Lesson 3.3
Seasons and Climate
Lesson Overview

Students compare temperature graphs from the last lesson to temperature graphs in the reference book for the same cities (Anchorage, Queenstown, and Saint Petersburg). The reference book graphs give the average temperature of these locations for many years, and students discuss what the averages show. Students make sense of a graph of average total precipitation and discuss it as a class. At the end of the lesson, students return to World Weather Handbook and read the sections for those locations, which describe the different seasons in each place. The purpose of this lesson is for students to build an understanding of how meteorologists describe and represent a place’s weather and climate.

Predicted Phenomenon: The future weather on three islands
Investigative Phenomenon: Average monthly high temperatures and average monthly precipitation totals for several different places

Students learn:

- Knowing a place’s climate makes it possible to predict the weather far into the future.
- Climate is the typical weather in a place over a long period of time.
- Even though the weather is different every day, the monthly changes in weather repeat year after year.
- Graphs of average temperature or average precipitation summarize many years of data into one graph.
- Meteorologists describe climate by talking about warm, cold, wet, and dry seasons.
Introducing Seasons

After analyzing graphs from World Weather Handbook, students use Shared Listening to discuss seasons.

Instructional Guide


   So far, we've learned how meteorologists show what a place's weather is like over many years: they take many years of data and make graphs of average temperature and average precipitation. But how do they describe a place's weather over many years? We are going to find out by reading World Weather Handbook.

2. Read aloud page 10 in World Weather Handbook. Have students turn to page 10 and read along as you read about Anchorage, Alaska.

3. Call attention to seasons.

   - "What are some ways that weather was described?" [If students do not bring it up, point out that the text mentioned different types of seasons.]
   - "What types of seasons does Anchorage have?" [A wet season, a dry season, a warm season, a cold season.]
   - "When you hear the word season, what do you think of?" [Students may mention the astronomical seasons—winter, spring, summer, and fall. Students might also mention flu season, a holiday season, or different sports seasons.] In each case, point out that season refers to a specific period of time.

   Meteorologists often think about temperature and precipitation when they use the word season. They think about several months, or periods of time, that are hot, cold, wet, or dry.

4. Discuss seasons in your locale. Invite students to think about seasons like a meteorologist. Bring up a warm, cold, wet, or dry season in your own region. Choose one that is fairly obvious and lasts several months. Ask students to say the months in which this season occurs and what the weather is like. Point out the typical months that this season spans.
5. **Set purpose for Shared Listening.** Explain that students will now look at temperature and precipitation graphs to see if they can identify warm, cold, wet, and dry seasons in another place.

6. **Remind students of the Shared Listening routine.** Explain that students will use the routine to discuss seasons in Saint Petersburg, Russia. Remind students that during this routine they will have a chance to talk and listen to a classmate. Describe the routine, if necessary.

   - Teacher poses a question.
   - Partner A shares for one minute while Partner B listens.
   - Partner B restates what they heard Partner A say. Partner A can correct misstatements, if necessary, but cannot add any new information.
   - Some students share with the class.
   - Partners switch roles for a second question. (Partner B shares; Partner A listens and restates.)

7. **Prepare for Shared Listening.** Assign pairs for Shared Listening. Make sure each pair has one copy of *World Weather Handbook* opened to page 39.

8. **Project Shared Listening 1.** Have students discuss the first set of questions while referring to the Average High Temperatures graph. Give pairs a minute to discuss the questions. When you give the signal, Partner B should restate Partner A's answers.

   **Shared Listening 1**

   - When is the cold season in Saint Petersburg?
   - When is the warm season?
9. Project Shared Listening 2. Have students discuss the second set of questions while referring to the Average Total Precipitation graph. Give pairs a minute to discuss the questions. When you give the signal, Partner A should restate Partner B’s answers.

**Shared Listening 2**

- When is the rainy season in Saint Petersburg?
- When is the dry season?

10. Project Saint Petersburg Graphs. Call on students to share their ideas of when these seasons occur.

- **Cold/warm seasons.** It is fine if there is some variation in the months that students include (they should not worry whether April is warm or cold or whether every month is assigned to a season). Focus students on the general trends. [Cold: October through March/April. Warm: May/June through August/September.]
- **Rainy/dry seasons.** [Rainy: June through November/December. Dry: January through May.]
- **Discuss one vs. two cold seasons.** Some students may think there were two cold seasons in St. Petersburg (January to March, and November to December). If students did not bring it up, ask if the temperature graph shows one or two cold seasons. [Accept all answers.]
11. Partners read page 38 (Saint Petersburg) in *World Weather Handbook*. Invite students to read the meteorologist’s description of seasons in Saint Petersburg. Ask them to compare the book’s description to their Shared Listening discussion. Call on a few students to comment on when the seasons occur according to the text and how the meteorologist’s description aligned with their Shared Listening discussions.

12. Return to the question of one vs. two cold seasons.

- “How is the cold season described in the book?” [The cold season is from November to March.]

Refer students to the Average High Temperature graph on page 39 or to the projection. Point out that that it is cold in January, February, and March. It is also cold in November and December, which might seem like two cold seasons. However, December comes right before January, it’s possible to think of the months November, December, January, February, and March as one season.

13. Project Three Years of Temperature Data. Explain that these side-by-side graphs do not show data from Saint Petersburg, but the monthly changes in temperature are similar. It shows average temperatures from three specific years: 1980, 1981, and 1982. Note that putting several graphs side-by-side can help us see how months that are one after the other like November, December, January, February and March are all one season.

14. Discuss and post key concept. Hold up the key concept and read it aloud. (*Even though the weather can be different every day, there is a pattern to the weather. The seasons that happen in one year repeat at the same time every year.*)

Post it on the classroom wall.

- We know the weather can be different every day. We have seen that as we measure our local temperature and precipitation, but the work we’ve done with bar graphs has helped us figure out that even though the weather is different every day, there is a pattern to the weather.

15. Introduce and post the vocabulary card for *climate* on the classroom wall. Point out that as students think about the wet/dry seasons and the warm/cold seasons, they are thinking about the typical weather in different places over many years.
When you think about the pattern of different seasons, you are thinking about a place’s climate. Climate is the typical, or usual, weather in a place over a long period of time.

16. Conclude the lesson. Let students know that in the next lesson, they will read a book that will help them think more about seasons and climate in different places.

Teacher Support

Background

Discourse Routine: Shared Listening
This is the second time that students use the Shared Listening discourse routine. Shared Listening helps students discuss science ideas. In this lesson, students discuss the warm/cold and wet/dry seasons in Saint Petersburg, Russia. This routine is especially helpful for English learners as it allows students to hear models of language from their peers. You can listen in on a few students’ discussions as partners share their ideas about seasons in Saint Petersburg.

Rationale

Pedagogical Goals: Identifying Particular Seasons
When asking students to identify warm/cold and wet/dry seasons, focus them on the broad trends; they should not worry about what the “cutoff” temperature is for determining whether a month is included in a warm or cold season, and the same holds for precipitation amounts. For example, it is okay if some students say the warm season in St. Petersburg is April through October, and others say it is May through October. The main goal is for them to identify time periods within the year that are warmer and colder, relative to each other.

Rationale

Literacy Note: Referring to the Language of the Reference Book
Throughout this lesson, students have thought about warm/cold seasons and wet/dry seasons as they looked at the graphs from *World Weather Handbook*. As they identified the warmest, coldest, wettest, and driest months in the graphs of average temperature and precipitation in different locations, students have built a foundation of considering how temperature and precipitation change over the year. Likewise, as they have used the strategy of tracing the shape of the bars, they have thought about how temperature and precipitation change in a given place over a year. Reading the text of the reference book in this activity provides the scientific language to describe these seasonal changes.
What Is Average Precipitation?

Directions:
1. Turn to page 11 in *World Weather Handbook*.
2. Look at the graph, Average Total Precipitation in Anchorage, Alaska.
3. With a partner, use the graph to answer the following questions.

A. On average, what is the rainiest month in Anchorage, Alaska?

________________________________________________________________

B. On average, what is the driest month in Anchorage, Alaska?

________________________________________________________________

C. What do you think was the rainiest month in Anchorage, Alaska, in 1960?

________________________________________________________________

D. What do you think was the driest month in Anchorage, Alaska, in 1960?

________________________________________________________________

E. What do you predict will be the rainiest month in Anchorage, Alaska, in the future?

________________________________________________________________

F. What do you predict will be the driest month in Anchorage, Alaska, in the future?

________________________________________________________________
Introducing Seasons

After analyzing graphs from World Weather Handbook, students use Shared Listening to discuss seasons.

Instructional Guide


Hasta ahora, hemos aprendido cómo los meteorólogos muestran las condiciones atmosféricas de un lugar durante muchos años: toman muchos años de datos y hacen gráficas de temperatura promedio y precipitación promedio. Pero, ¿cómo describen las condiciones atmosféricas de un lugar durante muchos años? Vamos a averiguarlo leyendo el Manual de condiciones atmosféricas alrededor del mundo.

2. Read aloud page 10 in World Weather Handbook. Have students turn to page 10 and read along as you read about Anchorage, Alaska.

3. Call attention to seasons.

   - "What are some ways that weather was described?" [If students do not bring it up, point out that the text mentioned different types of seasons.]
   - "What types of seasons does Anchorage have?" [A wet season, a dry season, a warm season, a cold season.]
   - "When you hear the word season, what do you think of?" [Students may mention the astronomical seasons—winter, spring, summer, and fall. Students might also mention flu season, a holiday season, or different sports seasons.] In each case, point out that season refers to a specific period of time.

Los meteorólogos a menudo piensan en la temperatura y la precipitación cuando usan la palabra estación. Piensan en varios meses, o periodos de tiempo, que son calurosos, fríos, húmedos o secos.

4. Discuss seasons in your locale. Invite students to think about seasons like a meteorologist. Bring up a warm, cold, wet, or dry season in your own region. Choose one that is fairly obvious and lasts several months. Ask students to say the months in which this season occurs and what the weather is like. Point out the typical months that this season spans.
5. **Set purpose for Shared Listening.** Explain that students will now look at temperature and precipitation graphs to see if they can identify warm, cold, wet, and dry seasons in another place.

6. **Remind students of the Shared Listening routine.** Explain that students will use the routine to discuss seasons in Saint Petersburg, Russia. Remind students that during this routine they will have a chance to talk and listen to a classmate. Describe the routine, if necessary.

   - Teacher poses a question.
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8. **Project Shared Listening 1.** Have students discuss the first set of questions while referring to the Average High Temperatures graph. Give pairs a minute to discuss the questions. When you give the signal, Partner B should restate Partner A’s answers.

### Escucha compartida 1

- ¿Cuándo es la estación fría en San Petersburgo?
- ¿Cuándo es la estación cálida?
9. **Project Shared Listening 2.** Have students discuss the second set of questions while referring to the Average Total Precipitation graph. Give pairs a minute to discuss the questions. When you give the signal, Partner A should restate Partner B’s answers.

### Escucha compartida 2

- ¿Cuándo es la estación lluviosa en San Petersburgo?
- ¿Cuándo es la estación seca?

10. **Project Saint Petersburg Graphs.** Call on students to share their ideas of when these seasons occur.

- **Cold/warm seasons.** It is fine if there is some variation in the months that students include (they should not worry whether April is warm or cold or whether every month is assigned to a season). Focus students on the general trends. [Cold: October through March/April. Warm: May/June through August/September.]
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   - “How is the cold season described in the book?” [The cold season is from November to March.]

Refer students to the Average High Temperature graph on page 39 or to the projection. Point out that it is cold in January, February, and March. It is also cold in November and December, which might seem like two cold seasons. However, December comes right before January, it’s possible to think of the months November, December, January, February, and March as one season.

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14. Discuss and post key concept. Hold up the key concept and read it aloud. (*Even though the weather can be different every day, there is a pattern to the weather. The seasons that happen in one year repeat at the same time every year.*) Post it on the classroom wall.

Sabemos que las condiciones atmosféricas pueden ser diferentes cada día. Hemos visto eso mientras medimos nuestra temperatura y precipitaciones locales, pero el trabajo que hemos hecho con gráficas de barras nos ha ayudado a averiguar que aunque las condiciones atmosféricas son diferentes cada día, hay un patrón en las condiciones atmosféricas.
15. Introduce and post the vocabulary card for climate on the classroom wall. Point out that as students think about the wet/dry seasons and the warm/cold seasons, they are thinking about the typical weather in different places over many years.

16. Conclude the lesson. Let students know that in the next lesson, they will read a book that will help them think more about seasons and climate in different places.

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¿Qué es precipitación promedio?

Instrucciones:
1. Pasa a la página 11 en el Manual de condiciones atmosféricas alrededor del mundo.
2. Mira la gráfica “Precipitación total promedio en Anchorage, Alaska”.
3. Con un/a compañero/a, usa la gráfica para responder las preguntas siguientes.

A. En promedio, ¿cuál es el mes más lluvioso en Anchorage, Alaska?

B. En promedio, ¿cuál es el mes más seco en Anchorage, Alaska?

C. ¿Cuál piensas que fue el mes más lluvioso en Anchorage, Alaska en 1960?

D. ¿Cuál piensas que fue el mes más seco en Anchorage, Alaska en 1960?

E. ¿Cuál predices que será el mes más lluvioso en Anchorage, Alaska en el futuro?

F. ¿Cuál predices que será el mes más seco en Anchorage, Alaska en el futuro?