# Third Grade Earth/Space Science

WEATHER AND CLIMATE: Graphical Displays

Background Information

Weather and climate are related to one another. Current conditions and seasonal descriptions are considered weather, which include precipitation, temperature, wind speed and direction, cloud cover, and barometric pressure to name a few. Each season has its unique features based on weather and amount of daylight. Thirty years' worth of weather pattern data are analyzed to determine climates. Annual and monthly temperatures, as well as precipitation data are the basis for climate zones. Landforms, proximity to oceans, and sea level also contribute the traits of the zones.

Latitude is used to geographically delineate climate zones. The higher the latitude, the less sunlight received. The tilt of the Earth is important in the amount of sunlight that reaches the surface rather than Earth's distance from the sun. When tilted farther away from the sun, the sun's rays are less direct than when the hemisphere is tilted toward the sun. Greater amounts of energy are absorbed the Earth when it is tilted toward the sun resulting in warming trends. (*Note climate zone identified on the map below will be used by students in this activity.)
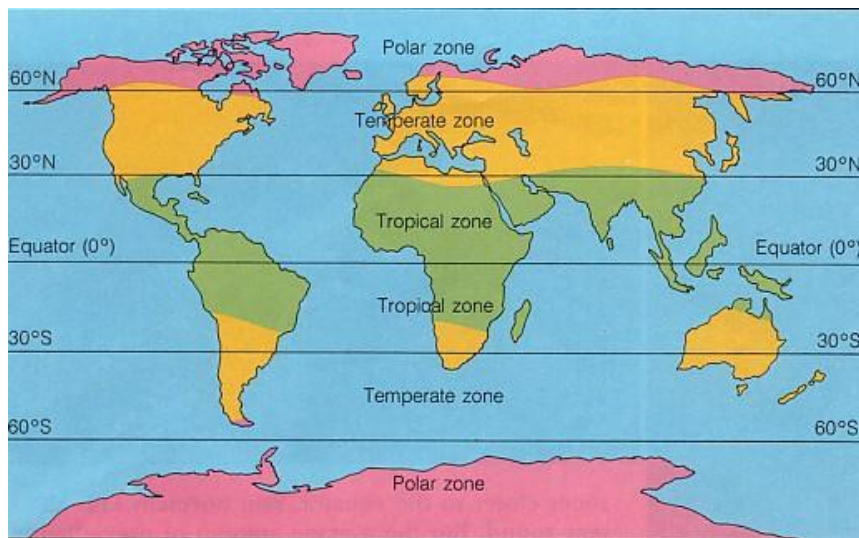
Performance Expectations

3-ESS2-1 Earth's Systems

Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
https://www.nextgenscience.org/pe/3-ess2-1-earths-systems

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3-ESS2-2 Earth's Systems

Obtain and combine information to describe climates in different regions of the world.

https://www.nextgenscience.org/pe/3-ess2-2-earths-systems

Disciplinary Core Ideas

ESS2.D: Weather and Climate

Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.

Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.

Science and Engineering Practices

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships.

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

Obtain and combine information from books and other reliable media to explain phenomena.

Crosscutting Concepts

Patterns of change can be used to make predictions.

Advanced Preparation

- Gather resources for research.
- Determine size of passport and how each will be bound.
- Obtain materials to be used in building structures.

Objectives

- Students will graphically represent, analyze, and interpret data.
- Students will use data to identify climate zones.

Materials

- Multiple Sheets – Drawing Paper
- Coloring Materials
- Binding Materials
- World Map
- Computer with Internet Access
- Computer with Projector
- Power Point
- Books for Research
- Latitude and Longitude Map
- Passport Template
- Average Temperature and Precipitation Tables

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Suggested Approach Weather and Climate Part 1

Place students in groups of four to begin the activity. Have the groups describe each of the four seasons relative to one another. Suggest the following to lead the groups' conversations:

- *Compare the seasons: winter, spring, summer, and fall.*
- *What traits were used to discuss the seasons?*
- *How could these traits be classified?*

Display the power point slide that shows the weather map. Open a class discussion for the following ideas:
- *What do you know about a weather maps?*
- *Share observations about the map.*
- *What information is on the map?*
- *What are the numbers on the map?*
- *How many days does this map represent?*

Have students continue to work in groups of four. Share the power point slides showing the type of data that will be used. Review latitude and longitude as needed. Distribute the city/location information to each group. Share with them a scenario, such as they are meteorologists, and that their tasks are to organize the information.

Note: Pictographs and/or bar graphs are the expected types of graphical displays for students to develop.

1. Seasonal precipitation and seasonal temperature into a graph. The following website is suggested for making online graphs.
   https://nces.ed.gov/nceskids/graphing/Classic/
2. Locate and label each group's city(ies) on the map. Students may need a world map to locate their city/location.

Assist students as needed. After allowing sufficient time for groups to complete their tasks, combine two groups together. These new groups should:

- *Explain and share their work from the above steps, as well as discuss similarities and differences among the locations.*
- *Mark the new locations on their maps.*

Continue this process by having groups pair with different groups each time until all groups have been able to meet with each other.

The class should return to their original working groups. Students then examine their maps.

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During discussion within groups, students decide which cities have the most in common in regards to weather and determine which cities can be paired. Ask the class questions such as:

☆ *How did you pair the cities?*
☆ *Why did you pair them in this way?*
☆ *What do you notice about the locations of the cities you paired?*

Share the power point slide Locations. (Note: Locations are based on climate zones.) Ask students to think about and share their ideas about locations of the pairs of cities/locations that are on the slide.

☆ *Anchorage, Alaska and Boden, Sweden*
☆ *Scott Base and Falkland Islands*
☆ *Los Angeles, California and Vienna, Austria*
☆ *Cape Town, South Africa and Melbourne, Australia*
☆ *Punta Cana, Dominican Republic and Manila, Philippines*
☆ *Rio de Janeiro, Brazil and Jakarta, Indonesia*

Ask students why there are lines across and up and down the map and what we call these lines. Follow this with a discussion about what they notice regarding location of the city/location points that are indicated on the map. Coach students to the concept that latitude "bands" have similar conditions. Use the latitude slide if needed. Display the climate zone map slide. Have students make observations about the map. Make sure they notice the climate zone labels. Students label and color the climate zones.

Debrief
Ask students questions such as:
- *What categories were you and your group organizing and graphing?*
- *Which characteristics do you think are used to identify the climate zones?*
- *What do you notice about these climate zones and where their cities are located?*
- *How would you describe the difference(s) between climate and weather?*

Suggested Approach Weather and Climate Part 2

Host a discussion using questions such as the following:
☆ *What is a passport?*
☆ *When would you use a passport?*

Share that they will now make a climate zone passport. (Decide how students will bind the passports.) The passport will contain items such as the following:
- *Cover*

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- *Drawing of world with climate zones labeled*
- *Short explanation of how climate zones are identified*
- *__cities/locations from each climate zone.*
- *Name of city/location*
- *Latitude*
- *Picture to represent the area*
- *Time of year to visit based on data from graphs*
- *What to pack using data from graphs*
- *Written summary of what they have discovered about climate zones*

Debrief

- *What climate zone(s) did you decide to visit?*
- *Share some of the characteristics of the climate zone.*
- *Why did you select your destination(s)?*
- *How does the climate of where you visited compare to Illinois' climate?*

Resources

- https://www.weather.gov/timeline
- https://www.weather.gov/ (current U.S. weather conditions)
- https://iowa.pbslearningmedia.org/resource/buac17-35-sci-ess-whatclimate/what-is-climate/
- https://scijinks.gov/climate-zones/
- https://climatekids.nasa.gov/menu/weather-and-climate/

Book suggestions from: http://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf
- Gibbons, G. (1993). *Weather forecasting.*
    With straightforward text and colorful pictures, this behind-the-scenes look at a modern weather station answers basic questions kids ask most, and makes weather forecasting more fun and accessible than ever.
- Dean. J. (2013). *Freddy the frogcaster.*
    Freddy the Frog loves learning about the weather, and he's known for having the best predictions in town. But what happens when the town picnic is almost ruined by a storm that catches the local frogcaster by surprise? Freddy has to step in to save the day!
- DeWitt, L. (2015). *What will the weather be?*
    Uses colorful, simple diagrams to explain meteorology in a fun, engaging way. Perfect for young readers and budding meteorologists, this bestseller is filled with rich climate vocabulary and clear explanations of everyday weather instruments like thermometers and barometers.

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- Singer, M. (2001). *On the same day in March: A tour of the world's weather.*

  What the weather is like on March 17th in spots around the world.
- Morris, M. (1995). *Houses and homes.*

  The world is full of houses. Big houses and little houses. Houses that stay in

  one place and houses that move from place to place. Some houses are made of wood or stone; others are made from mud or straw. But all of them are made for families to live in.
- Aillaud, C. (2005). *Recess at 20 below.*

  In Delta Junction, Alaska, it is recess (and school) as usual at 20 below zero. Join real students as they trudge to school in the dark, bundle up for snowy fun, and share what it is like to live in a cold and beautiful place.
- Alberti, T. (2006). *Climates.*

  Showcases Earth's diverse climates and will help children compare and contrast polar and boreal climates with those in tropical, subtropical, temperate, mountain and desert climates.

Assessment

The following single point rubric can be used to assess student understanding. For each of the criteria listed below, either circle the proficient description or add notes to a box indicating why the student's performance was either lacking or exceptional.

Areas that need improvement. **Developing Performance**	Criteria for **Proficient Performance**	Evidence of exceeding standards. **Advanced Performance**
	Can provide an example of a graph that represents climate data for a location on earth.	
	Can identify the characteristics of the different climate zones.	
	Given a scenario involving weather or climate data, can identify what climate zone is being described.	

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