Lesson 3.1
Getting Warm in the Sunlight
Lesson Overview

Students use ideas from a new book, Getting Warm in the Sunlight, to inform their model of sunlight shining on Earth’s surface over time, and then use the model to test their ideas. At the beginning of the lesson, students learn that they will begin to investigate what causes the playgrounds, and Earth’s surfaces in general, to get warmer as the day goes on. The teacher leads the class in a Shared Reading about a lizard in the desert over the course of a day and hypothesizes that as the sun shines on a surface for a longer time, the surface gets warmer. Students discuss how to use the Warming Model to represent sunlight and Earth's surface over the course of a day. Then, students make predictions and gather data from the model. This lesson allows students to begin to gather evidence through first-hand experience to support their ideas about the warming effect of sunlight over time.

Anchor Phenomenon: Students at Carver Elementary School are too cold during morning recess, while students at Woodland Elementary School are too hot during afternoon recess.

Investigative Phenomenon: The desert is cooler in the morning and warmer in the afternoon.

Students learn:

- Throughout the day, Earth’s surface can be many different temperatures.
- A surface gets warmer the longer a lamp shines on it.
- The temperature of Earth’s surfaces affects living things besides people.
Reading: Getting Warm in the Sunlight

As the class reads a book about a lizard in the desert, they look for ideas about why Earth’s surface is warmer in the afternoon.

Instructional Guide

1. Introduce the book Getting Warm in the Sunlight.

   We want to figure out why Earth’s surface is warmer in the afternoon than it is in the morning.

   Sometimes, when scientists are looking for ideas that might help them answer a question, they read books about the kinds of things they are interested in.

2. Display the front cover of Getting Warm in the Sunlight. Invite students to share what they notice on the cover.

   This book is about a day in the life of a lizard in the desert. He moves around on different surfaces, trying to get warm but not too hot in the morning, in the afternoon, and in the evening. The book might help us think about why surfaces get warmer and warmer.

   Let’s read the book together. As we do, pay careful attention to anything you hear about surfaces getting warmer and warmer.

3. Review making predictions when reading.

   Remember that an important way that readers learn from a book is to make a prediction. When you make a prediction, you use what you already know to decide what you think might happen.

   As we read, you can check your prediction to see if it matches what you decided before you read.

4. Read page 3 aloud, and ask students to make predictions.

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The sun is just coming up. That means it was nighttime in the desert. Let’s pause here to make a prediction.

Turn to the person next to you and tell him: How hot or cold do you think the surfaces in the desert are right now? Why do you think so?

[Very cold or cold, because the sun was not shining on them.]

Have a few students share their predictions with the class.

5. **Read aloud page 4 to check predictions.** Have students describe what they heard about the temperature of the surfaces, and share with their partner whether what you read matched their prediction.

6. **Read the first two sentences of page 5, and ask students to make predictions.**

Turn to the person next to you and tell her: How hot or cold do you think the surfaces in the desert are now? Why do you think so?

[Warming than before, because the sun is shining on them.]

Have a few students share their predictions with the class.

7. **Continue reading page 5 to check predictions.** Have students describe what they heard about the temperature of the surfaces, and share with a partner whether what you read matched their prediction.

8. **On-the-Fly Assessment:** Continue reading to the middle of page 10 and pause to have students make predictions.

The day goes on. Now it is the afternoon, and the sun has been up for many hours. The sunlight has been shining on the rocks and the sand for a long time.

Once again, turn to the person next to you and tell him: How hot or cold do you think the surfaces in the desert are now in the afternoon? Why do you think so?

Have a few students share their predictions with the class.

9. **Read through page 11 to check predictions.** Have students describe what they heard about the temperature of the surfaces, and share with their partners whether what you read matched their predictions.

10. Finish reading the book.

11. **Ask students to describe patterns of warming.**

A pattern is something similar that happens over and over again.
What pattern of surfaces getting warmer and warmer did you notice in the book?
[The rocks and sand got cool, then they got warm, and then they got too hot.]

What caused the pattern? Why did the surfaces keep getting warmer and warmer?
[Because the sunlight kept shining on it; the sun shined longer and longer.]

12. Revisit the Warmer and Cooler movement routine. Lead students in acting out the temperatures of the desert over the day. Have students stand up and space themselves out appropriately. Lead them in using the temperature movements to act out the temperatures of the desert surfaces over the day.

What was the temperature of the desert surfaces like before the sun came up?
[Very cold.]

If necessary, remind students of the gesture you agreed upon in previous lessons to represent very cold.

What was the temperature of the desert surfaces like in the early morning, after the sunlight was shining on them for a little while?
[Cold, or cool.]

What was the temperature of the desert surfaces like in the late morning, after sunlight was shining on them for a few hours?
[Warm.]

What was the temperature of the desert surfaces like in the afternoon, after sunlight was shining on them for many hours?
[Very hot.]

If necessary, remind students of the gesture you agreed upon in previous lessons to represent very hot.
Embedded Formative Assessment

On-the-Fly Assessment 5: Students’ Use of Making Predictions

Look for: As students are sharing what they predict the temperature of surfaces in the desert are—based on what was read on page 10—listen for and make note of individual students or partners who are attending to pictures and the words read aloud to support their prediction. For example, a student might say something such as, “I think the temperature will be hot because in the late morning it was already warm. The sun has been out for a long time so it is probably hot.”

Now what? If students are not attending to pictures and the words read aloud to make and support their predictions, provide an explicit reminder (e.g., “Think about what we just read, and what you see in the pictures. What do you predict the temperature of the surfaces is like now?”) If additional student practice is necessary, read aloud the first three sentences on page 11 in the book. Pause and ask students to make predictions about how hot or cold they think the surfaces in the desert are now that the sun starts to set. Remind students to use what was just read, and what they see in the pictures to help them make their predictions.

Teacher Support

Background

About the Book: Getting Warm in the Sunlight

Getting Warm in the Sunlight explores the warming effects of sunlight through the story of a lizard’s day. In the morning, it’s too cold for the lizard to come out of its burrow. As the sun shines on Earth’s surface, it starts to warm up enough for the lizard to come out and hunt for insects. Various surfaces—the dark rocks and pale sand—warm at different rates, and the lizard chooses on which surface to hunt based on when it reaches optimal temperature. As the day gets hotter, the lizard has to first seek out the pale sand and then the shade of a shrub. When the sun sets, the surfaces quickly cool down, and the lizard has to seek shelter again. Getting Warm in the Sunlight is a Shared Reading that provides a clear introduction to the idea that pale-colored surfaces and dark-colored surfaces warm up at different rates, which helps set the stage for students’ firsthand investigations and for understanding what’s going on with the two schools in the unit that are experiencing varying temperatures.

Rationale

Science Practices: Turning to Texts for Ideas

While learning science from textbooks has sometimes been overemphasized to the exclusion of all else, it is important to remember that texts are crucial resources for scientists. Whether writing papers or designing new experiments, scientists turn to texts to inspire their thinking and to ensure that they are building on the ideas that others have already developed. When students turn to texts as a resource for ideas that inform their own investigations and understanding of phenomena, they are engaging in authentic scientific knowledge-building practices. In this lesson, students turn to text for the purpose of investigating why Earth’s surface is warmer in the afternoon.
Rationale

Pedagogical Goals: Making Predictions About the Desert Surfaces
At this point in the unit, students have had opportunity to develop ideas about sunlight’s role in warming surfaces, but not the effect of sunlight on surfaces’ temperature over time. Therefore, it is reasonable to expect them to make accurate predictions that the desert surfaces will be cold or cool in the early morning as the sun is coming up, and that they will be warmer than that once it has been up. However, since they are just taking up the question of warming over time, they may not make accurately grounded predictions about surface temperatures later in the day.
As the class reads a book about a lizard in the desert, they look for ideas about why Earth’s surface is warmer in the afternoon.

Instructional Guide

1. Introduce the book *Getting Warm in the Sunlight*.

   Queremos averiguar por qué la superficie de la Tierra es más caliente en la tarde que en la mañana.

   A veces, cuando los científicos están buscando ideas que podrían ayudarles a responder una pregunta, leen libros acerca de los tipos de cosas en las que están interesados.

2. Display the front cover of *Getting Warm in the Sunlight*. Invite students to share what they notice on the cover.

   Este libro trata sobre un día en la vida de un lagarto en el desierto. Él se mueve de un lado a otro sobre diferentes superficies, intentando estar tibio pero no demasiado caliente en la mañana, en la tarde y en la noche. El libro podría ayudarnos a pensar acerca de por qué las superficies se calientan más y más.

   Leamos el libro juntos. Mientras lo hacemos, ¡pongán mucha atención a cualquier cosa que oigan sobre superficies que se calientan más y más!

3. Review making predictions when reading.

   Recuerden que una manera importante en la que los lectores aprenden de un libro es hacer una predicción. Cuando hacen una predicción, usan lo que ya saben para decidir lo que piensan que podría pasar.

   Mientras leemos, pueden revisar su predicción para ver si coincide con lo que decidieron antes de leer.

4. Read page 3 aloud, and ask students to make predictions.

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El sol justo está saliendo. Eso significa que eran las horas nocturnas en el desierto. Hagamos una pausa aquí para hacer una predicción.

Acérquense a la persona junto a ustedes y dígale: ¿Qué tan calientes o frías piensas que están las superficies en el desierto ahora mismo? ¿Por qué piensas eso?
[Muy frías o frías, porque el sol no las estaba alumbrando].

Have a few students share their predictions with the class.

5. **Read aloud page 4 to check predictions.** Have students describe what they heard about the temperature of the surfaces, and share with their partner whether what you read matched their prediction.

6. **Read the first two sentences of page 5, and ask students to make predictions.**

El sol llega hasta arriba. La luz del sol alumbrara las rocas y la arena. Hagamos otra predicción.

Acérquense a la persona junto a ustedes y diganle: ¿Qué tan calientes o frías piensas que están las superficies en el desierto ahora? ¿Por qué piensas eso?
[Más calientes que antes, porque luz del sol las está alumbrando].

Have a few students share their predictions with the class.

7. **Continue reading page 5 to check predictions.** Have students describe what they heard about the temperature of the surfaces, and share with a partner whether what you read matched their prediction.

8. **On-the-Fly Assessment: Continue reading to the middle of page 10 and pause to have students make predictions.**

El día avanza. Ahora es la tarde, y el sol ya lleva muchas horas en lo alto. La luz del sol ha estado alumbrando las rocas y la arena durante un largo tiempo.

Una vez más, acérquense a la persona junto a ustedes y dígale: ¿Qué tan calientes o frías piensas que están las superficies en el desierto ahora en la tarde? ¿Por qué piensas eso?

Have a few students share their predictions with the class.

9. **Read through page 11 to check predictions.** Have students describe what they heard about the temperature of the surfaces, and share with their partners whether what you read matched their predictions.

10. **Finish reading the book.**

11. **Ask students to describe patterns of warming.**

Un patrón es algo similar que sucede una y otra vez.
12. Revisit the Warmer and Cooler movement routine. Lead students in acting out the temperatures of the desert over the day. Have students stand up and space themselves out appropriately. Lead them in using the temperature movements to act out the temperatures of the desert surfaces over the day.

¿Qué patrón de superficies calentándose más y más notaron en el libro? [Las rocas y la arena se enfriaron, luego se calentaron, y luego se pusieron demasiado calientes].

¿Qué causó el patrón? ¿Por qué las superficies seguían calentándose más y más? [Porque la luz del sol seguía alumbrándolas; el sol alumbraba más y más tiempo].

If necessary, remind students of the gesture you agreed upon in previous lessons to represent very cold.

¿Cómo era la temperatura de las superficies del desierto antes de que saliera el sol? [Muy fría].

¿Cómo era la temperatura de las superficies del desierto temprano por la mañana, después de que la luz del sol estuvo alumbrándolas durante un ratito? [Fría, o fresca].

¿Cómo era la temperatura de las superficies del desierto tarde en la mañana, después de que la luz del sol estuvo alumbrándolas durante unas cuantas horas? [Tibia].

¿Cómo era la temperatura de las superficies del desierto en la tarde, después de que la luz del sol estuvo alumbrándolas durante muchas horas? [Muy caliente].

If necessary, remind students of the gesture you agreed upon in previous lessons to represent very hot.
Embedded Formative Assessment

On-the-Fly Assessment 5: Students’ Use of Making Predictions

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Now what? If students are not attending to pictures and the words read aloud to make and support their predictions, provide an explicit reminder (e.g., “Think about what we just read, and what you see in the pictures. What do you predict the temperature of the surfaces is like now?”) If additional student practice is necessary, read aloud the first three sentences on page 11 in the book. Pause and ask students to make predictions about how hot or cold they think the surfaces in the desert are now that the sun starts to set. Remind students to use what was just read, and what they see in the pictures to help them make their predictions.

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