

Teachers' Guidelines

Title of the package: Comparison of Arctic and Antarctic fauna

Information about the package:

Brief Description: The package is dedicated to the fauna of polar regions: discovering animal species and their adaptations to the living in the Arctic and the Antarctic.

How does the package relate to STEAM education: The package mainly focuses on science with technology elements.

Science

Biological issues mainly concern Arctic and Antarctic animal species and their abilities to adapt to the climate of polar zones. There are also some geographical facts presented connected with polar regions and their main characteristics.

Technology

In the research section dedicated to citizen science there are two projects to choose by the student. Both are available at Zooniverse platform and their main aim is to analyze given scientific data. The platform offers tools to fulfill that activity with detailed guidelines for users.

Keywords: Arctic, Antarctic, Antarctica, fauna, polar zone, climate, polar regions, citizen science, citizen scientist.

Age Range: 14-16

Didactical Hours: 4 hours + individual student time needed to complete tasks on Zooniverse platform.

Learning objectives:

The student will:

- understand the main differences between Arctic and Antarctic;
- name Arctic and Antarctic animal species;
- give the examples of animals adaptations to the cold climate and explain their importance;
- understand the phenomenon of citizen science and advantages connected with supporting such kind of activities.

Content of the package:

Link to the package: <https://graasp.eu/s/m4nyau>

1. Arctic and Antarctic (slides: 2-5 in presentation)

- Polarpedia definitions: Arctic (<https://polarpedia.eu/en/arctic/>), Antarctic (<https://polarpedia.eu/en/arctic/>) and Antarctica (<https://polarpedia.eu/en/antarctica/>);
- Exercise 1: show Arctic, Antarctic and Antarctica on a map (see: slide 4);
- Film: "The Arctic vs. the Antarctic": <https://youtu.be/Z5VRoGTF60s>;
- Exercise 2: write the definition of word "aphelion".

Project office: Księcia Janusza 64, 01-452, Warsaw, Poland edu-arctic2.eu edukacja@igf.edu.pl

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.

2. What does live THERE? (slides 6-9 in presentation)

- Exercise 3: what is the main difference in behavior between seals living in the Arctic and Antarctic? (see: slide 6);
- Interactive image of Antarctic fur seal:
<https://view.genial.ly/602ce3e9fbb30d0d31c6e027/interactive-image-fur-seal;>
- Interactive image of Weddell seal:
<https://view.genial.ly/602ce9e6db3d0e0d8634a795/interactive-image-weddell-seal;>
- Interactive image of 6 Arctic animal species:
<https://view.genial.ly/602cf03b88eaff0d97edce95/horizontal-infographic-lists-arctic-animals;>
- Interactive image of 6 Antarctic animal species:
<https://view.genial.ly/602cfd59bc59f0d83cb6a02/horizontal-infographic-lists-antarctic-animals;>
- Worksheet 1: check what you have learned about the Arctic and Antarctic fauna;
- Exercise 4: quiz –which animal doesn't have circumpolar distribution? (see: slide 9).

3. How to survive in cold climate? (slides 10-12 in presentation)

- Film: “How do animals survive in the Arctic?”: <https://youtu.be/IFqQALaXUo;>
- Exercise 5: which animal among the listed was not mentioned in the movie? (see: slide 10);
- Exercise 6: what types of adaptations to the Arctic climate do these animals have? Base on the information given in the movie (see: slide 10);
- Film: “How do animals survive in Antarctica?”: <https://youtu.be/waasDgIAZ04;>
- Exercise 7: there are three types of adaptations mentioned in the film. What animals are they referring to? (see: slide 11);
- Interactive image of blubber: <https://view.genial.ly/603392fb9fbc300d16743c85/horizontal-infographic-review-blubber;>
- Graphic of sea otters and exercise 8: where do sea otters live? (see: slide 12).

4. Be citizen scientist! (slides 13-14 in presentation)

- Exercise 9: think about three advantages connected with being a citizen scientist;
- Exercise 10/Worksheet 2: research projects “Whale chat” and “Penguins watch” on Zooniverse platform.

5. What if..? (slides 15-18 in presentation)

- Exercise 11: create three hypothesis connected with the scenario - what would happen if the animals from two polar zones lived on one territory? Which species will have less chances to survive, and which might be flourishing?.

6. Let's check your knowledge! (slide 19 in presentation)

- Film: “The Arctic vs. the Antarctic”: <https://youtu.be/Z5VRoGTF60s;>
- Worksheet 3: Do the sum up quiz.

Guidelines for teachers:

1. Arctic and Antarctic – SLIDES: 2-5

Read about Arctic, Antarctic and Antarctica in Polarpedia and show that regions on the world map. Watch the film “The Arctic vs. the Antarctic” and do the exercises.

2. What does live THERE? – SLIDES: 6-9 + comparison-arctic-antarctic-fauna-worksheet1

That section is dedicated to Arctic and Antarctic animal species. There are interactive material that shows the differences between one of the most confused animals: true seals

and fur seals, and a few exercises. Fauna of both polar regions is presented on two interactive infographics – every animal's name is linked to the definition in external resource. There is also worksheet No. 1 attached to that material. Think about effective way of doing that activity by your students.

3. How to survive in cold climate?: SLIDES 10-12

There are two films: "How do animals survive in the Arctic?" and "How do animals survive in Antarctica?" with accompanying exercises. The interactive infographic "What is blubber?" is an additional material presenting interesting phenomenon connected with few animal species. TIP: all interactive materials (the list is presented in "Other materials" category in the end of this document) might be used separately during your other classes and are easy to share with other teachers.

4. Be citizen scientist! – SLIDES: 13-14 + comparison-arctic-antarctic-fauna-worksheet2

That section may be treated as a homework for your students or separate project to accomplish. It shows the topic of citizen science and encourage to discuss with you students why such initiatives are important. The Zooniverse platform mentioned in that part is a great source of knowledge about scientific projects from many disciplines: from arts to space. We propose two projects connected with Arctic and Antarctic fauna to participate in. Attached worksheet No. 2 might be helpful with doing the activity.

5. What if..? – SLIDES: 15-18

That part is about making predictions. Students have learned about fauna and types of animal adaptations to the Arctic and Antarctic climate, so it's high time to use that knowledge and think how do the animals of polar regions cope with global warming? The main goal is to prepare three hypothesis: pessimistic, neutral and optimistic. Think about engaging way of presenting students' findings: short presentation, infographic etc. There are also some materials given in that section to help you with doing that activity.

6. Let's check your knowledge! – SLIDE: 19 + comparison-arctic-antarctic-fauna-worksheet3

What have your students learned during the classes about Arctic and Antarctic fauna? Let's check it out! In worksheet No. 3 attached there is a sum up quiz.

Additional resources and links, references:

1. Additional resources:

- *South Pole Live Camera*: <https://www.esrl.noaa.gov/qmd/obop/spo/livecamera.html>

2. Articles:

- *Polar bear habitat*: <https://arcticwwf.org/species/polar-bear/habitat/>
- *Reindeer & Caribou*: <https://arcticwwf.org/species/reindeer-caribou/>

3. Definitions from Polarpedia – an online encyclopedia of the Arctic – used in the package:

- *Arctic*: <https://polarpedia.eu/en/arctic/>
- *Antarctic*: <https://polarpedia.eu/en/antarctica/>
- *Antarctica*: <https://polarpedia.eu/en/antarctica/>
- *Citizen science*: <https://polarpedia.eu/en/citizen-science/>

4. Films used in the package:

- *The Arctic vs. the Antarctic*: <https://youtu.be/Z5VRoGTF60s>;
- *How do animals survive in the Arctic?*: <https://youtu.be/IFqQALaXUo>
- *How do animals survive in Antarctica?*: <https://youtu.be/waasDglAZ04>
- *Annual Arctic sea ice minimum 1979-2018 with area graph*: <https://youtu.be/ULEFPCIPP7Y>

5. Other materials:

- *Interactive image of Antarctic fur seal:*
<https://view.genial.ly/602ce3e9fbb30d0d31c6e027/interactive-image-fur-seal;>
- *Interactive image of Weddell seal:*
<https://view.genial.ly/602ce9e6db3d0e0d8634a795/interactive-image-weddell-seal;>
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