

# WEATHER AND CLIMATE



In this learning plan, students explore weather patterns and how to graph and chart weather data. They learn about the climate in different regions of the world and make predictions about typical weather conditions for the area. They also learn different weather-related hazards to make a claim and design a solution that reduces the impact of the weather-related hazard.



## STANDARDS

### NGSS 3-ESS2-1, 3-ESS2-2, 3-ESS3-1

- Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season
- Obtain and combine information to describe climates in different regions of the world.
- Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

## OBJECTIVES

- ✓ Students will graph weather patterns and identify and predict the weather in different seasons.
- ✓ Students will obtain and combine information to describe and predict climate patterns in different regions worldwide.
- ✓ Students will identify a weather-related hazard and its impact on the environment, and they will design a solution.

## GUIDING QUESTIONS

Why is knowing about the seasons important to our everyday lives?

Why do climates change in different regions of the world?

How can we protect people from weather-related hazards?

## MATERIALS

- Scissors
- Crayons or colored pencils
- Weather and Climate worksheet
- Weather Data Investigation worksheet
- Map of the World
- Earth's Seasons worksheet
- Climate Zones worksheet
- How to Prepare for a Weather-Related Hazard worksheet



## ASSESSMENTS

Formative assessments and checks for understanding occur throughout the lesson:

- Students' responses to questions
- Students' sharing and work during guided practice
- Students' discussion about their questions and answers
- Students' work during independent practice

**Summative Assessment:**  
written explanations to the activities/questions throughout

## DIFFERENTIATION STRATEGIES

- For students who need support, read all informative texts aloud and frequently pause to check for understanding. Ask students questions to make sure they can define and recall facts from the worksheets.
- Make flashcards with the vocabulary from the Climate and Weather activities for your students to use for matching or to create sentences with the words in context.

## EXTENSION ACTIVITIES

- Watch science videos on extreme weather, weather, climate, and seasons, and invite students to note similarities and differences.
- Read related texts, such as [The Cloud Book](#) by Tomie de Paola or [The Cloud Book of Wonder](#) by Christina M. Brandt. Have students write an interactive book report to share with a peer.
- Invite students to write a weather forecast for your area.



## ACTIVITY OVERVIEW

### Activity 1

#### Weather & Climate

Students read about the difference between weather and climate, draw the climate in their local area, and complete a Venn diagram to check for comprehension.

### Activity 2

#### Collecting Weather Data

Students make observations of their local weather and a city with a different climate, record the data on a chart, and compare it with the weather of other regions.

### Activity 3

#### How Weather Changes With the Seasons

Students learn how weather changes and predict the weather for their area across the seasons.

### Activity 4

#### Climates Around the World

Students identify the climate zones and complete a matching activity of different climates around the world.

### Activity 5

#### Preparing for Weather-Related Hazards

Students read about weather-related hazards, choose a hazard, describe the impact on the environment, and provide a solution.

### ACTIVITY 1: WEATHER & CLIMATE

- Ask students, “Have you ever gotten up in the morning and it’s pouring rain, but by the time you are ready to go out and play, the sun is shining?” Let students share their responses.
- Discuss that weather and climate are an integral part of Earth’s systems. Weather refers to short-term changes in the atmosphere, and climate describes what weather is like over a long period of time in a specific area. For example:
  - In Florida, it is mostly always warm.
  - In Antarctica, it is always frigid cold.
- Distribute the Weather and Climate worksheet to students and explain the directions:
  - Students should read the passage independently and circle, underline, or highlight weather and climate-related words.
- After reading, ask:
  - What is the weather like outside today?
  - What might the weather be like tomorrow or the next day?
  - How does the weather in our area change over time?
- Discuss the temperatures and different precipitation that happens in your local area.
- Point to the Venn diagram activity at the bottom of the worksheet and invite students to follow along as you read aloud the phrases about weather and climate in the word box.

**CONTINUED-- ACTIVITY 1: WEATHER & CLIMATE**

- Explain that each phrase will go under one of the three topics in the Venn diagram (Weather, Both, Climate). One of the phrases was placed in the diagram for students as an example. Tell students to put the remaining phrases under the appropriate topic in the Venn diagram to complete the worksheet.
- Review the completed worksheet as a class.

**ACTIVITY 2: COLLECTING WEATHER DATA**

- Ask: "Do you think the weather is the same everywhere in the United States or in the world?"
- Explain to students that they will track the weather where they live and in another part of the world.
- Distribute the Weather Data Investigation worksheet.
- Share a map of the world with students and have them choose a city in another country where they would like to track the weather. Share the example on the worksheet of different countries.
- Have students fill in the sentences with where they live and the city and country they chose.
- Explain that students will use the internet to check the weather forecast in their local area and the city they chose. Students can use pre-identified websites that track weather.
- Discuss the different types of weather students may encounter and how they might record it in their chart.
- Once both charts are completed, students will study the data they collected and compare the weather patterns in both areas.
- Invite students to discuss their findings with a partner or as a class. Then, have students answer the questions below the charts and write their conclusion about weather patterns.

**ACTIVITY 3: EARTH'S SEASONS**

- Ask: “Is the weather in your area the same all the time?”
- Distribute the Earth’s Seasons worksheet.
- Read the text about seasons.
- Discuss the different types of weather at different times of the year.
- Read the directions with the students and provide support as needed.
- Invite students to share their completed work with a partner as time allows.

**ACTIVITY 4: CLIMATES AROUND THE WORLD**

- Distribute the Climate Zones worksheet.
- Ask students if they have ever traveled to another state or country, or if they know anything about the weather in another part of the world.
- Students will read about climate zones on the worksheet.
- Discuss what the weather might be like in each of these areas.
- Have students complete the worksheet.
- Review the worksheets as a class and provide clarification as needed.

**ACTIVITY 5: PREPARING FOR WEATHER-RELATED HAZARDS**

- Distribute the How to Prepare for a Weather-Related Hazard worksheet.
- Explain the directions:
  - Students will read through the worksheet. (Offer support as needed.)
  - In Part 1: Students will complete the activity by matching extreme weather events with their cause and weather-related hazard.
  - In Part 2: Students will choose one of the extreme weather events and design a plan to solve a weather-related hazard.
    - Invite students to share their completed plans with the class. Encourage students to share how they came up with their ideas.
    - \*Optional: Post completed worksheets in a gallery in the classroom or hallway to display student thinking.

# WEATHER & CLIMATE

Read the text below, then complete the activity.

## WHAT IS WEATHER?

Weather is the current temperature, **precipitation**, **state of the wind**, and clouds in a specific place. For example, today might be a warm, cloudy day with a slight breeze. Weather is reported day to day as a forecast. Weather lasts over short periods.

## WHAT IS CLIMATE?

Climate is weather that happens over long periods in a specific area. The climate in specific areas is tracked by collecting information about temperatures, precipitation, and wind patterns and recorded as **data** in charts and reported as **averages** over at least 30-year periods.

There are many types of climates across the Earth. For example, deserts are hot and dry, while the Antarctic has a cold and dry climate. When seasons like winter and summer change, so does the climate. As the amount of sunlight changes, it affects precipitation, wind, and temperatures. The precipitation changes to rainy or snowy periods. As the temperature changes in specific areas, it will get warmer or colder. The day-to-day weather makes climate over a long period of time.

## VOCABULARY

**precipitation:** rain, snow, sleet, hail

**state of the wind:** breezy, strong, light; from the north, south, east

**data:** facts collected together and put in a chart

**average:** the sum of numbers divided by how many numbers there are



**Part 1: Read the phrases in the box and write each phrase in the correct part of the Venn diagram on the next page.**

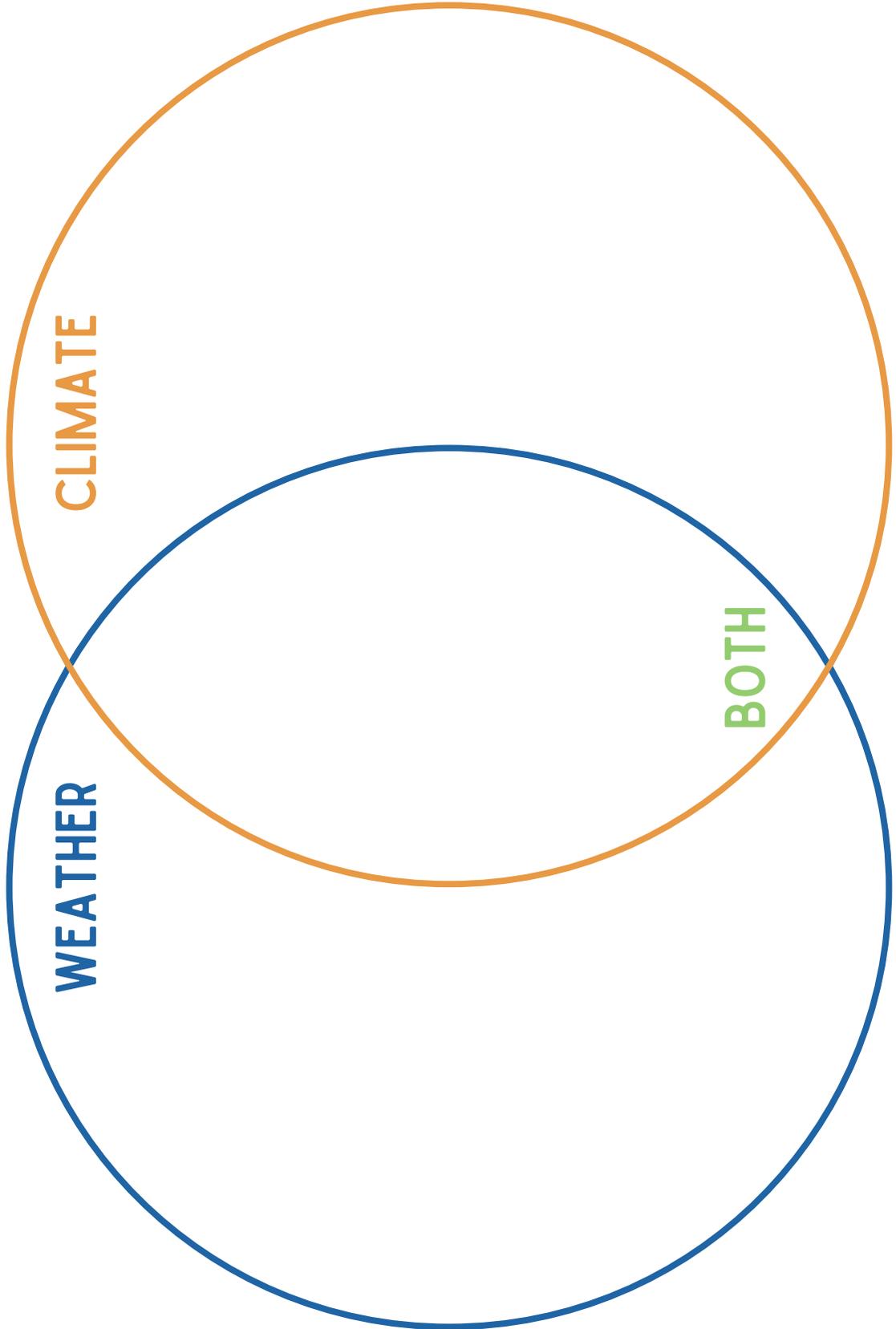
- short periods of time
- temperatures
- over long periods of time
- day to day
- reported as a forecast
- reported as averages
- precipitation/wind
- seasons

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## WEATHER & CLIMATE (CONTINUED)

Write the phrases from the previous page in the correct section of the Venn diagram.



NAME \_\_\_\_\_

DATE \_\_\_\_\_

## WEATHER & CLIMATE (CONTINUED)

**Part 2: Describe the difference between weather and climate.**

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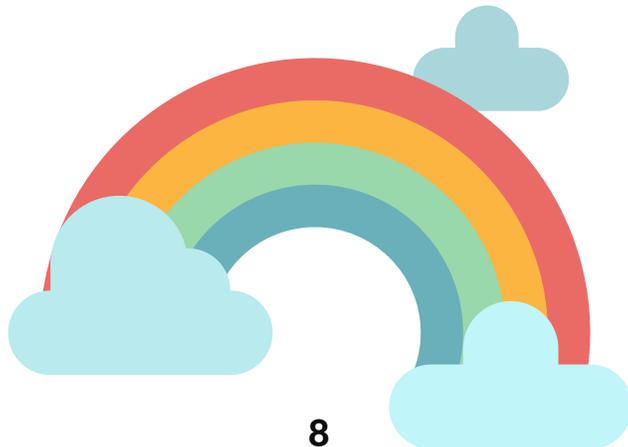
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**Part 3: Provide some examples of weather and climate.**

WEATHER	CLIMATE

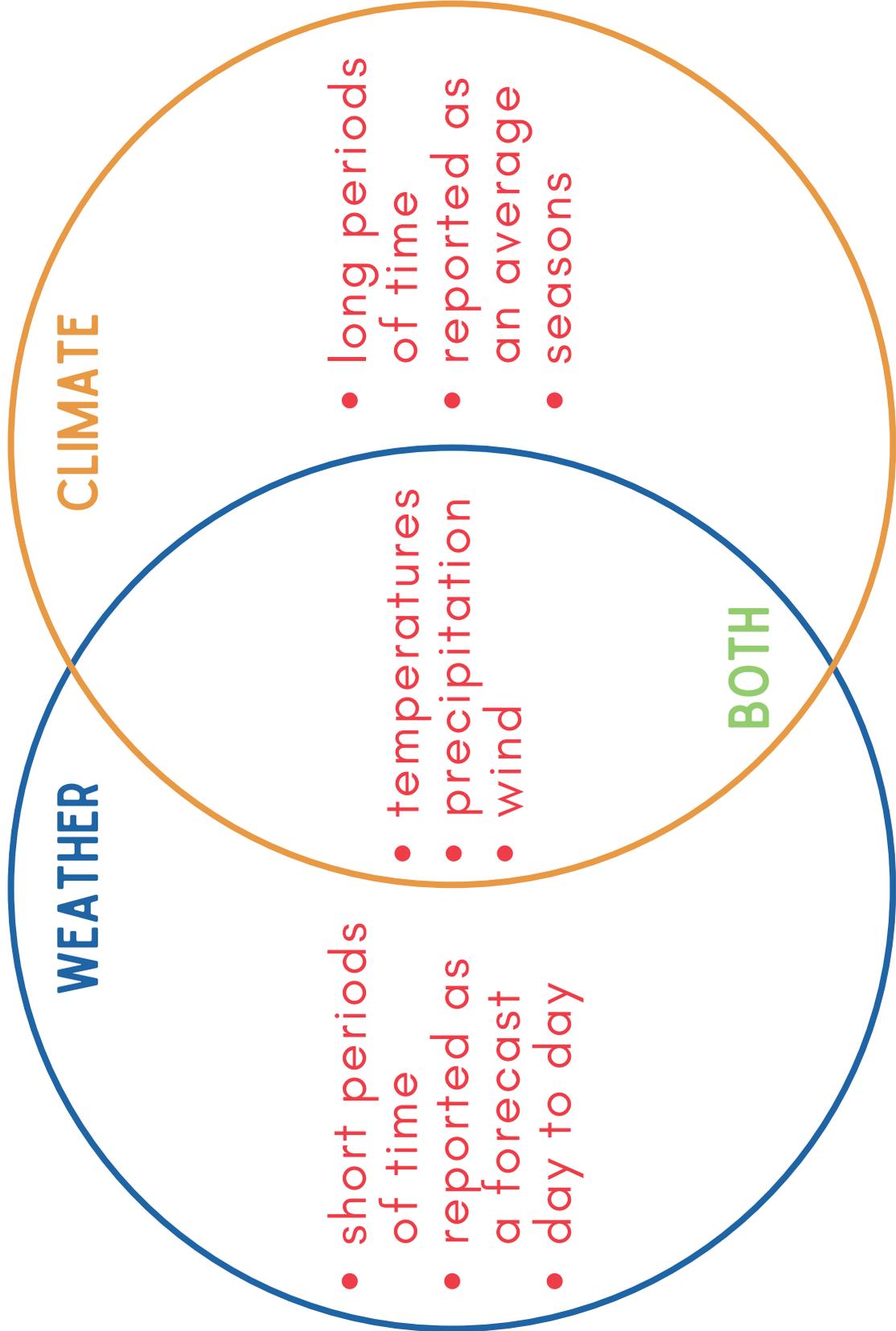


NAME \_\_\_\_\_

DATE \_\_\_\_\_

## WEATHER & CLIMATE (CONTINUED)

Write the phrases from the previous page in the correct section of the Venn diagram.



NAME \_\_\_\_\_

DATE \_\_\_\_\_

## WEATHER & CLIMATE (CONTINUED)

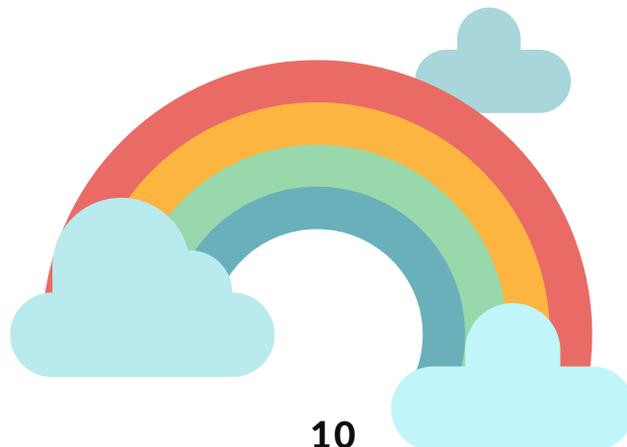
**Part 2: Describe the difference between weather and climate.**

**Answers may vary slightly.**

Climate is what happens over longer periods of time in a specific region. Weather is what is forecasted day to day over short periods of time.

**Part 3: Provide some examples of weather and climate. Answers may vary slightly.**

WEATHER	CLIMATE
Today it will be sunny and 75 degrees.	It will be a long, hot summer.
It will be rainy for the next two days.	The average temperature this winter is 25 degrees.
There is snow in the forecast for tomorrow.	Our rainy season begins in March.



NAME \_\_\_\_\_

DATE \_\_\_\_\_

# WEATHER DATA INVESTIGATION

Your task is to investigate the weather in your local area and compare it to a city in another region. Once you have completed your observations, answer the questions on the next page.

I live in \_\_\_\_\_ . I will choose the city \_\_\_\_\_ .  
CITY OR STATE/PROVINCE CITY, COUNTRY

City I live in: \_\_\_\_\_

WEEK 1	TEMPERATURE	WIND SPEED	SUN/ CLOUDS	PRECIPITATION	NOTES
EXAMPLE	72°F	SW 10 mph	Partly cloudy	rainy	
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					

City I chose: \_\_\_\_\_

WEEK 1	TEMPERATURE	WIND SPEED	SUN/ CLOUDS	PRECIPITATION	NOTES
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## WEATHER DATA INVESTIGATION (CONTINUED)

Answer the questions below based on the information in your data charts.

Did you notice any temperature patterns between the two cities?

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Did you notice any weather patterns between the two cities?

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What is your conclusion about the weather in the two cities?

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NAME \_\_\_\_\_

DATE \_\_\_\_\_

## **WEATHER DATA INVESTIGATION (CONTINUED)**

Answer the questions below based on the information in your data charts.

Did you notice any temperature patterns between the two cities?

### **Possible answers:**

- The temperatures in both areas stayed the same.
- The temperatures in one area were higher/lower than in the other.

Did you notice any weather patterns between the two cities?

### **Possible answers:**

- The weather patterns in both cities were very different. In one, it was rainy and cold; in the other it was warm and sunny.
- The weather in both cities was mostly the same. It was cold for a long time or it was very warm for weeks.

What is your conclusion about the weather in the two cities?

### **Possible answers:**

- Both cities are in the same region due to the fact that their climates are very similar.
- Both cities are in different regions since their climates are very different.

# EARTH'S SEASONS

Read the text, then complete the activity.

## HOW DO THE SEASONS AFFECT THE WEATHER?

As a year goes by, regular changes occur in the weather. It may rain or snow. It might be very windy or calm. There might be thunder and lightning storms, or it could be warm and sunny. Each season has its weather patterns. This cycle of weather changes is divided into four parts, known as the seasons. The four seasons are winter, spring, summer, and fall.



Report what the weather is like in each season where you live. Draw a picture and write a description of the weather for the season.

**SPRING**

**SUMMER**

**WINTER**

**FALL**

Is the weather very different in all four of your seasons? Explain your answer.

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# CLIMATE ZONES

Read the text, then complete the activity.

You wouldn't go to Australia in the winter and expect to see snow or travel to Antarctica and swim in the ocean. The weather and climates are different in different parts of the world. Earth is divided into **four major climate zones** due to its tilt. The four major zones are polar, temperate, subtropical, and tropical. A climate zone is an area where the weather pattern differs from other parts of Earth.



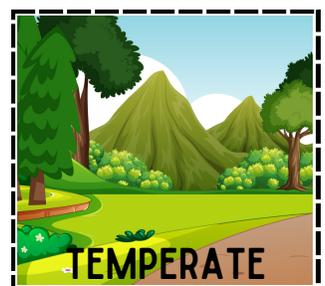
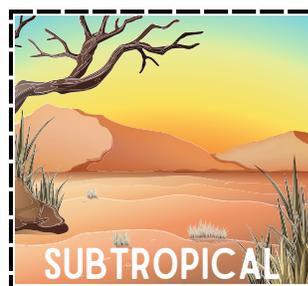
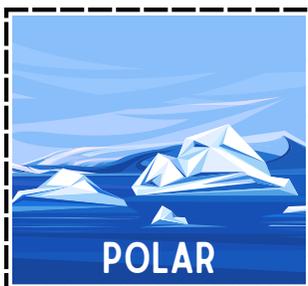
Cut out the climate zone cards. Then glue them above the description of weather in that zone.

sunny very warm lots of moisture humid	very hot sunny dry	rainy/sunny cloudy mild	freezing cold year round

I would like to live in a \_\_\_\_\_ climate because \_\_\_\_\_.

The weather in the \_\_\_\_\_ climate is typically \_\_\_\_\_.

I currently live in the \_\_\_\_\_ climate zone.



NAME \_\_\_\_\_

DATE \_\_\_\_\_

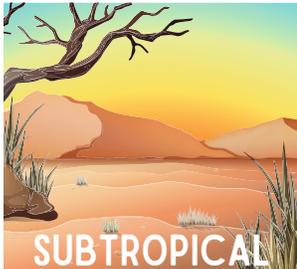
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Cut out the climate zone cards. Then glue them above the description of weather in that zone.

 <p><b>TROPICAL</b></p>	 <p><b>SUBTROPICAL</b></p>	 <p><b>TEMPERATE</b></p>	 <p><b>POLAR</b></p>
<p>sunny very warm lots of moisture humid</p>	<p>very hot sunny dry</p>	<p>rainy/sunny cloudy mild</p>	<p>freezing cold year round</p>

### POSSIBLE ANSWERS

I would like to live in a tropical climate because I love very hot weather.

I would like to live in a temperate climate because I like all the seasons.

The weather in the polar climate is typically very frigid and cold.

The weather in the temperate climate is typically mild and nice.

I currently live in the \_\_\_\_\_ climate zone. (Answers will vary.)

Read the text, then complete the activity.

# HOW TO PREPARE FOR A WEATHER-RELATED HAZARD



Have you experienced a really bad storm where you live? One where it won't stop raining, or it gets so windy that it makes trees fall? Sometimes the weather can become extreme and cause environmental hazards that affect people. Some types of extreme weather are hurricanes, tornadoes, and blizzards. Each of these extreme types of weather creates different weather-related hazards. In a blizzard, schools close and people must stay indoors to stay warm. If there is a tornado, people need to go to low ground or a cellar because of the high winds.

Part A: Draw lines to match each type of extreme weather with its cause and weather hazard. Each extreme weather or cause may match with more than one weather hazard.

EXTREME WEATHER	CAUSES	WEATHER HAZARD
<p><b>hurricane</b></p> 	<ul style="list-style-type: none"> <li>Extremely high winds</li> </ul>	<ul style="list-style-type: none"> <li>wires are down</li> <li>electricity goes off</li> <li>fires</li> </ul>
<p><b>thunderstorm</b></p> 	<ul style="list-style-type: none"> <li>Wind funnel</li> </ul>	<ul style="list-style-type: none"> <li>frostbite</li> <li>flooding in the streets</li> <li>trees down</li> <li>schools close</li> <li>mudslides</li> </ul>
<p><b>blizzard</b></p> 	<ul style="list-style-type: none"> <li>Frigid cold</li> <li>Storm surges of water</li> </ul>	<ul style="list-style-type: none"> <li>houses destroyed</li> <li>houses flooded</li> <li>roofs come off</li> <li>buildings torn down</li> </ul>
<p><b>tornado</b></p> 	<ul style="list-style-type: none"> <li>Many feet of snow</li> <li>Lightning</li> <li>Heavy snowfall</li> <li>Heavy rainfall</li> </ul>	<ul style="list-style-type: none"> <li>items fly around and get moved</li> <li>car accidents</li> </ul>

# HOW TO PREPARE FOR A WEATHER-RELATED HAZARD (CONTINUED)



Part B: Your task is to choose one of the extreme weather events on the previous page and design a plan to solve a weather-related hazard. Fill in the charts with descriptions and/or drawings.

**EXAMPLE:**

There is flooding due to extreme rain during a hurricane. I would build a bridge or create a wall to stop the water from getting through.

MY EXTREME WEATHER EVENT	CAUSES	WEATHER-RELATED HAZARD(S)
MY PLAN		

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## HOW TO PREPARE FOR A WEATHER-RELATED HAZARD



Part A: Draw lines to match each type of extreme weather with its cause and each cause with a weather hazard. There are more than one match for each extreme weather.

EXTREME WEATHER	CAUSES	WEATHER HAZARD
<p><b>hurricane</b></p> 	<ul style="list-style-type: none"> <li>Extremely high winds</li> <li>Wind funnel</li> </ul>	<ul style="list-style-type: none"> <li>wires are down</li> <li>electricity goes off</li> <li>fires</li> <li>frostbite</li> <li>flooding in the streets</li> </ul>
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**There may be more possible connections.**

**Answers for Part B will vary but should be related to solving the effects of the weather-related hazard the student has chosen.**