- Sunlight warms the Earth's surface.
- The shape and stability of structures of natural and designed objects are related to their functions.
- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

Skills - What will students be able to do?

- Observe patterns in events generated by cause and effect relationships.
- Make observations to collect data that can be used to make comparisons.
- Make observations to determine the effect of sunlight on earth's surface.
- Describe how the shape and stability of structures are related to their function.
- Use tools and materials to design and build a device that solves a specific problem or a solution to a specific problem.

- Use tools and materials to design and build a structure that will reduce the warming effects of the sun.
- Brainstorm a list of objects that reduce the warming effects of the sun.
- Make and use observations to determine if the designs worked as intended.

Activities - How will we teach the content and skills?

- Mystery Science Sunlight and Warmth Lesson 1
- Mystery Science Sunlight and Warmth Lesson 2
- Mystery Science Sunlight and Warmth Lesson 3
- Sunlight and Warmth
- Brainpop Jr. Sun
- Sunlight Warms the Earth
- Shade Structure Design
- Observing the Sun
- The Sun's Heat Unit

Evidence/Assessments - How will we know what students have learned?

- Mystery Science Sunlight and Warmth Lesson 1 Assessment
- Mystery Science Sunlight and Warmth Lesson 2 Assessment
- Mystery Science Sunlight and Warmth Lesson 3 Assessment
- Teacher Observation
- Student projects/models
- Individual and Group Participation
- Exit Tickets
- Quizzes
- Kindergarten Unit 2 Benchmark

Spiraling for Mastery

Content or Skill for this Unit	Spiral Focus from Previous Unit	Instructional Activity
The effects of the sun on the surface of the Earth. Patterns of change. Warming effect of sunlight. The shape and stability of structures of designed objects are related to their function.	N/A	Brainpop Jr. Sun Sunlight Warms the Earth Observing the Sun The Sun's Heat UNit Casting Shadows Across Literacy and Science A Big Star The Warmth of the Sun The Sun Lesson Plan Cooler in the Shadows

21st Century Life and Careers

WRK.9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.

Career Readiness, Life Literacies, & Key Skills

TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
TECH.9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
TECH.9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
TECH.9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
TECH.9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

Interdisciplinary Connections/Companion Standards

NJSLS ELA

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS3-1, K-PS3-2)

RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1, K-2-ETS1-3)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1, K-2-ETS1-3)

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

NJSLS Mathematics

K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of/less of" the attribute, and describe the difference. (K-PS3-1, K-PS3-2)

MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1, K-2-ETS1-3)

MP.4 Model with mathematics. (K-2-ETS1-1, K-2-ETS1-3)

MP.5 Use appropriate tools strategically. (K-2-ETS1-1, K-2-ETS1-3)

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1, K-2-ETS1-3)

English Language Arts

With guidance and support from adults, students recall information from experiences and gather information from books (read-alouds, big books) and other resources about the warming effects of the sun. Strategies such as Think-Pair-Share can be used to encourage students to think about and use information from books to answer questions and share their thinking. Kindergartners can add drawings or other visual displays to

descriptions to provide additional detail about the structures they built to reduce the warming effects of the sun. With guidance and support from adults, students produce and publish their descriptions and observations of the structures they designed and built.

Mathematics

Students make comparisons of objects using relative temperature [hotter, colder, warmer, cooler] and describe the objects as warmer or cooler. Students can classify the objects into categories (warmer/cooler), then count and compare the number of objects in each category. Data should be organized and compared so that students understand that placing objects in the sun generates an observable pattern of change (i.e., the objects get warmer). Kindergarteners attend to the meaning of various quantities using a variety of measurement tools, such as thermometers