Kindergarten Unit 2 - Effects of the Sun

Content Area: **Science**
Course(s): **Science Grade K**
Time Period: **MP2**
Length: **15 days**
Status: **Published**

NJSLS - Science

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.
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.
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.

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)

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.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)

Scientific Investigations Use a Variety of Methods

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

Rationale and Transfer Goals

In this foundational physical science unit, students explore the observable patterns of how sunlight warms the Earth’s surface. Kindergarteners act as scientists by conducting outdoor observations to feel and compare the sun's relative temperature effects on surfaces like sand, soil, rocks, and water. Transitioning into engineers, students then design, build, and test a small structure (such as an umbrella or canopy) to explicitly solve a real-world problem: reducing the warming effects of the sun on an area.

Enduring Understandings

Sunlight hits the Earth and warms up its surface (sand, soil, rocks, water).

We can use simple tools and everyday materials to design and build structures that create shade and keep areas cooler.

Essential Questions

How does the sun change the temperature of things we touch outside?

How can we protect ourselves and other surfaces from getting too hot from the sun?

Content - What will students know?

- The sun shines on the Earth and provides warmth to the surfaces it touches.
- Different materials on Earth's surface (like sand, soil, rocks, mulch, asphalt, and water) heat up at different rates when exposed to sunlight.
- An area or object blocked from direct sunlight stays cooler than an area or object sitting in direct sunlight.
- Opaque materials (materials you can't see through) block sunlight and cast a shadow, which is how we create shade.
- Humans can intentionally design and build things like umbrellas, hats, tents, or awnings to block the sun's rays and reduce its warming effect on an area.

- Some materials work better than others at blocking light and creating effective shade (e.g., thick construction paper or fabric works better than clear plastic wrap).
- Solving a problem involves looking at what is wrong, planning a design, building it with tools and materials, and testing it to see if it actually works.

Skills - What will students be able to do?

- Conduct outdoor field observations to feel and compare the temperature differences of various Earth materials when exposed to direct sunlight versus shade.
- Use comparative vocabulary to describe and rank the temperature of different surfaces.
- Collect and record data using simple sketches, pictorial charts, or guided science journals to show the relationship between sunlight and surface temperature.
- Identify a real-world problem caused by the sun's warmth.
- Select appropriate materials based on their ability to block light and create a shadow.
- Construct a physical structure designed to block the sun and cast a shadow.

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
- Brainpop Jr. Sun
- Sunlight Warms the Earth
- Shade Structure Design
- Observing the Sun
- The Sun's Heat Unit

Formative 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
- Mystery Science Sunlight and Warmth Performance Task
- Teacher Observation
- Student projects/models
- Individual and Group Participation
- Exit Tickets

Summative Assessments - How will we know students have learned?

- 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

Career Readiness, Life Literacies, and Key Skills

9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
9.1.2.CR.1	Recognize ways to volunteer in the classroom, school and community.
9.4.5.CI.2	Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
9.1.2.CR.2	List ways to give back, including making donations, volunteering, and starting a business.
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
9.4.5.CT.2	Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.

Interdisciplinary Connections

K.M.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.
2.DL.B.4	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.
RI.CR.2.1	Ask and answer questions to demonstrate understanding of key details in an informational text, referring explicitly to the text as the basis for the answers.
W.WR.K.5	With prompting and support, generate questions through shared research in response to a topic, text, or stimulus (e.g., event, photograph, video, book).
W.SE.2.6	Prioritize information provided by different sources on the same topic while gathering ideas and planning to write about a topic.