

Teachers' Guidelines

Title of the package: North American Arctic

Information about the package:

Brief Description: An Arctic of North America comprises North Canada, the northern part of Alaska, and Greenland. It's an area within the polar circle, but there are also other criteria (e.g., culture, language, average temperature). The Arctic is a home for many plants and animals despite cold winters and short moderate summers.

How does the package relate to STEAM education: The package mainly focuses on science with some inquiry-based activities. It is interdisciplinary as it uses geographical and environmental protection concepts and may be used during Science or Geography classes.

Keywords: Arctic, climate, global circulation, tundra, taiga, Inuit, mining in Canada

Age Range: 14-18

Didactical hours: 2 hours.

Learning objectives:

The student will:

- Know the difference between the Arctic and the Antarctic
- Understand how the Arctic area is determined
- Understand global circulation and its relationship with climate
- Know groups of native people living in the Arctic and their culture
- Know how to observe the weather and climate
- Know what type of ore deposits are present in Canada

Content of the package and guidelines for teachers:

Link to the package: <https://graasp.eu/spaces/60cc4de8cab63469d19fe6d6>

We encourage teachers to copy the graasp package to their own graasp space to become "owner" and modify the content, hide or unhide some materials, add quizzes, etc. Moreover, teachers may share the package with their students and check the progress of each student.

A short video tutorial on how to do it is available at:

<https://view.genial.ly/5f7ef81f1b2b330d2efa3411/video-presentation-tutorial-graasp>

If you don't have access to the graasp package, contact us: edukacja@igf.edu.pl

The package consists of 8 sections described in detail below:

1. Introduction

First, students read about an extent of the Arctic in North America and then watch a short video showing the Arctic landscape. Following task 1 will check geographic knowledge focusing on recognizing countries located around the North Pole. Next, students watch

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EDU-ARCTIC 2: from polar research to scientific passion – innovative nature education in Poland and Norway receives a grant of ca. 240 000 EUR received from Iceland, Liechtenstein and Norway under EEA funds. The purpose of the EDU-ARCTIC 2 project is to: enhance the knowledge about nature, geography, natural resources, political specificities concerning polar regions and increase awareness of environmental issues and climate change, increase of interest in pursuing STEM education and careers due to enhancement of knowledge about scientific research, and their place in the modern world, familiarizing young people with scientific career opportunities; introduce innovative tools by way of an e-learning portal and effective methods of teaching science in schools.

a video about Greenland and its connection to Denmark. At the end of this chapter, students will work with maps recognizing the geography of the Arctic.

Suggested resources:

- North American Arctic ppt presentation (slides 2-6)
- Video on Alaska geology and ecology on YouTube: <https://youtu.be/v8jdH1-6ndg>
- Video on Greenland owned by Denmark on YouTube: https://youtu.be/pS_zMuGGY5k
- Worksheet for students – task 1 and 2.
- Section “Introduction” on graasp.eu platform

Estimated time: 10-15 minutes

2. Geography

Working with the map in chapter 1 will prepare students to focus on this part. Students will learn about the ‘Glaciers,’ the most important factor that impacts the morphology of the Arctic. Next, students will perform the task of checking their knowledge related to the topic. Then, watch two movies related to glacial erosion and ice wedges. An interactive map of Alaska will broaden students’ knowledge about geography of this area.

Suggested resources:

- North American Arctic ppt presentation (slides 7-10)
- Video on Ice wedges in Alaska’s National Parks on YouTube: <https://youtu.be/Se549H-xYx0>
- Video on how glaciers shape the landscape: <https://youtu.be/lo584OFVpE>
- Worksheet for students – task 3.
- Section “Geography” on graasp.eu platform

Estimated time: 15 minutes

3. Oceanography

In this section, students will learn about global circulation and how it shapes the Earth's climate. Next, they take the task of filling in the blanks on the base of the video watched previously. The second task in this chapter checks knowledge of oceans. In the end, there is a video related to phenomena called heat blob.

Suggested resources:

- North American Arctic ppt presentation (slides 11-14)
- Video on ocean currents on YouTube: <https://youtu.be/p4pWafuvdrY>
- Video on YouTube: <https://youtu.be/cXnFNs7otuc>
- Worksheet for students – task 4 and 5.
- Section “Oceanography” on graasp.eu platform

Estimated time: 10-15 minutes

4. Climate

Students will get to know about the Arctic’s climate. The first video is related to climate change in the Arctic, which is much more evident than in other areas on Earth. Next, students will learn the differences between the Arctic and the Antarctic. Following tasks

requires working with data – students will use datasets of precipitation and average temperature from the Arctic to answer the questions.

Suggested resources:

- North American Arctic ppt presentation (slides 15-20)
- Video on YouTube: <https://youtu.be/YZ1tsg7RDY>
- The Arctic vs the Antarctic – video on Youtube: <https://youtu.be/Z5VRoGTF60s>
- Worksheet for students – task 6 and 7.
- Section “Climate” on graasp.eu platform

Estimated time: 25 minutes

5. Flora and fauna

In this section, students will learn arctic biomes: ice desert, tundra, and taiga. That will allow them to see the differences and dependence of flora and fauna on climate. Students will be able to name plants and animals living in each biome.

Tasks at the end of the chapter help to check students’ knowledge and help them memorize more details.

Suggested resources:

- North American Arctic ppt presentation (slides 21-25)
- Video “What are tundras?”: <https://youtu.be/RT6x5GVPF8>
- Worksheet for students – task 8, 9 and 10.
- Section “Flora and fauna” on graasp.eu platform

Estimated time: 10 minutes

6. Culture & People

First, students will learn about native people living in the Arctic – their life, activities, culture, and beliefs. They will become familiar with the changes related to 20th and 21st centuries. Students will watch a couple of videos related to dogs of the North and one video related to picking mussels.

Suggested resources:

- North American Arctic ppt presentation (slides 26-28)
- video on YouTube: <https://youtu.be/HDG4GSypclE>
- video on YouTube: <https://youtu.be/rsI7Hkeg4S8>
- video 360° on YouTube: <https://youtu.be/OgVJNiO6lzl>
- Worksheet for students – task 11.
- Section “Culture & People” on graasp.eu platform

Estimated time: 20 minutes

7. Economy

First, students will learn about the consequences of changing the lifestyle of natives in the Arctic and seeking new sources of income. Next task is to work with an interactive map and finding mines and extracted deposits in the Arctic. Finally, students prepare notes related to mining in the Arctic.

Suggested resources:

- North American Arctic ppt presentation (slides 29-31)
- An interactive map of Canada: <https://atlas.gc.ca/mins/en/index.html>
- Worksheet for students – task 12.
- Section “Economy” on graasp.eu platform

Estimated time: 15 minutes

8. Wrap-up

Students wrap-up their knowledge in a 11-question quiz.

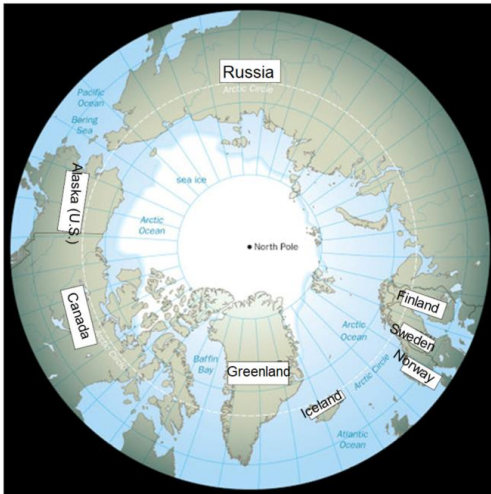
Suggested resources:

- Worksheet for students – task 13.
- Section “Wrap-up” on graasp.eu platform

Estimated time: 5-10 minutes

Worksheet answer keys:

- task 1



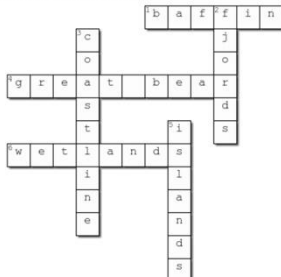
- task 2

The length of Yukon river is around 3185 km.

- task 3

Arctic Crossword

During all these topics we come across different terminologies. Let's find out if you can remember all these by solving a simple match-making game.



Created using the Crossword Maker on TheTeachersCorner.net

Horizontal

1. Name of largest island in Canada (**baffin**)
4. Largest lake entirely in Canada **great bear**
6. Land that has a wet and spongy soil, as a marsh, swamp, or bog. (**wetlands**)

Vertical

2. A long, narrow arm of the sea bordered by steep cliffs: usually formed by glacial erosion. (**fjords**)
3. The outline or contour of a coast (**coastline**)
5. Piece of subcontinental land that is surrounded by water. (**islands**)

- task 4



- task 6

Average temperature North Pole: -7.8°C , average temperature South Pole: -17°C .

- task 7

Q.1: 1.338; Q.2: 49%; Q.3: August; Q.4: April; Q.5: Rain gauge.

- task 8

E.g. treeless regions; extreme cold; low rainfall; 2 types: alpine & arctic; expand: Arctic Ocean to the N-coniferous forest of the taiga to the S; permafrost: is deteriorating, contains 14% of Earth C; shrubs; short summer ~50-60 days; animals: arctic foxes, polar bear, caribou).

- task 9

Boreal forest (taiga) occupies about 17% of Earth's land surface area. The boreal represents 29% of the world's forest cover. It is a biome of vegetation composed primarily of cone-bearing needle-leaved evergreen trees, characterized by long winters and moderate to high annual precipitation. Coniferous trees, such as spruce, pine, larch and fir, are common, as they are very well adapted to the climatic conditions. Animals living in the taiga include foxes, lynxes, bears, minks, squirrels, while larger ones include grey wolves and their preys: caribou (Canada), reindeers and mooses. The boreal forest stores enormous quantities of carbon, possibly more than the temperate and tropical forests combined, much of it in peatland.

- task 10



- task 11

North, Canada, whales, shamanism, migrate, winter, summer.

- task 12

Nickel	Quebec	Raglan
	Newfoundland and Labrador	Nunavik
Copper	Quebec	Voisey's Bay
	Newfoundland and Labrador	Raglan
Cobalt	Quebec	Nunavik
	Newfoundland and Labrador	Voisey's Bay
Platinum group metals	Quebec	Raglan
		Nunavik
Iron ore [Fe]	Baffinland	Mary River
Gold	Nunavut	Meliadine
		Hope Bay
		Meadowbank
		Amaruq

- task 13

1.c; 2.Nuuk; 3. land that has a wet and spongy soil; 4. yes; 5. Arctic Ocean; 6. large mass of relatively warm water in the Pacific Ocean off the coast of North America that was first detected in late 2013 and continued to spread throughout 2014 and 2015; 7.ice desert, tundra, taiga; 8. caribou, grizzly bear, wolverine; 9.b; 10. reliable transport, part of the culture, family member, tourist attraction; 11. Copper, Nickel, Cobalt, Iron ore, Gold, Platinum group metals.

Additional resources and links, references:

1. Polarpedia – tundra: <https://polarpedia.eu/en/arctic-tundra/>
2. Polarpedia – taiga: <https://polarpedia.eu/en/boreal-forest-taiga/>
3. Britannica – Culture & People: <https://www.britannica.com/place/Arctic/Peoples-and-cultures-of-the-American-Arctic>
4. National Geographic - The Global Conveyor Belt: <https://www.nationalgeographic.org/media/global-conveyor-belt/>
5. National Geographic – tundra: <https://www.nationalgeographic.org/encyclopedia/tundra-biome/>
6. National Geographic – taiga: <https://www.nationalgeographic.org/encyclopedia/taiga/>
7. National Geographic – the Arctic: <https://www.nationalgeographic.org/encyclopedia/arctic/>