STEMscopes NGSS 3D
K-12 SCIENCE

Energy from the Sun

Kindergarten Sample Lesson

www.stemscopes.com/science

Scope (Unit) Energy from the Sun

Explore (Lesson) Scientific Investigation – Hanging Out in the Shade

The following pages introduce lesson resources that guide you through the STEMscopes NGSS Kindergarten lesson. This sample lesson does not include all the elements and features of our digital and print science curriculum.

Resource List:

The following resources, as well as additional Scope resources not listed, can be found in the digital curriculum *Kindergarten Scope, Energy from the Sun*.

Home

- Standards Alignment
- Sample Lesson Plan
- Teacher Background
- CCC and SEP Scoring Rubric
- Answer Keys
- Materials List

Engage

- Investigative Phenomena – Introductory activity that facilitates a connection between the content and real-world phenomena and encourages students to ask why or how something happens.
- Graphic Organizer – Students fill this in as they work through the elements of this Scope.
- Accessing Prior Knowledge – A brief probing activity to gauge students' prior knowledge before engaging in the inquiry process.
- Hook – An engaging activity that includes instructor preparation, supplemental resources, and ready-made handouts for students.

Explore

- Explore 1: Scientific Investigation – This sample lesson.
- Explore 2: Activity
- Explore 3: Engineering Solution

Explain

- Picture Vocabulary - Key terms explained through pictures and by definition.
- Linking Literacy - Strategies to help students comprehend difficult informational text.
- Science Rock - A musical/video software platform where students can sing and learn from standards-based science songs.
- STEMscopedia - Reference materials that include parent connections, career connections, technology, and science news.
- Communicative Science - A class activity in which students use different forms of communication to discuss scientific topics connected to the content of this Scope.
- Concept Review Game - An interactive game that helps students review important concepts.
- Content Connections Video - A short video that supports student understanding of the content.

Elaborate

- Math Connections
- Read Alouds
- Career Connections
- Scientist Spotlight
- SEP Simulations

Evaluate

- Claim-Evidence-Reasoning
- Open-Ended Response Assessment
- Multiple Choice Assessment

Intervention

- Guided Practice
- Independent Practice
- Concept Attainment Quiz

Acceleration

- Extensions
- Science Art
- Books on Topic

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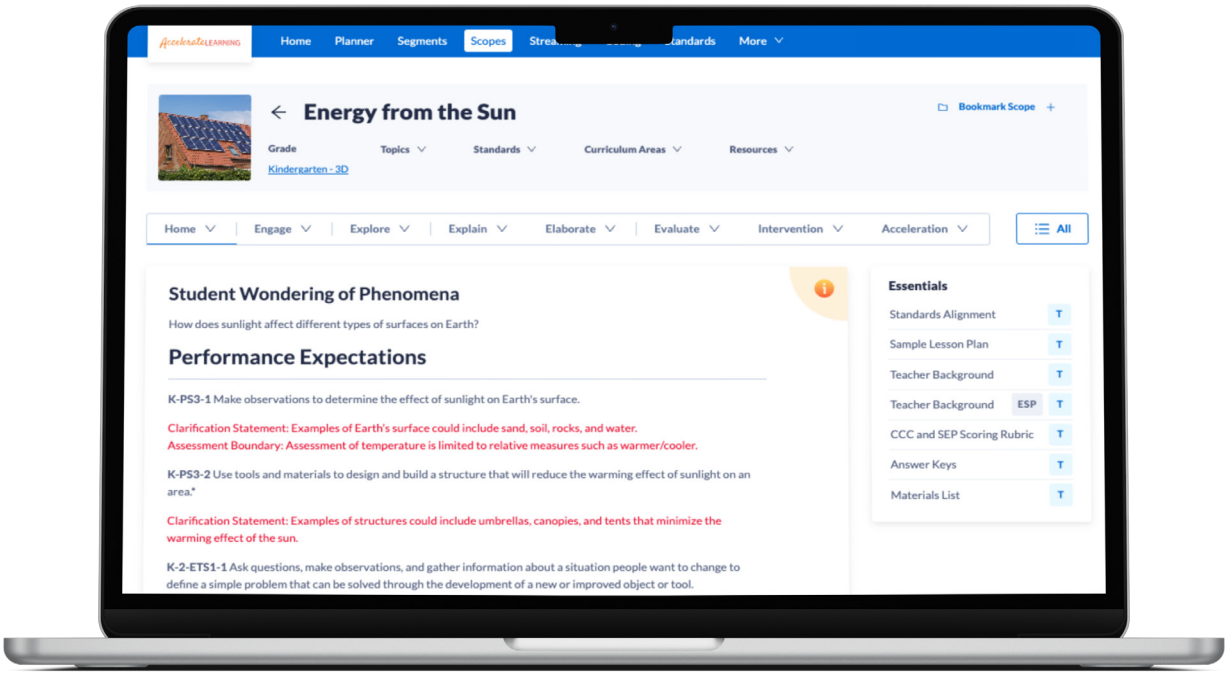
Scope (Unit) Overview

Scope (Unit) Energy from the Sun



Student Wondering of Phenomena

How does sunlight affect different types of surfaces on Earth?

Performance Expectations

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.
Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water.
Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.

K-PS3-2 Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.*
Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.

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.

Scope (Unit) Overview

Scope (Unit) Energy from the Sun

Three-Dimensional Focus

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept
Planning and Carrying Out Investigations Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-2) 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) Connections to Nature of Science Scientists use different ways to study the world. (K-PS3-1)	PS3.B (1): Conservation of Energy and Energy Transfer Sunlight warms the Earth's surface. ETS1.A (2): Defining and Delimiting an Engineering Problem Asking questions, making observations, and gathering information are helpful in thinking about problems. (Secondary to K-ESS3-2)	Cause and Effect Events have causes that generate observable patterns. (K-PS3-1), (K-PS3-2)

Energy from the Sun

Explore 1: Scientific Investigation - Hanging Out in the Shade

Everyday Phenomena

How is the ground's surface temperature in a sunny location different from the surface temperature in a shady location?

Common Core Connections

CCSS.ELA-LITERACY.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).

Description

Students conduct an investigation comparing the ground's surface temperature in a sunny location to the surface temperature in a shady location.

Materials

Printed Material
1 Hanging Out in the Shade (per student)
1 Student CER (per student)

Reusable
Heat lamp (per class) (optional)
Box (per class) (optional)

Consumable
2 Large ice cubes (per class)
2 Small cups, plastic, clear (per class) (optional)

Preparation

- Freeze two blocks of ice in small milk cartons or paper cups.
- During inclement weather, place the ice under a heat lamp to simulate the Sun. A box or other object must be used under the lamp in order to create a shaded area. Place one cup of ice in the shaded area and the other cup of ice in direct path of the heat lamp.

STEMcoach in Action

An essential aspect of facilitating student understanding is insight into student thinking. This insight is best provided by observing how students are able to communicate their understanding. When we say "facilitating questioning and discourse," we are describing the effective questioning and meaningful communication that the teacher uses to establish what students know and are able to do. For further information on facilitating questioning and discourse, please click on the provided link.
Site

Procedure and Facilitation Points

1. Prior to the lab, discuss the following questions with students:
    a. What do you think the words "warm" and "cool" mean? "Warm" means you can feel the heat. "Cool" means you don't feel heat.
    b. What does it mean when something is warmer than something else? The warmer object will have a higher temperature.
    c. What does it mean when something is cooler than something else? The cooler object will have a lower temperature.
    d. **(SEP)** What do you think will happen to the ice in the sunny area and the ice in the shaded area after 6–10 minutes? I think the ice in the sunny area will melt quicker than the ice in the shaded area.
2. As students work through the activity, look for teachable moments to introduce students to the following vocabulary terms. Try to point out examples of the terms as students are working so they can connect the meaning of the word with their experiences. Encourage students to use the following words as they record and discuss their findings.
    a. **Earth's surface**: the part of Earth we can see
    b. **Materials**: things needed for doing or making something
    c. **Sunlight**: the energy from the Sun that plants need to make food
    d. **Heat**: the type of energy that makes things warm
3. Go outdoors to a place where there is sunlight and shade on the same type of surface (both grassy, or both concrete surfaces).
4. Place one block of ice in the sunlight and the other block of ice in the shade.
5. Have students draw how the ice looks in both the sunlight and the shade right now.
6. Let the ice stay in its place for 6–10 minutes.
7. While waiting for the ice, stand in the sunlight for a few minutes.
8. Discuss:
    a. **(CCC)** How does it feel to stand in the sunlight? It is warm. It is bright.
    b. Do you think you will feel differently in the shade? Yes, I will not be as warm.
9. Stand in the shade to test your idea.
10. Discuss:
    a. **(SEP)** Do you feel differently in the shade than you did in the sunlight? Yes, I am cooler in the shade than I was in the sunlight.
11. Have students compare and discuss how objects feel in the sunlight or in the shade. Students should explore rocks, grass, concrete, sticks, etc., and share their ideas with a partner while waiting.
12. Observe what the blocks of ice look like now.
13. Have students draw a picture of how each block of ice looks now. Label which block of ice is warmer and which one is cooler.
14. Students will complete their CER.

Connection to the Investigative Phenomena

Once students have completed the activity, have them refer to the Investigative Phenomena question, anchor their learning, and revise their thinking.

Math Moment

Extend this learning task by connecting it to math standard *K.MD.A.2 Directly compare two objects with a measurable attribute in common in order to see which object has "more of" or "less of" the common attribute. Describe the difference.*

Measure the amount of time it takes the ice to completely melt in each of the two settings. Compare and find the difference between the two times.

Language Acquisition Strategies

Hanging Out in the Shade

For emerging language acquisition strategies, have the materials translated into students' native language as a reference for them to use during the activity. Students use data from the investigation to fill in the sentence stems.

The students can complete the following sentence stems verbally or as a writing activity in their journals.

It took _ (seconds/minutes) for the ice to melt in the sunlight. It took _ (seconds/minutes) for the ice to melt in the shade.

It took longer in the shade because __. The _ gives us heat.

Explore Lesson

Ene

Explore

Name: _____ Date: _____

Hanging Out in the Shade

1. Place one block of ice in the sunlight and the other block of ice in the shade.
2. Draw how the ice in the sunlight and the ice in the shade look right now.
3. Let the ice stay in its place for 6–10 minutes.
4. Observe what the blocks of ice look like now.
5. Draw a picture of how the two ice blocks look after being placed in the sunlight and shade, and label which one is warmer and which one is cooler.

	Before	After
Sunny Area		
Shaded Area		

Explore

Name: _____ Date: _____

Hanging Out in the Shade

1. Place one block of ice in the sunlight and the other block of ice in the shade.
2. Draw how the ice in the sunlight and the ice in the shade look right now.
3. Let the ice stay in its place for 6–10 minutes.
4. Observe what the blocks of ice look like now.
5. Draw a picture of how the two ice blocks look after being placed in the sunlight and shade, and label which one is warmer and which one is cooler.

	Before	After
Sunny Area	Student will draw a full block of ice with little or no puddle around it.	Student will draw a partially or completely melted block of ice with a puddle around it.
Shaded Area	Student will draw a full block of ice with little or no puddle around it.	Student will draw a mostly full block of ice with a small puddle around it.

Explore

Name: _____ Date: _____

Hanging Out in the Shade
Claim-Evidence-Reasoning

Claim:
Check the correct sentence.

☐ The ice melted faster in the Sun.

☐ The ice melted faster in the shade.

Evidence:
Draw a picture describing the sentence.

Explore

Hanging Out in the Shade

Student CER, continued

	3	2	1
Claim	☺ ☺ ☺ My claim was correct.	☺ ☺ I made a claim, but it was incorrect.	☺ I did not make a claim.
Evidence	☺ ☺ ☺ I gave evidence that helped me make my claim.	☺ ☺ I gave evidence, but it did not have anything to do with my claim.	☺ I did not give any evidence.

Picture Vocabulary

Energy from the Sun

Picture Vocabulary

Earth's Surface

The part of Earth we can see

Heat

The type of energy that makes things warm

Materials

Equipment and supplies for doing or making things

Structure

How something is arranged

Sunlight

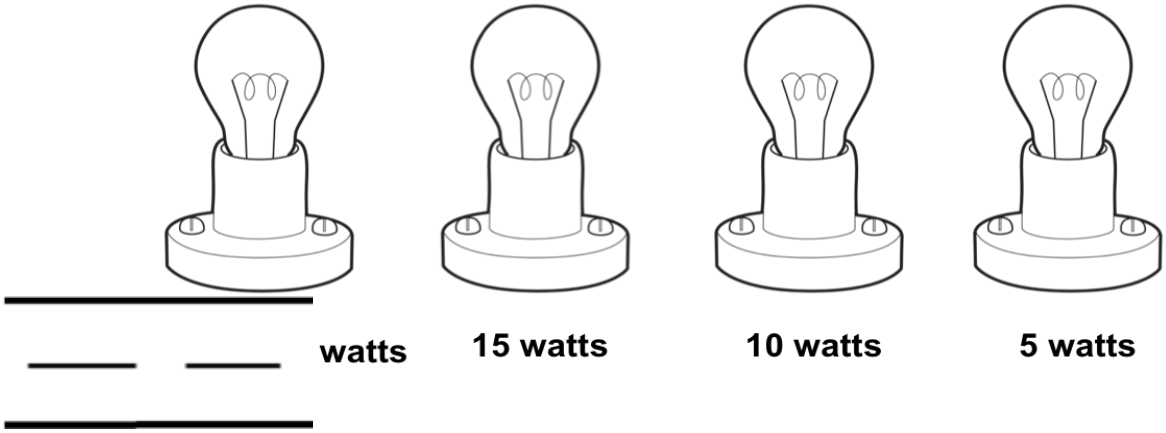
The energy from the Sun that plants need to make food

Math Connections

Math Connections

Name: _____ Date: _____

Below is a chart showing the amount of energy used by different types of lightbulbs. The larger the number of watts, the brighter the bulb will burn.



1. Circle the bulb above that has the largest number of watts.

2. Draw an *X* on the bulb that would have the least light.

3. The bulb on the far left has 5 more watts than the bulb next to it. How many watts does it have? Use tally marks to help you add.

15 watts	+	5 watts	=	Bulb on Left

Math Connections

4. When your body blocks some of the Sun's light, it causes a shadow to form next to you. The shadow takes on the shape of your body. Circle all answers that are true:

   a. The man is taller.

   b. The woman’s shadow is longer than the man’s shadow.

   c. The man is shorter.

   d. The woman’s shadow is shorter than the man’s shadow.

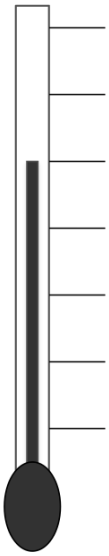
   e. Their heights are equal.

5. Sara planted a garden in April. As time passed, she noticed that some of the plants were getting more light from the Sun because of where they were planted in the garden. Look at the plants below. Order them from smallest to largest, using the numbers 1–4. Begin with the number 1 under the shortest plant.

Math Connections

Erica took the temperature outside on Monday and Friday. Each day, the Sun had heated up the earth to a different temperature. Count by 2s and write the number next to each line on the thermometers. Next, fill in the sentence, using the day of the week.

Monday Temperature



Friday Temperature

6. The temperature was higher on _____ .

Energy from the Sun

Claim-Evidence-Reasoning

CER Assessment

Name: _____ Date: _____

Scenario

You are having a picnic at the beach with your family on a sunny day. Yo
set down a large pitcher of ice water and go play in the ocean. Before you
walk away, you see your sister move the pitcher so it is under an umbrella.

Prompt

Explain why it is better to leave your drink under an umbrella instead of in the sunlight.

Claim:

The sunlight will _____ the drink to make it warm.

Evidence: Draw and write about what could happen to the drink after being left in the Sun instead of under the shade of an umbrella.

The umbrella would provide shade that would reduce the

_____

_____

1

Claim-Evidence-Reasoning

Energy from the Sun CER
Rubric for Writing a Scientific Explanation

	3	2	1
Claim	☺ ☺ ☺ My claim was correct.	☺ ☺ I made a claim, but it was incorrect.	☺ I did not make a claim.
Evidence	☺ ☺ ☺ I gave evidence that helped me make my claim.	☺ ☺ I gave evidence, but it did not have anything to do with my claim.	☺ I did not give any evidence.

Energy from the Sun

Claim-Evidence-Reasoning

Name: _____ Date: _____

Scenario

You are having a picnic at the beach with your family on a sunny day. You set down a large pitcher of ice water and go play in the ocean. Before you walk away, you see your sister move the pitcher so it is under an umbrella.

Prompt

Explain why it is better to leave your drink under an umbrella instead of in the sunlight.

Claim:

The sunlight will heat the drink to make it warm.

Evidence: Draw and write about what could happen to the drink after being left in the Sun instead of under the shade of an umbrella.

The umbrella would provide shade that would reduce the

sunlight or heat

Student draws a picture of a drink with no ice. Prompt students to show light or heat rays coming from the Sun to the drink.

1

Claim-Evidence-Reasoning

Energy from the Sun CER

Rubric for Writing a Scientific Explanation

	3	2	1
Claim	☺ ☺ ☺ My claim was correct.	☺ ☺ I made a claim, but it was incorrect.	☺ I did not make a claim.
Evidence	☺ ☺ ☺ I gave evidence that helped me make my claim.	☺ ☺ I gave evidence, but it did not have anything to do with my claim.	☺ I did not give any evidence.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