Lesson 1.4
Sky Notebook
Lesson Overview

Students read *Sky Notebook*, an informational text about a boy who collects and records weather data each day for a week from his home in western Colorado. At the beginning of the lesson, the teacher reminds students of the importance of visualizing when reading and investigating. The teacher models visualizing data from one data table in the book. Partners read and practice visualizing with the remaining data tables in the book. After reading, the class compares two data tables from the book and concludes that recording data the same way each day allows for comparisons. At the end of the lesson, students are introduced to the Local Weather Data Collection routine, an opportunity to collect their own weather data, similar to the way the boy did in the book. Finally, students compare the weather data they collected to the weather the boy in *Sky Notebook* experienced in Colorado. The purpose of this lesson is for students to understand how meteorologists collect and organize data in order to compare it.

**Predicted Phenomenon:** The future weather on three islands  
**Everyday Phenomenon:** Local weather (temperature, precipitation, and clouds)

Students learn:

- Meteorologists make weather measurements in the same way each time so they can make comparisons.
- Organizing data in tables helps meteorologists compare weather data.
- Scientists visualize using information from many sources.
- The methods scientists use are determined by the questions they are investigating.
- Scientists use a variety of methods, tools, and techniques when they conduct investigations.
- Scientists use tools and technologies to make accurate measurements and observations.
- Science findings are based on recognizing patterns.
- Science assumes consistent patterns in natural systems.
- Science affects everyday life.
Introducing Sky Notebook

The teacher introduces *Sky Notebook*, sets the purpose for reading, and models how to visualize with data from the book.

Instructional Guide

1. **Connect today’s lesson to previous lessons.** Refer to earlier lessons and to the Investigation Question on the board.

   We have been learning how to measure temperature and precipitation. We have learned that if we describe our measurements the same way, we can compare our data and the data that others collect. Today, we will read a book about a boy who records weather data each day, just outside his home in Colorado.

2. **Set purpose for reading.** Hold up a copy of *Sky Notebook*. Read the title aloud. Prepare students to think about how the boy in the book measures temperature and precipitation and how he organizes his weather data.

3. **Designate partners and distribute books.**

4. **Read aloud pages 3–4.** Have partners follow along in their books as you read. Stop at the end of page 4 to discuss the following questions:

   - “What are some ways meteorologists record weather data?” [In tables, graphs, and maps.]
   - “How does weather data help meteorologists predict the weather?” [They find patterns in the data that help them predict the weather.]

5. **Read aloud pages 5–6.** Discuss how the boy in the book collects and organizes his data.

   - “What tools does the boy in the book use to collect his weather data?” [A ruler to measure new snow. A thermometer to measure temperature. A camera to take pictures of the sky.]
   - “After he takes a photo and measures, what does the boy do with his weather data?” [He records the date and measurements in a table like you see at the top of page 6.]

6. **Introduce and post the vocabulary card for **visualize** on the classroom wall.**
In the previous lesson, we created pictures in our mind to help us better understand temperature. When you make a picture in your mind to help you understand something you are investigating or reading, it is called visualizing. As you read Sky Notebook, you will practice making pictures in your mind of the weather data that the boy collects each day.

7. Model visualizing with the data table on page 6. Refer to the posted Temperature Benchmarks chart.

If I want to understand the boy’s data for January 24th, I can create a picture in my mind. The table tells me the temperature is 33°F, there is no new snow, and it is partly cloudy. I will use this information to think about what it would feel like to be outside in this weather. First, I think it would feel cold, so I would be wearing a jacket. If I look at our Temperature Benchmarks chart, I see that water freezes into ice at 32°F, and 33°F is very close to that, so it would be nearly freezing. I think I would also be wearing a hat and gloves, and I wouldn’t want to stay outside too long unless I were moving around.

8. Read page 7 and discuss the maps. Point out that the map is for January 24th, the same date as the data table on page 6. Explain that the maps show temperature and precipitation all around the United States on that day. Note the pin icon in Colorado, which shows where the boy lives. You may also want to point out where you live. Emphasize that maps are another tool that meteorologists use to organize weather information.

Teacher Support

Instructional Suggestion

Providing More Experience: Today’s Daily Written Reflection
Why do meteorologists use tools (for example, a thermometer) to measure weather data? This prompt (on page 7 in the Investigation Notebook) allows students to reflect on the importance of consistent and objective measurements for comparing weather.

Background

About the Book: Sky Notebook
Sky Notebook is set in the mountains of Colorado where storms move through on a regular basis during the winter. The narrator is an amateur meteorologist who takes measurements and makes notes about the weather each day in his sky notebook. Beautiful photographs illustrate what the narrator sees each day (a daily photograph is part of the measuring and observing regimen), so the reader experiences the weather visually as well as through data. The book models the scientific practice of recording data, demonstrating how students could conduct their own firsthand daily weather investigation. It also offers a secondhand investigation experience by giving students a chance to make predictions from the data included in the book.

Rationale

Literacy Note: Partner Reading
Throughout this unit, we suggest that students read the books with a partner. This allows students time to apply and practice the reading strategies they’re learning, keeps them focused on the task at hand, and provides opportunities for them to assist each other with reading. Of course, you can use any effective reading procedures you’ve already established with your class. Before reading this first book in the unit, you may need to provide instruction on how to
read with a partner by using the provided Partner Reading Guidelines or your own guidelines. Establishing procedures takes time at first, but will pay off in terms of student learning and classroom management. Over time, students gain practice working together and will need fewer reminders about reading together effectively.

Rationale

Literacy Note: Approach to Reading
Skillful readers use a variety of strategies to actively engage with informational text. The books in this unit are designed so the responsibility of reading science text can be gradually released to students. This allows students to read more independently as the unit progresses, and they become increasingly familiar with the concepts and vocabulary in the unit. In this unit, the sense-making strategy of visualizing helps students make sense of what they are reading and understand processes that they can’t observe directly. Whenever possible, model how to use this strategy by thinking aloud about how you visualize as you read. Students will have multiple opportunities to learn about and practice this strategy through a gradual-release model: you initially provide a high level of direction and support, and this level of support decreases over time in order to promote students’ independence.
Partner Reading

Students read *Sky Notebook* in pairs, and then compare weather data from two different days.

Instructional Guide

1. **Give students time to read and visualize the data.** Ask partners to read the rest of the book, visualizing the weather data in each data table. Encourage students to share what they visualized with their partners and to think about how the weather changes each day.

2. **On-the-Fly Assessment: Visualizing with Data Tables.** As you circulate, listen and make note of whether students are sharing what they visualize as they read with their partners. Prompt students to visualize what the data in the tables mean by asking, “What picture do you have in your mind as you read the data in the table on this page?”

3. **Have students share what they visualized.** After most students finish reading, call on a few students to share what they visualized about the temperatures in the book. Have them specify the page numbers, so their classmates can turn to those pages.

4. **Reflect on visualizing as a reading strategy.**

Visualizing is a strategy that readers use to help them understand what they’re reading. Readers visualize as they are reading to get a clearer picture of what is happening in the book. When you visualized the weather data, that was helping you better understand the information in the book.
5. Project *Sky Notebook* Data Tables. Explain that as meteorologists, the goal is to describe weather so it’s possible to compare the data. Point out that these are *Sky Notebook* data tables from two different days. Invite students to share whether or not they are able to compare the weather data from January 25 and 29. Use the following discussion questions:

- "Which day was warmer? How do you know?" [January 25. Both temperatures use degrees Fahrenheit and January 25 has a higher number.]
- "Which day had more precipitation (new snowfall)? How do you know?" [January 29. The data from both days is recorded in millimeters, and I know 152 is more than 48.]
- "Are you able to compare the weather data from January 25th and January 29th? Why or why not?" [Yes, because the boy recorded the data in the same way each day.]

<table>
<thead>
<tr>
<th>January 25</th>
<th>January 29</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td><strong>Temperature</strong></td>
</tr>
<tr>
<td>37°F</td>
<td>20°F</td>
</tr>
<tr>
<td><strong>Depth of new snow</strong></td>
<td><strong>Depth of new snow</strong></td>
</tr>
<tr>
<td>48 mm</td>
<td>152 mm</td>
</tr>
<tr>
<td><strong>Cloud cover</strong></td>
<td><strong>Cloud cover</strong></td>
</tr>
<tr>
<td>partly cloudy</td>
<td>clear</td>
</tr>
</tbody>
</table>

6. Summarize comparing data.

The boy measured and recorded the temperature and precipitation in the same way each day, which makes it possible to compare the data from day to another day.

7. Introduce and post the vocabulary card for *weather* on the classroom wall.

The data tables also show his observations about how many clouds there are—descriptions like partly cloudy, clear, or overcast. Clouds are a part of weather, too. Sometimes he described the wind (page 18—the wind is strong), because wind is also part of weather.

Weather is what is happening with the air and sky, including precipitation, temperature, and wind.
Embedded Formative Assessment

On-the-Fly Assessment 2: Visualizing with Data Tables

Look for: Throughout the unit, students will employ the strategy of visualizing as they read and as they engage in science investigations. Students will have multiple opportunities to learn about and use the strategy of visualizing to support their reading comprehension. As you circulate, make note of whether or not students are using the strategy to help them interpret the data tables throughout the book. Are they discussing with their partners what they are visualizing while they read?

Now what? When you hear students discussing what they visualize as they read, point out the process to other students. For example, you could say, "I heard a student describe a picture she created in her mind when she was reading about the weather on January 26th. Visualizing helped her understand what the weather was like more clearly than just looking at the numbers on the page." You can also provide students with more examples by looking up weather conditions in locations that might be interesting to students, and have them visualize. Have students share how visualizing helped them understand what the weather was like in that location.

Teacher Support

Instructional Suggestion

Providing More Support: Facilitate Comprehension

Sky Notebook is relatively simple to read, but some students may understand it better if they know more about its context. You may want to quickly describe winter weather in the Colorado Rockies (cold, especially at high altitudes where this book takes place; many snowstorms). Other students may have difficulty using the data provided in the book in a meaningful way. If so, read one or two entries with these students, stopping to discuss the weather data and what it indicates in relation to the descriptive entry that accompanies the data. After modeling this with one or two entries, encourage students to continue reading independently.

Rationale

Pedagogical Goals: Understanding the Nature of Science

One goal set forth by the Next Generation Science Standards (NGSS) is for students to understand the nature of science as a discipline and how scientific knowledge develops over time. The NGSS calls out eight understandings about the nature of science which are woven throughout the Amplify Science curriculum. This unit gives students an opportunity to experience the understanding that Scientific Investigations Use a Variety of Methods, that Science Knowledge Is Based on Empirical Evidence, and that Scientific Knowledge Assumes an Order and Consistency in Natural Systems. Specifically the book Sky Notebook illustrates the ideas that:

- The methods scientists use are determined by the questions they are investigating.
- Scientists use a variety of methods, tools, and techniques when they conduct investigations.
- Scientists use tools and technologies to make accurate measurements and observations.
• Science findings are based on recognizing patterns.
• Science assumes consistent patterns in natural systems.
Introducing Sky Notebook

The teacher introduces *Sky Notebook*, sets the purpose for reading, and models how to visualize with data from the book.

Instructional Guide

1. **Connect today's lesson to previous lessons.** Refer to earlier lessons and to the Investigation Question on the board.

   Hemos estado aprendiendo a medir la temperatura y la precipitación. Hemos aprendido que si describimos nuestras mediciones de la misma manera, podemos comparar nuestros datos con los datos que recopilan otros. Hoy leeremos un libro sobre un niño que apunta datos sobre las condiciones atmosféricas todos los días, justo afuera de su casa en Colorado.

2. **Set purpose for reading.** Hold up a copy of *Sky Notebook*. Read the title aloud. Prepare students to think about how the boy in the book measures temperature and precipitation and how he organizes his weather data.

3. **Designate partners and distribute books.**

4. **Read aloud pages 3–4.** Have partners follow along in their books as you read. Stop at the end of page 4 to discuss the following questions:

   - "What are some ways meteorologists record weather data?" [In tables, graphs, and maps.]
   - "How does weather data help meteorologists predict the weather?" [They find patterns in the data that help them predict the weather.]

5. **Read aloud pages 5–6.** Discuss how the boy in the book collects and organizes his data.

   - "What tools does the boy in the book use to collect his weather data?" [A ruler to measure new snow. A thermometer to measure temperature. A camera to take pictures of the sky.]
   - "After he takes a photo and measures, what does the boy do with his weather data?" [He records the date and measurements in a table like you see at the top of page 6.]
7. Model visualizing with the data table on page 6. Refer to the posted Temperature Benchmarks chart.

8. Read page 7 and discuss the maps. Point out that the map is for January 24th, the same date as the data table on page 6. Explain that the maps show temperature and precipitation all around the United States on that day. Note the pin icon in Colorado, which shows where the boy lives. You may also want to point out where you live. Emphasize that maps are another tool that meteorologists use to organize weather information.

Teacher Support

Instructional Suggestion

Providing More Experience: Today’s Daily Written Reflection

Why do meteorologists use tools (for example, a thermometer) to measure weather data? This prompt (on page 7 in the Investigation Notebook) allows students to reflect on the importance of consistent and objective measurements for comparing weather.

Background

About the Book: Sky Notebook

Sky Notebook is set in the mountains of Colorado where storms move through on a regular basis during the winter. The narrator is an amateur meteorologist who takes measurements and makes notes about the weather each day in his sky notebook. Beautiful photographs illustrate what the narrator sees each day (a daily photograph is part of the measuring and observing regimen), so the reader experiences the weather visually as well as through data. The book models the scientific practice of recording data, demonstrating how students could conduct their own firsthand daily weather investigation. It also offers a secondhand investigation experience by giving students a chance to make predictions from the data included in the book.

Rationale

Literacy Note: Partner Reading

Throughout this unit, we suggest that students read the books with a partner. This allows students time to apply and practice the reading strategies they’re learning, keeps them focused on the task at hand, and provides opportunities for them to assist each other with reading. Of course, you can use any effective reading procedures you’ve already...
established with your class. Before reading this first book in the unit, you may need to provide instruction on how to read with a partner by using the provided Partner Reading Guidelines or your own guidelines. Establishing procedures takes time at first, but will pay off in terms of student learning and classroom management. Over time, students gain practice working together and will need fewer reminders about reading together effectively.

Rationale

Literacy Note: Approach to Reading
Skillful readers use a variety of strategies to actively engage with informational text. The books in this unit are designed so the responsibility of reading science text can be gradually released to students. This allows students to read more independently as the unit progresses, and they become increasingly familiar with the concepts and vocabulary in the unit. In this unit, the sense-making strategy of visualizing helps students make sense of what they are reading and understand processes that they can’t observe directly. Whenever possible, model how to use this strategy by thinking aloud about how you visualize as you read. Students will have multiple opportunities to learn about and practice this strategy through a gradual-release model; you initially provide a high level of direction and support, and this level of support decreases over time in order to promote students’ independence.
Partner Reading

Students read *Sky Notebook* in pairs, and then compare weather data from two different days.

Instructional Guide

1. **Give students time to read and visualize the data.** Ask partners to read the rest of the book, visualizing the weather data in each data table. Encourage students to share what they visualized with their partners and to think about how the weather changes each day.

2. **On-the-Fly Assessment: Visualizing with Data Tables.** As you circulate, listen and make note of whether students are sharing what they visualize as they read with their partners. Prompt students to visualize what the data in the tables mean by asking, "What picture do you have in your mind as you read the data in the table on this page?"

3. **Have students share what they visualized.** After most students finish reading, call on a few students to share what they visualized about the temperatures in the book. Have them specify the page numbers, so their classmates can turn to those pages.

4. **Reflect on visualizing as a reading strategy.**

Visualizar es una estrategia que usan los lectores para ayudarles a entender lo que están leyendo. Los lectores visualizan mientras leen para obtener una imagen más clara de lo que está sucediendo en el libro. Cuando visualizaron los datos sobre las condiciones atmosféricas, eso les estaba ayudando a entender mejor la información en el libro.
5. Project *Sky Notebook Data Tables*. Explain that as meteorologists, the goal is to describe weather so it’s possible to compare the data. Point out that these are *Sky Notebook* data tables from two different days. Invite students to share whether or not they are able to compare the weather data from January 25 and 29. Use the following discussion questions:

- "Which day was warmer? How do you know?" [January 25. Both temperatures use degrees Fahrenheit and January 25 has a higher number.]
- "Which day had more precipitation (new snowfall)? How do you know?" [January 29. The data from both days is recorded in millimeters, and I know 152 is more than 48.]
- "Are you able to compare the weather data from January 25th and January 29th? Why or why not?" [Yes, because the boy recorded the data in the same way each day.]

<table>
<thead>
<tr>
<th>25 de enero</th>
<th>Profundidad de la nieve nueva</th>
<th>Nubosidad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperatura</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37°F</td>
<td>48 mm</td>
<td>parcialmente nublado</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>29 de enero</th>
<th>Profundidad de la nieve nueva</th>
<th>Nubosidad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperatura</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20°F</td>
<td>152 mm</td>
<td>despejado</td>
</tr>
</tbody>
</table>

6. Summarize comparing data.

El niño midió y apuntó la temperatura y precipitación de la misma manera cada día, lo cual hace que sea posible comparar los datos de un día a otro.

7. Introduce and post the vocabulary card for *weather* on the classroom wall.

Las tablas de datos también muestran sus observaciones sobre cuántas nubes hay, descripciones como parcialmente nublado, despejado o cubierto. Las nubes también forman parte de las condiciones atmosféricas. En ocasiones él describió el viento (página 18, el viento es fuerte), porque el viento también forma parte de las condiciones atmosféricas.

Las condiciones atmosféricas son lo que está sucediendo con el aire y el cielo, incluyendo la precipitación, la temperatura y el viento.
Embedded Formative Assessment

On-the-Fly Assessment 2: Visualizing with Data Tables

Look for: Throughout the unit, students will employ the strategy of visualizing as they read and as they engage in science investigations. Students will have multiple opportunities to learn about and use the strategy of visualizing to support their reading comprehension. As you circulate, make note of whether or not students are using the strategy to help them interpret the data tables throughout the book. Are they discussing with their partners what they are visualizing while they read?

Now what? When you hear students discussing what they visualize as they read, point out the process to other students. For example, you could say, “I heard a student describe a picture she created in her mind when she was reading about the weather on January 26th. Visualizing helped her understand what the weather was like more clearly than just looking at the numbers on the page.” You can also provide students with more examples by looking up weather conditions in locations that might be interesting to students, and have them visualize. Have students share how visualizing helped them understand what the weather was like in that location.

Teacher Support

Instructional Suggestion

Providing More Support: Facilitate Comprehension

Sky Notebook is relatively simple to read, but some students may understand it better if they know more about its context. You may want to quickly describe winter weather in the Colorado Rockies (cold, especially at high altitudes where this book takes place; many snowstorms). Other students may have difficulty using the data provided in the book in a meaningful way. If so, read one or two entries with these students, stopping to discuss the weather data and what it indicates in relation to the descriptive entry that accompanies the data. After modeling this with one or two entries, encourage students to continue reading independently.

Rationale

Pedagogical Goals: Understanding the Nature of Science

One goal set forth by the Next Generation Science Standards (NGSS) is for students to understand the nature of science as a discipline and how scientific knowledge develops over time. The NGSS calls out eight understandings about the nature of science which are woven throughout the Amplify Science curriculum. This unit gives students an opportunity to experience the understanding that Scientific Investigations Use a Variety of Methods, that Science Knowledge Is Based on Empirical Evidence, and that Scientific Knowledge Assumes an Order and Consistency in Natural Systems. Specifically the book Sky Notebook illustrates the ideas that:

- The methods scientists use are determined by the questions they are investigating.
- Scientists use a variety of methods, tools, and techniques when they conduct investigations.
- Scientists use tools and technologies to make accurate measurements and observations.
• Science findings are based on recognizing patterns.
• Science assumes consistent patterns in natural systems.