Top of The World

4th-6th Grade

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Transfer Goals:	Essential Questions:
Students will be able to independently use their learning to: • Identify differences in ecosystems and their connection to global ecosystem health. • Recognize local ecosystems and community to build place-based learning connections to their personal place	What makes each location on earth unique from one another? How does the environment influence how people live?

Standards:	Materials:	Objectives:
NGSS: 4-ESS2-1 4-ESS2-2 5-ESS1-2 MS-ESS2-6 **CCSS:** ELA/Literacy-W.4.8 W.4.7 RI.4.7	Activity 1: • Large Chart Paper or white board to display Activity 2: • Arctic Map (one per student) • Large World Map • Globe • Coloring Utensils • Writing Utensils Activity 3: • "66 degrees and Me!" Chart • Local Newspaper • Almanac (optional) • World Map • Globe • Writing Utensil	*Students will know:* • How to identify, locate, outline, and map the Arctic Circle, including the countries that lie within its boundaries. *Students will be skilled at:* • Defining the Arctic region by latitude, temperature, and tree line. *Students will understand:* • Differences in ecosystem characteristics of the North and South Poles, the equator, and their home town.

Description:

The Arctic is a vast and surprisingly diverse region of land and ice. The Arctic Circle is an imaginary line of latitude at 66 degrees 33 minutes (66°33’ above the equator) or in other words 6,215 miles (10,000 km) from the equator. The following countries exist within the Arctic Circle: the United States (Alaska), Russia, Canada, Norway (Svalbard), Sweden, Finland, Iceland, and Greenland (Denmark). There are many misconceptions about the Arctic, especially when compared to Antarctica. For example, polar bears and penguins do not live in the same regions; polar bears live in the Arctic only, while penguins species are found in Antarctica, South Africa, and South America. The following myth-busting lesson will help you explore the land's geography, preparing students to explore who and what lives there all while connecting them back to the latitude they call home.

Vocabulary:

Arctic: The northernmost polar region. The Arctic region consists of landmasses covered in treeless permafrost surrounded by the Arctic Ocean.
Arctic Circle: The Arctic Circle is an imaginary line of latitude located at 66 degrees 33 minutes (66°33’ above the equator). Above this line, The sun does not set on the summer solstice (June 21) nor rise on the winter solstice (December 21).
Antarctica: Earth’s southernmost continent, encapsulating the South Pole.

Isotherm: A line on a map that connects points that have the same average temperature at the same time

Permafrost: Ground that is permanently frozen, often to great depths, the surface sometimes thawing in the Summer and overall increasingly thawing due to climate change.

Tundra: A cold, treeless area between the Arctic shoreline and the tree line. The lower layers of soil are permanently frozen, but in summer the top layer of soil thaws and can support low-growing mosses, lichens, grasses, and small shrubs.

Duration:

This lesson contains several activities. Timing for all activities will take 1-2 hours total.

Lesson Plan

Activity 1: Arctic or Antarctic

Engage:

- Make a large chart with one side listed “The Arctic” and the other “Antartica”.
- Engage students to list characteristics they can think of for each area or call out a fact about either the Arctic or Antarctica. Have students decide which column it should be listed under.

- Use the chart below to prompt students if they are having trouble.

  The Arctic
  - ❒ An ocean surrounded by land
  - ❒ Contains the North Pole
  - ❒ Elevation: 3 feet (0.9144 meters) of sea ice
  - ❒ Bedrock: 1,400 feet (426.72 meters) below sea level
  - ❒ Average mean temperature: 0° F/ -17.8° C
  - ❒ Tundra, flowering plants, shrubs, tree line
  - ❒ Land mammals (e.g. caribou, fox, polar bear)
  - ❒ No penguins
  - ❒ Marine mammals
  - ❒ Several indigenous cultures
  - ❒ Population: More than 2 million people
  - ❒ Extensive exploitation of natural resources

  Antarctica
  - ❒ An ice-covered continent surrounded by ocean
  - ❒ Contains the South Pole
  - ❒ Elevation: 9,300 feet (2987.04 meters) above sea level
  - ❒ Bedrock: 100 feet (30.48 meters) above sea level
  - ❒ Average mean temperature: -58° F/-50°C
  - ❒ No tundra or tree line
  - ❒ No land mammals
  - ❒ Penguins
  - ❒ Marine mammals
  - ❒ No record of primitive humans or native groups
  - ❒ Population: Seasonal scientific researchers
  - ❒ No exploitation of natural resources

Activity 2:

Explore and Explain:
- Ask students what they know about the Arctic and record their ideas on poster paper to reference later. Have each student go back and rate from 1-10 how confident they are whether or not they think their answer is correct.
- On a classroom map of the world, ask a student to locate the Arctic. Meanwhile, ask another student to locate the Arctic on a globe. Compare and contrast these two views. As a class, discuss which view (map or globe) shows the Arctic region in a format that is easier to see.
- Show students the “Polar Bears and Arctic Sea Ice” video
  - https://www.youtube.com/watch?v=rqh5pxVUChw&t=4s
- Discuss each definition of the Arctic (by latitude, temperature, and tree line) using a large classroom map of the world or a globe; discuss longitude and latitude as needed.
  - Have students keep track of their definitions on a separate paper
- Emphasize that the Arctic is a “region” consisting of seven countries and is a unique and harsh habitat that people and a range of plants, and animals call home.

- As a class, locate and label each country that lies within the Arctic Circle using the “Arctic Map”
    - Norway (Svalbard), Finland, Sweden, Russia, Iceland, Greenland (Denmark), United States (Alaska), and Canada.
- Trace the Arctic Circle (66 degrees latitude) using colored pencils, markers, or crayons.
- Return to the students’ ideas of the Arctic. Confirm correct ideas and change incorrect ideas. Leave unanswered ideas from this lesson to address later and tell students that they will continue to learn more about the Arctic in the following lessons.

Activity 3:

Elaborate and Evaluate:

- Have students draw out a “place observation chart” in a journal or paper designated to this lesson.
- Instruct each student to choose a specific outdoors place to observe over the next few weeks.
    - Help the students find a safe, comfortable place to observe. This could be outside a window, on their front porch, in their backyard, in the schoolyard, etc.
- Instruct students to observe and record in this place with their five senses three times a week for four weeks.
    - What do I see?
        - Think animals, plants, signs of nature
    - What do I smell?
    - What do I feel?
        - Could be feelings or physical touch
    - What do I hear?
    - What did I eat today?
    - What is the weather like?
- Once data is collected return students to the lesson and have students complete the “66 Degrees and Me!” table in pairs or small groups.
- Compare and contrast as a class what they discovered about the Arctic through the comparison of their hometown and the other countries.
- Instruct students to complete the Flips below:
    - How is the Arctic the same as your home? How is it different? How does the environment affect the people who live there?

Extension:	Adaptation:

• For higher grades, consider having students explore online resources about the Arctic and Antarctica.
  ○ After they have completed some self guided research, they can participate in these interactive quizzes for further learning
  ■ https://climate.nasa.gov/quizzes/frozen-poles/
	• For lower grades, get creative with how you present Arctic and Antarctica traits. Instead of asking the students to come up with their own ideas, you can print out the list provided in Activity 1, or even use pictures to depict characteristics.
	• For lower grades, a “place observation chart” might be a challenging self directed task.

■ https://climate.nasa.gov/quizzes/quiz-ice/	Consider making this part of the classroom routine in the morning or afternoon. Setting aside 10 minutes for their observations to ensure they are meaningful reflections.

References

- “Polar Bears and Arctic Sea Ice” video
  - https://www.youtube.com/watch?v=rqh5pxVUChw&t=4s