

Teachers' Guidelines

Title of the package: Svalbard

Information about the package:

Brief Description:

Svalbard is a Norwegian archipelago in the High Arctic, located between mainland Norway and the North Pole. The islands lie between longitude 10° and 35° East and latitude 74° and 81° North. The biggest island is Spitsbergen. Few places on Earth see a more dramatic impact of climate changes than Svalbard, where sea ice vanishes, glaciers shrink, and permafrost thaws. Precipitation for the years to come is more rain instead of snow.

How does the package relate to STEAM education: The package mainly focuses on life in Svalbard, its landscape, geology, climate, and economy.

Keywords: Svalbard, Spitsbergen, High Arctic, climate, climate change, settlements, Longyearbyen, Hornsund, Barentsburg, glaciers, polar bears, tundra.

Age Range: 14-18

Didactical Hours: 2 hours.

Learning objectives:

The student will:

- know where Svalbard lies and when was it discovered;
- understand what characterizes polar regions on Earth;
- know how to dress in the Arctic during summertime and wintertime;
- learn about the rich geological diversity of Svalbard;
- learn about the climate change in Svalbard;
- know the diversity of fauna and flora;

Content of the package and guidelines for teachers:

Link to the package: <https://graasp.eu/spaces/6037a62034145d1814ff6939>

We encourage teachers to copy the graasp package to their own graasp space in order to become "owner" and be able to 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.

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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 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 7 sections described in detail below. At the end there is a short quiz summarizing the knowledge.

1. Introduction to Svalbard

First, students find Svalbard archipelago and other listed locations on a map (in "Atlas of the World" or "Google Maps"). Then they drag and drop these names into the correct frames on the map. Use the ppt presentation to introduce students to the Svalbard archipelago in the north, in the European part of the Arctic. After that students watch a short video "What is Svalbard". Ask your students to discuss what characterizes polar regions of Earth. There are some hints on the poster. Then discuss what kind of clothes would students wear during summer and winter in the Arctic. You can watch the video "How to dress in Svalbard" to see what is recommended.

Suggested resources:

- Name the frame - interactive map
<https://graasp.eu/applications/6037a62234145d1814ff6a82>
- PPT presentation on Svalbard
<https://graasp.eu/resources/6037a62734145d1814ff6d12>
- Video on YouTube: <https://www.youtube.com/watch?v=0Xff5Wt6X70>
- Poster useful for discussion
<https://www.canva.com/design/DAEDco5GYoo/hoXgMiN8qCyjTwWmnlgyVg/edit>
- Visit Svalbard page with videos "how to dress in Svalbard"
<https://en.visitsvalbard.com/visitor-information/travel-information/how-to-dress-in-svalbard>

Estimated time: 25 minutes

2. Geology and landscape

Did you know that more than 60% of Svalbard is covered by glaciers? Discover the landscape of Svalbard Archipelago using map, satellite and aerial images on the website <https://toposvalbard.npolar.no/>. Let students spend some time observing the islands of the archipelago and the landscape. There are options for 3D view, topographic, nautical map, aerial and satellite images. When you click the right mouse button on the map you will be able to see a satellite image of the archipelago. Then you can zoom in and zoom out to see the landscape of Svalbard. Find Longyearbyen, Barentsburg, Hornsund, and Hansbreen using "Zoom to place name".

As clearly seen on the images mot of Svalbard is bare rocks that are perfect for geological surveys. Use the poster and Geological guide (pages 6-7, 28-29) to discuss geological diversity of Svalbard.

In the package you will find a presentation on glaciers (you should download it before the lesson). If the file does not work, change the name of the file into: GLACIERS_presentation.exe This will allow you to open the presentation in Prezi application. You can also open it online using this link: <https://prezi.com/view/YMc4jpbolcT5pDXtqrRj/>

To summarize this section, ask your students to write a short paragraph on what surprised them most.

Suggested resources:

- Presentation on glaciers <https://prezi.com/view/YMc4jpbolcT5pDXtqrRj/>
- Topographical map, satellite images, etc.: <https://toposvalbard.npolar.no/>
- Poster: https://www.canva.com/design/DAEFho68Wq4/J3_m3XGlv2uau20LQrOA_Q/edit
- Geological guide: <https://brage.npolar.no/npolar-xmlui/bitstream/handle/11250/173141/GeologyOfSvalbard.pdf?sequence=1&isAllowed=y>

Estimated time: 20 minutes

3. Climate

In this section students will learn about climate and its change in Svalbard. Watch video Climate Change – Svalbard Archipelago <https://www.youtube.com/watch?v=e07WUFhuMkQ> , read the short note on what influences changes in air temperature and precipitation. Learn about recent conditions in the Arctic by simply checking the weather forecast for Longyearbyen and your city. Read about the meteorological conditions in chosen month from meteorological bulletins published by the Polish Polar Station Hornsund in Spitsbergen.

Suggested resources:

- Video on YouTube: <https://www.youtube.com/watch?v=e07WUFhuMkQ>
- Weather forecast for Longyearbyen: <https://www.yr.no/en/forecast/daily-table/1-2759929/Norway/Svalbard/Svalbard/Longyearbyen>
- Meteorological bulletins from the Hornsund station: <https://hornsund.igf.edu.pl/Biuletyny/>
- Short game on meteors in meteorology: https://www.educaplay.com/learning-resources/6683185-meteors_in_meteorology.html

Estimated time: 15 minutes

4. Economy

Students will learn that despite the many factors limiting the development of settlements, permanent human settlements have developed in the Arctic and Antarctic. This was mainly due to economic and political aspects. Recently natural beauty of the landscape becomes more and more important for visitors. Since 1990, tourism development in Svalbard has been given priority by the Norwegian government, and there has been a significant increase both in commercial activities and in the number of tourists.

Suggested resources:

- Settlements ppt presentation
- Interactive map: <https://view.genial.ly/5f19872ea07dc10d6f7ff3b9/interactive-image-svalbard-permanent-settlements>
- Statistics on Svalbard population and economy: : <https://www.ssb.no/en/virksomheter-foretak-og-regnskap/virksomheter-og-foretak/statistikk/naeringer-pa-svalbard>
- videos on YouTube: <https://www.youtube.com/watch?v=FPbZZ1qlozk>
<https://www.youtube.com/watch?v=3k1DXFwZ3xg&t=103s>
<https://www.youtube.com/watch?v=0XhRFxZYRUo&t=24s>

Estimated time: 25 minutes

5. Animals

In this section students will learn about wildlife, and which species living in the Arctic have adapted to the extreme conditions in Svalbard. Which of them stay in Svalbard throughout the year. There is also a presentation and a poster on the largest land dwelling carnivore on Earth. There is also crossword puzzle to be solved.

Suggested resources:

- Svalbard's wildlife, Polar bear ppt presentations
- Website on Svalbard's fauna <http://cruise-handbook.npolar.no/en/svalbard/wildlife.html>
- Crossword puzzle on mammals of Svalbard: https://www.educaplay.com/game/6683677-mammals_of_svalbard.html

Estimated time: 15 minutes

6. Flora

In Svalbard, plant growth and distribution are limited by large temperature fluctuations, a short growing season, nutrient deficiency, and wind exposure. Trees and shrubs are absent but in the summertime flowering tundra vegetation is astonishing. This part of the package will inform students about life of plants in Svalbard. There is a presentation, website with multiple images of plants, and puzzle to find the plant names.

Suggested resources:

- Flora ppt presentation

- Website on flora with pictures and description: <https://svalbardflora.no/>
- Puzzle: https://www.educaplay.com/learning-resources/6684198-plants_of_svalbard.html

Estimated time: 10 minutes

7. Summary quiz

Check the students knowledge by simple game “Cruise to Svalbard”. The wrong answers will sink the ship.

