Lesson 1.3
Measuring Temperature
Lesson Overview

Students continue to investigate how meteorologists describe weather data so the measurements are consistent and comparable. In this lesson, students engage in a temperature investigation. First, they use their fingers to feel the relative temperatures of hot and cold water, and then they measure with thermometers. They realize that their initial descriptions are subjective; the descriptions are not comparable. However, thermometers offer an objective way to compare temperatures. Students are introduced to the strategy of visualizing as a way to make sense of temperature measurements. They practice making pictures in their minds of different weather conditions as they explore various places in the unit’s reference book, *World Weather Handbook*. The purpose of this lesson is for students to further solidify their understanding of how and why meteorologists need weather data that is objectively collected and consistently described.

**Predicted Phenomenon:** The future weather on three islands

**Investigative Phenomenon:** Cups of water at different temperatures

**Students learn:**

- To measure is to use a tool to find out information such as how heavy, how big, how fast, or how hot or cold something is.
- Meteorologists use tools to measure weather data so they can compare it.
- Temperature is how hot or cold something is.
- Meteorologists describe weather in standard units. In the United States, they describe temperature in degrees Fahrenheit.
- Scientists use tools and technologies to make accurate measurements and observations.
Visualizing with World Weather Handbook

Students practice visualizing as they explore World Weather Handbook.

Instructional Guide

1. Hold up a copy of World Weather Handbook. Let students know that this is a reference book, and explain that reference books are useful places to look for information about a particular topic; in this case—weather.


We just thought about some different temperatures and made pictures in our minds to understand what it would be like to experience those temperatures. This book has information about many different places in the world. Reading about those places will help us better understand temperatures and weather in many parts of the world, and we need to understand weather so we can recommend the best island for orangutans.

3. Introduce Partner Reading Guidelines. Let students know that they will read with a partner. Point out the guidelines that you posted on the wall and review them with the class. If Partner Reading is an unfamiliar activity for your students, let them know that they can refer to the guidelines as they read.

4. Designate partners and distribute books. Give students a few minutes to browse through the book.

5. Introduce making pictures in your mind when reading. Remind students that when they discussed temperatures in degrees Fahrenheit, they made pictures in their minds to understand what those temperatures would feel like. Explain that it’s also useful to make pictures in their minds when reading, and that will help them understand the weather in the places they are reading about.

6. Describe the reading task. Explain that students will choose three places in World Weather Handbook. For each place, students will think about what they might be wearing, doing, or seeing if they were in those places. Encourage students to use the Temperature Benchmarks chart to help them make pictures in their minds as they read.

7. Discuss how to choose three places. Students can use the table of contents on page 3, or they can choose three places that interested them as they looked through the book.
8. **Model making a picture in your mind as you read.** Explain that you are interested in reading about Akumal, Mexico, on page 8. Have students turn to page 8 and follow along as you read aloud. Use the fourth sentence to visualize the high temperature in Akumal.

The fourth sentence says, “The average high temperature for each month is between 83°F and 91°F.” When I look at the Temperature Benchmarks chart, I see that chocolate melts at 93°F. Akumal’s high temperature is close to 93°F, so it must be a hot place to live. If you close your eyes and think about what it would feel like if you were in Akumal, what you would be wearing? What would you be doing? What would others be wearing and doing?

Ask several students to share what they visualized with the class.

9. **Give students time to read and make pictures in their minds.** Have students select two or three other places in the book, read, and visualize the temperatures of those places as they read. Ask students to describe what they pictured to their partners. Encourage students to refer to the Temperature Benchmarks chart on the wall as they are reading.

10. **Have students share.** Accept all answers; students will have more experience comparing weather data later in the unit.

   - Share anything interesting that they read and visualized.
   - Briefly focus on comparing weather with the following questions:
     - “What was the hottest place you read about?”
     - “Which place had the most precipitation?”
   - Invite students to share any new questions they have after what they read.

11. **Conclude the lesson.** Let students know that in the next lesson, they’ll read another book to learn more about how meteorologists collect and compare weather data. Collect the books.

Teacher Support

**Rationale**

**Pedagogical Goals: Informational Text**

A major goal of the Amplify Science curriculum is to deepen students’ awareness of and experience with the genres of science writing that they will encounter in school and in their lives outside of school. This curriculum is designed to address the Common Core State Standards for English Language Arts (CCSS-ELA) related to reading and writing informational text, with a specific focus on science text. Learning effective strategies and approaches for comprehension of informational text is extremely important for success in school, yet reading and writing these texts can be challenging for many students. The student books and related investigations in this curriculum program provide explicit, supportive instruction around how to tackle informational text.
Background

Literacy Note: Visualizing
Visualizing is a sense-making strategy that is useful in both science and reading. Readers of science text often create pictures in their minds to assist their comprehension. Being able to think visually is a critical strategy in science, and it is particularly useful in this unit, as students learn to generate mental images to make meaning from science text. Visual representations such as tables, line plots, bar graphs, and maps are prevalent throughout this unit, and visualizing gives students a way to access these representations. Students will have many opportunities to learn about and practice visualizing throughout the unit. In this lesson, students are not formally introduced to the word visualizing; that comes in the next lesson. If your students are already familiar with visualizing, you may want to use the word with students in this lesson.

Background

About the Book: World Weather Handbook
World Weather Handbook is the reference book for this unit, providing a place for students to explore weather data and information from locations around the world. Bar graphs, maps, detailed descriptions, and photos combine to help students get a full picture of weather and climate in 19 diverse locations. World Weather Handbook allows for a secondhand investigation experience where students can analyze graphs and identify a variety of seasonal patterns. The book also provides background information that helps students begin to recognize broad global climate patterns.

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 a reference book, 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. In this lesson, students explore the book, and this exploration prepares students to use the reference book in later lessons in this unit, as a scientist might. It also encourages students to read complex text in varied but strategic ways. You may wish to provide instruction around the table of contents, glossary, and index if students are not familiar with these features.

Rationale

Pedagogical Goals: Time for Exploration
The first time students are introduced to World Weather Handbook, they have a few minutes to browse the text and images. This exploration time allows students to become familiar with helpful text features that might offer clues about where to find information and sparks an interest in reading about the various cities and countries in the book. This type of open-ended exploration enhances overall student interest and provides an opportunity to share with and learn from peers. Exploration time can reduce distractions on subsequent encounters, helping students read with more focused goals.
Image Credits

Shutterstock (Temperature Benchmarks chart).
Visualizing with World Weather Handbook

Students practice visualizing as they explore World Weather Handbook.

Instructional Guide

1. **Hold up a copy of World Weather Handbook.** Let students know that this is a reference book, and explain that reference books are useful places to look for information about a particular topic; in this case—weather.

2. **Set purpose for reading World Weather Handbook.**

3. **Introduce Partner Reading Guidelines.** Let students know that they will read with a partner. Point out the guidelines that you posted on the wall and review them with the class. If Partner Reading is an unfamiliar activity for your students, let them know that they can refer to the guidelines as they read.

4. **Designate partners and distribute books.** Give students a few minutes to browse through the book.

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6. **Describe the reading task.** Explain that students will choose three places in World Weather Handbook. For each place, students will think about what they might be wearing, doing, or seeing if they were in those places. Encourage students to use the Temperature Benchmarks chart to help them make pictures in their minds as they read.
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8. **Model making a picture in your mind as you read.** Explain that you are interested in reading about Akumal, Mexico, on page 8. Have students turn to page 8 and follow along as you read aloud. Use the fourth sentence to visualize the high temperature in Akumal.

   La cuarta oración dice: "La temperatura máxima promedio para cada mes es entre 83°F y 91°F". Cuando miro la gráfica de Puntos de referencia de temperatura, veo que el chocolate se derrite a 93°F. La temperatura máxima de Akumal es cercana a los 93°F, así que debe ser un lugar caluroso para vivir. Si cierran los ojos y piensan en cómo se sentiría si estuvieran en Akumal, ¿qué ropa traerían puesta? ¿Qué estarían haciendo? ¿Qué ropa traerían puesta otros y qué estarían haciendo?

   Ask several students to share what they visualized with the class.

9. **Give students time to read and make pictures in their minds.** Have students select two or three other places in the book, read, and visualize the temperatures of those places as they read. Ask students to describe what they pictured to their partners. Encourage students to refer to the Temperature Benchmarks chart on the wall as they are reading.

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