

## Arctic Climate Connections Activity 1 Exploring the Arctic

### CONCEPT MAPPING – WHAT IS THE ARCTIC?

- What do you know about the Arctic?
  
- What makes the Arctic so unique?
  
  
  
  
  
  
  
  
  
  
- What do you know about the environment, climate, plant cover, animals, human activity, habitability, natural resources, politics, history, populations, and other aspects that come to mind?

### DEFINITION OF THE ARCTIC:

- What are the four possible definitions of Arctic?
  
  
  
  
  
  
  
  
  
  
- Which of the four possible definitions of Arctic are listed on the class sheet?
  
  
  
  
  
  
  
  
  
  
- Which of the four definitions in the background reading is the closest to the definition you have in front of you?



## EXPLORING VEGETATION IN THE ARCTIC

### Reading: Landscapes and Vegetation in the Arctic

Guiding questions for the reading “Landscapes and Vegetation in the Arctic”:

- In which of the four Arctic landscapes are trees found?
- What is permafrost? Where does permafrost occur?
- Why do we care about Arctic vegetation?

### Extension: Exploration of Arctic Environmental Atlas

Guiding questions for exploring the “Arctic Environmental Atlas”:

- In which country/region does forest cover reach furthest north?
- In general, do deciduous or evergreen forests extend further north?

### Visualization: Greening of the Arctic

Guiding questions about the visualization, “Greening of the Arctic”:

- How does the Arctic vegetation respond to a changing climate?
- Based on the visualization, how do scientists study vegetation in the Arctic?
- Explain what is meant by a positive feedback loop with respect to climate change and vegetation in the Arctic. Does this mean the feedback is beneficial?

**EXPLORATION OF ARCTIC'S INDIGENOUS POPULATION:****Guiding questions:**

- What percentage of the Arctic population is comprised of indigenous people in Canada, Greenland and Russia, respectively?
  
- How did people in the Arctic originally adapt to live in the extreme Arctic environment?

**Extension – Documentary of Arctic People and Climate Change:****Guiding questions:**

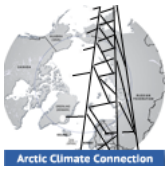
- What effects of climate change are being reported by Inuit people of Sachs Harbor?
  
- How are scientists working together with these Sachs Harbor citizens?

**Part B: A Virtual Trip to the Arctic****Exploration of Arctic Research Sites:****Guiding questions:**

- Who participates in the IASOA?
  
- What role do Arctic people play in Arctic research efforts?

**START GOOGLE EARTH EXPLORATION CLOSE TO HOME**

- 1) Can you recognize any landforms like ponds, parks, rivers, streams, lakes, hills, and valleys?
  
- 2) Add a “placemark” at your school by clicking on the yellow pin icon at the top of the screen.



3) Make sure to note what vegetation you can see in the images – can you see trees, grass, and shrubs? Describe the vegetation that you can identify.

### LET'S VISIT THE ARCTIC

1) Add a placemark that you name, "Eureka".

2) Explore the settlement. Make a simple hand-sketch on a separate piece of paper that shows the layout of the settlement.

- What type of vegetation do you see around Eureka, Canada?
- Describe the physical setting (mountains, rivers, ocean) of Eureka, Canada using cardinal directions (N, S, E, W)?
- What does the infrastructure of Eureka, Canada look like (roads, buildings)?

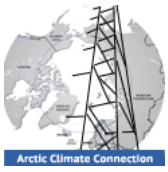
3) What is the elevation above sea level of Eureka, Canada?

4) When does it get light in Eureka today and when does it get dark?

5) Approximately, how far is the flux tower away from the ocean (make sure to include the unit you used for the measurement)?

6) Set a placemark where the station is and choose an appropriate name for your placemark.

7) Measure the distance (in a straight line) from the station to the airport in the town of Barrow (following the instructions about distance measurements under question 5).



8) Does the webcam show the same light/darkness as you see in Google Earth?  
If not, please explain and explore if there is a way to replicate the webcam light conditions.

9) What does the vegetation in Ny Ålesund look like based on the pictures?

10) Set a “placemark” for Tiksi.

11) Use the ruler and determine the distance between each station and the Arctic Circle—make sure to use a sensible unit:

Eureka – Arctic Circle:

Ny Ålesund – Arctic Circle:

Tiksi – Arctic Circle:

Barrow – Arctic Circle:

12) Send the .kmz file to your teacher and your school email or save it to a flashdrive for data transfer.

### Thinking Deeper:

In these activities you have defined what the Arctic is and explored sites across the Arctic. What effect does the tilt of the Earth’s axis have on the Arctic?

Now imagine Earth’s axis wasn’t tilted. What would the effect be on the Arctic in terms of temperatures, daylight, and vegetation?





- Using internet-based research, find out what each of the instruments measure and complete the matrix below.

	What does the instrument measure?	Unit that parameters are measured in	Height above/below ground	Instrument Direction (facing upward, facing downward, no direction)
Soil heat flux plates and thermocouples				
Vaisala RH/T				
ASPTC thermocouple				
PIR pyrgeometer				
CM22 pyranometer				
Wind vane and cups				
7.5 m ATI sonic anemometer				
Ultrasonic snow depth sensor				

