Lesson 1.3
The Pattern of Daytime and Nighttime
Lesson Overview

Students analyze the data they have collected about daytime and nighttime and consider patterns in what they observe in the sky during the daytime and the nighttime. Partners work together to categorize illustrations of objects based on whether they can be seen during the daytime, the nighttime, or both. Students engage in a Sky Investigations Role-Play, during which they use their bodies to represent what they see in the sky during the daytime and the nighttime. The teacher introduces the unit’s reference book, *Patterns of Earth and Space*, to support students’ understanding that a pattern is something that we observe to be similar over and over again. Students revisit the Sky Investigations Role-Play to reflect on the patterns of what can be observed in the sky at different times. The teacher introduces the What We Know About Daytime and Nighttime chart and the first key concept to consolidate what students have learned so far about the daytime sky and the nighttime sky. The purpose of this lesson is for students to construct the idea that we can see the sun in the sky during the daytime and the stars in the sky during the nighttime and to introduce students to the crosscutting concept of Patterns.

**Anchor Phenomenon:** The sky looks different to Sai than to his grandma when they talk on the phone.

**Everyday Phenomenon:** What can be seen in the daytime sky and in the nighttime sky.

**Students learn:**

- Scientists organize their data to answer questions.
- We can see the sun in the sky during the daytime and the stars in the sky during the nighttime.
- A pattern is something that we observe to be similar over and over again.
- Many events in the world are repeated.
The teacher introduces the idea of patterns and leads a Shared Reading of sections of the *Patterns of Earth and Space* reference book.

**Instructional Guide**

1. **Hold up the *Patterns of Earth and Space* big book and show students the front cover.**

   This book is a reference book. The purpose of a reference book is to provide a lot of information about a topic. Instead of reading the book from beginning to end, you can read parts of the book to find out about something you want to learn.

   Read the reference book title aloud.

   **Patterns of Earth and Space.**

   A pattern is something we observe to be similar over and over again. Scientists look for patterns to help them understand and explain what they observe.

   This book is about patterns we can observe on Earth and in the sky.

2. **Set the purpose for reading.**

   Today, we will read parts of this book together to learn more about patterns. When we read, we can think about how patterns help us understand what we see in the sky during the daytime and during the nighttime.

3. **Display the contents page of the *Patterns of Earth and Space* big book.**

   This is the Contents page. The Contents page tells readers the important sections of the book. It also tells them what pages contain the information they are looking for so that they can find it.

4. **Point out the first entry on the Contents page.**
Observing Patterns.

The Contents page shows that I can find out more about observing patterns in the section on page 4. I am going to turn to that page.

5. Turn to page 4 and read it aloud. Pause at the end of the page to discuss the pattern.

• What pattern do you observe on this bracelet?  
  [A blue-green pattern. The blue and green colors repeat over and over again.]

• The blue and green colors repeat the same way over and over again. That is a pattern.

6. Turn to page 5 and read it aloud. Pause at the end of the page to discuss the pattern.

• What pattern do you observe on this page?  
  [When the traffic light is red, the cars stop. When the traffic light is green, the cars go.]

• When the traffic light is red, the cars stop. When the traffic light is green the cars go. It happens the same way over and over again. That is a pattern.

7. Introduce pattern with the vocabulary routine. Hold up the pattern vocabulary card and lead the vocabulary routine.

• This is the word pattern. A pattern is something we observe to be similar over and over again.

• We are going to practice saying the word. Say the word after me: pattern.

• Now say the word together: pattern.

• Now whisper the word pattern to your partner.

• A pattern is something we observe to be similar over and over again.

Post the pattern vocabulary card to the Vocabulary section of the classroom wall.

8. Ask for other examples of patterns.

• There are a lot of patterns that we can observe in the world around us. We observed daytime and nighttime sky patterns. What are some events in nature that happen over and over again in the same way?

If students struggle to come up with repeating events, provide a few examples such as how some animals go to sleep every night and wake up every morning, how some trees lose their leaves every autumn and then grow new leaves in the spring, or how the sun warms Earth’s surface every day.
When an event in nature has happened over and over in a pattern, scientists expect that the event will continue to happen over and over again in that same way.

9. Have students reflect on the pattern in the Sky Investigations Role-Play.

We just used our bodies to show what we can observe in the sky during the daytime and the nighttime. What pattern did we show with our bodies?

[When the lights were off, we showed the stars. When the lights were on, we showed the sun.]

When the lights were off, we showed the stars. When the lights were on, we showed the sun. It happened the same way over and over again. That is a pattern.

10. Turn back to the Contents page and point out the fourth entry.

Patterns of Daytime and Nighttime.

The Contents page shows that I can find out more about patterns of daytime and nighttime in the section on page 10. I am going to turn there.

11. Turn to page 10. Read pages 10–11 aloud and give students enough time to look at each pair of images.

What pattern did you observe on these pages?

[When it is daytime, we see the sun and the sky looks bright. When it is nighttime, we see the stars and the sky looks dark.]

When it is daytime, we can observe the sun and the sky looks bright. When it is nighttime, we can observe the stars and the sky looks dark. It happens the same way over and over again. That is a pattern.

Teacher Support

Background

About the Book: Patterns of Earth and Space

Patterns of Earth and Space is the reference book for this unit, giving students a place to explore many different kinds of patterns that can be observed on Earth and in the sky. The book introduces the concept of a pattern through two very simple examples and then moves on to present patterns over time, patterns of Earth’s movement, patterns of the seasons, patterns of the Moon and stars, and much more. Carefully arranged photographs provide students with rich visuals on each page to explore and use as evidence to support their ideas. Patterns of Earth and Space is used as a Shared Reading throughout the unit.

Background

Literacy Note: About Reference Books

Reference books provide in-depth information about specific topics and are typically read for particular purposes. For this reason, students do not read every section in reference books, nor do they read reference books from beginning to
end. Sometimes, they search for the information they need and then read the relevant sections carefully. At other times, they browse the book as a way of seeing multiple examples of something. In this lesson, students will be introduced to the table of contents and are given the opportunity to explore the book in search of examples of patterns. This exploration will prepare students to use the reference book in later lessons in this unit, as scientists might, and it encourages students to read complex text in varied but strategic ways.

Instructional Suggestion

Providing More Experience: Characteristics of Reference Books
To give students additional examples of the common features of reference books, gather a variety of informational texts from your classroom library. Ask students to work in small groups to look through the books and make observations about how they are organized, what kind of information they contain, and what text features are present. Make a class chart of these characteristics and reflect on the usefulness of the various text features to organize and highlight information.

Background

Science Note: What Are Crosscutting Concepts?
Crosscutting concepts are what science educators call the big, overarching ideas that cut across different topics and domains of science. Helping students recognize crosscutting concepts is important because it helps them connect ideas they are learning to ideas in different areas of science. Furthermore, crosscutting concepts can serve as a scaffold for student understanding—by connecting an unfamiliar idea to a familiar crosscutting concept, students can better construct an understanding of that new idea. Throughout this unit, there are many opportunities for students to engage with crosscutting concepts—we call out a few on which to focus. The focal crosscutting concept in the Spinning Earth unit is Patterns. Students have multiple experiences with this crosscutting concept and multiple opportunities to reflect on it as a useful idea in science. In addition, this unit has a secondary focus on Cause and Effect and includes opportunities to call attention to Systems and System Models. The Standards section for each lesson (part of the Lesson Brief) offers a list of crosscutting concepts that are relevant in each lesson. In addition, there are notes under the Teacher Support tab that identify some (although not all) particularly good opportunities for you to call out the focal crosscutting concepts. Some of these notes explain more generally how the crosscutting concepts manifest in the unit, chapter, or lesson.

Background

Crosscutting Concept: What Is Meant by Patterns?
Patterns is a crosscutting concept called out by the Next Generation Science Standards. It is one of seven powerful ideas that are widely useful across scientific topics and subdisciplines. In science, a pattern is a discernible regularity in the natural world—similarities in the characteristics of things or in the way that events occur. With students, we use a slightly different definition intended to capture similar ideas: a pattern is something we observe to be similar over and over again. Attending to patterns is useful in science because noticing a pattern often leads to questions about why the pattern occurs, which leads to a new understanding of how the world works. The crosscutting concept of Patterns is applicable throughout science and engineering.

Background

Crosscutting Concept: Patterns Across This Unit
This unit’s focus is primarily on describing the patterns we see in the sky at different times. Students are presented with the problem that Sai saw something different in the sky when he talked on the phone with his grandma. Students are
tasked with explaining why Sai and his grandma saw different things in the sky at the same time, which leads them to describe and explain various patterns in the sky during the daytime and during the nighttime. First, students construct an understanding that the sun is always in the sky during the daytime and the stars are always in the sky during the nighttime. Then, students go on to explain that when it is daytime, the part of the Earth they are on is facing the sun, and when it is nighttime, the part of the Earth they are on is not facing the sun. Students then chart the positions of the sun at various times throughout the day, noticing that the sun makes an arc-like pattern in the sky, and learn that this pattern is a result of Earth’s spin. Finally, students transition to investigating and explaining other patterns in the sky: why the daytime is shorter in the winter than other seasons. Throughout the unit, students are provided with multiple opportunities to conduct firsthand observations of the sky, enabling them to understand and explain the patterns they see.

Background

Crosscutting Concept: Patterns Across Chapter 1

In Chapter 1, students investigate the question *Why did the sky look different to Sai than to his grandma?* As a way to figure that out that question, they investigate the more general questions *What can we see in the sky at different times?* and *What does the sky look like to people in different places on Earth right now?* Figuring out these questions involves students observing and understanding patterns of what we see in the sky during the daytime and the nighttime. Students figure out that the sun is always in the sky during the daytime and the stars are always in the sky during the nighttime. These patterns are correlational patterns—patterns when two events or observations are repeatedly associated with each other (e.g., daytime and the sun in the sky; nighttime and the stars in the sky). Students will continue to investigate correlational patterns (although not specifically named as such) throughout the unit. As they investigate patterns in this chapter, students develop an understanding of the importance of patterns: patterns help scientists explain what they observe and answer their questions.
The teacher introduces the idea of patterns and leads a Shared Reading of sections of the *Patterns of Earth and Space* reference book.

### Instructional Guide

1. **Hold up the *Patterns of Earth and Space* big book and show students the front cover.**

   Este libro es un libro de referencia. El propósito de un libro de referencia es proporcionar mucha información sobre un tema. En vez de leer el libro de principio a fin, pueden leer partes del libro para averiguar sobre algo que quieren aprender.

   Read the reference book title aloud.

2. **Set the purpose for reading.**

   Hoy leeremos partes de este libro juntos para aprender más acerca de los patrones. Cuando leamos, podemos pensar en cómo los patrones nos ayudan a entender lo que vemos en el cielo durante las horas diurnas y durante las horas nocturnas.

3. **Display the contents page of the *Patterns of Earth and Space* big book.**

   Esta es la página del Contenido. La página del Contenido les dice a los lectores las secciones importantes del libro. También les dice qué páginas contienen la información que están buscando, para que puedan encontrarla.

4. **Point out the first entry on the Contents page.**
5. Turn to page 4 and read it aloud. Pause at the end of the page to discuss the pattern.

¿Qué patrón observan en este brazalete?
[Un patrón azul-verde. Los colores azul y verde se repiten una y otra vez].

Los colores azul y verde se repiten de la misma manera una y otra vez. Eso es un patrón.

6. Turn to page 5 and read it aloud. Pause at the end of the page to discuss the pattern.

¿Qué patrón observan en esta página?
[Cuando la luz del semáforo es roja, los carros se detienen. Cuando la luz del semáforo es verde, los carros avanzan].

Cuando la luz del semáforo es roja, los carros se detienen. Cuando la luz del semáforo es verde, los carros avanzan. Sucede de la misma manera una y otra vez. Eso es un patrón.

7. Introduce pattern with the vocabulary routine. Hold up the pattern vocabulary card and lead the vocabulary routine.

Esta es la palabra patrón. Un patrón es algo que observamos que sea similar una y otra vez.

Vamos a practicar decir la palabra. Digan la palabra después de mí: patrón.

Ahora digan la palabra juntos: patrón.

Ahora susurren la palabra patrón a su compañero o compañera.

Un patrón es algo que observamos que sea similar una y otra vez.

Post the pattern vocabulary card to the Vocabulary section of the classroom wall.

8. Ask for other examples of patterns.

Hay muchos patrones que podemos observar en el mundo a nuestro alrededor. Observamos patrones del cielo de las horas diurnas y de las horas nocturnas. ¿Podemos nombrar algunos eventos en la naturaleza que suceden una y otra vez de la misma manera?

If students struggle to come up with repeating events, provide a few examples such as how some animals go to sleep every night and wake up every morning, how some trees lose their leaves every autumn and then grow new leaves in the spring, or how the sun warms Earth’s surface every day.
9. Have students reflect on the pattern in the Sky Investigations Role-Play.

Acabamos de usar el cuerpo para mostrar lo que podemos observar en el cielo durante las horas diurnas y las horas nocturnas. ¿Qué patrón mostramos con el cuerpo?

[Cuando las luces estaban apagadas, mostramos las estrellas. Cuando las luces estaban encendidas, mostramos el sol].

Cuando las luces estaban apagadas, mostramos las estrellas. Cuando las luces estaban encendidas, mostramos el sol. Sucedió de la misma manera una y otra vez. Eso es un patrón.

10. Turn back to the Contents page and point out the fourth entry.

Patrones de las horas diurnas y de las horas nocturnas.

La página de Contenido muestra que puedo encontrar más información sobre patrones de las horas diurnas y las horas nocturnas en la sección de la página 10. Voy a pasar a esa página.

11. Turn to page 10. Read pages 10–11 aloud and give students enough time to look at each pair of images.

¿Qué patrón observaron en estas páginas?

[En las horas diurnas, vemos el sol y el cielo se ve luminoso. En las horas nocturnas, vemos las estrellas y el cielo se ve oscuro].

En las horas diurnas, podemos observar el sol y el cielo se ve luminoso. En las horas nocturnas, podemos observar las estrellas y el cielo se ve oscuro. Sucede de la misma manera una y otra vez. Eso es un patrón.

Teacher Support

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