

Details



Completion Time: Less than a week

Permission: Download, Share, and Remix

Science in Antarctica

Overview

Learners from 6th – 12th grade will investigate different science projects in Antarctica through the PolarTREC and the USAP websites. They will then make a short PowerPoint (or similar) presentation to the rest of the class. Learners can work independently or in small groups.

Objectives

Students will become familiar with the wide variety of science that occurs in Antarctica. Students will communicate the results of their investigation to the rest of the class using presentation software.

Lesson Preparation

Students need to know how to complete online research and to make computer-based presentations. Make copies of student directions and rubric.

Procedure

Engage: Discussion with students. What kinds of science do you think are occurring in Antarctica? As students brainstorm you can write down their responses and begin some columns on the whiteboard distinguishing between biological investigations, meteorological investigations, geological investigations, etc. as students discuss possible scientific endeavors. Use the LCD projector, or students at individual computers if available, to go to the USAP website at www.usap.gov. From there they should click on the “Researchers and Science Projects” link on the left side of the main page. This will take them to

Materials

I have included “Science in Antarctica Student Directions” that can be changed as needed. I have also included a rubric that can be changed as needed. I have a paper-saving tendency to format my directions and my rubric so they fit front and back on one-half sheet of paper. If you copy my student directions twice so they fit on one side, and then copy the rubric twice the same way – you can get both of them two time front-and-back on one sheet of paper. Students also need access to the internet for online research and access to presentation software such as PowerPoint. Classroom presentations benefit if there is access to an LCD projector.



a list of over 80 researchers doing science projects in Antarctica. Have students select a few researchers to click on and review what science they are doing.

Explore: Students should now independently look for projects that interest them and that they would like to investigate further. For this project, with high school students, I would do independent research projects. However, if you want to have students in pairs or in a small group, you could also do that. Students will explore the website, choose an investigation and begin their research using the directions given. Teachers are able to modify the provided directions and rubric as needed. For high school students, I would start the investigation in class, make sure they understand the directions and how they will be evaluated with the rubric, and then give them several days to a week to complete the assignment at home. For students without computer and/or internet access at home or ability to get to a public library, print out necessary pages for their research and accept an oral presentation.

Explain: Students will present the scientific investigation they researched to the rest of the class. Students will ask questions after the presentation.

Extend: Students can contact the Principal Investigators and/or graduate students that are involved with the project they are investigating. They can ask questions or seek clarification for their presentations. They could conduct phone interviews and include that information in their presentation as well.

Evaluation

Science in Antarctica Rubric

	5 points	3 points	1 point
Principal Investigator	Well identified	Partially identified	Not well identified
Field of Research	Well defined	Partially defined	Not well defined
Project Logistics	Completely described	Partially described	Not well described
Timing of Research	Well described	Partially described	Not well described
Importance of Research	Clear description	Partially described	Not well described
Presentation Quality	Great job!	Good job!	Could be improved
Total Points			



Extension

Students can contact the Principal Investigators and/or graduate students that are involved with the project they are investigating. They can ask questions or seek clarification for their presentations. They could conduct phone interviews and include that information in their presentation as well.

Resources

Students can begin with the USAP website at www.usap.gov and then select the link for "Researchers and Science Projects". From there they can learn basics about the investigation and follow other links to learn more about their chosen project. Other resources include the PolarTREC website where teachers have been involved with a wide variety of science projects.

Assessment

See rubric under Evaluation. This rubric is very rudimentary. Please add characteristics as desired, and share with Mindy at mbell@apsc.org if you are willing to get it posted on this website.

Credits

Mindy Bell created this lesson because she was so amazed by the wide variety of scientific research being conducted in Antarctica. You can contact Mindy with questions or comments at mbell@apsc.org.



National Science Education Standards (NSES):

Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

PO 1. Specify the requirements of a valid, scientific explanation (theory), including that it be:

- logical
- subject to peer review
- public
- respectful of rules of evidence

PO 2. Explain the process by which accepted ideas are challenged or extended by scientific innovation.

PO 3. Distinguish between pure and applied science.

PO 4. Describe how scientists continue to investigate and critically analyze aspects of theories.

Arizona State Technology Standards

Standard 4: Technology Communications Tools

Building on productivity tools, students will collaborate, publish, and interact with peers, experts and other audiences using telecommunications and media.

4T-P1. Routinely and efficiently use online information resources to meet needs for collaboration and communications

PO 1. Using criteria for research in Standard 5, create an end product (e.g., multimedia presentation, publication, Web page) to disseminate the information

4T-P2. Manage and communicate personal and professional information utilizing technology tools and resources

PO 1. Plan and present a product appropriate to the task

Science in Antarctica Student Directions

You will investigate and report on a scientific expedition and research project in Antarctica. You will create a PowerPoint presentation (or similar presentation) with a minimum of seven slides. The first slide will be the title, your name and date. The last slide will list the resources that you used to build the presentation. The other five slides, the core of your research, will cover as follows.

1. Principal Investigator: Who is conducting the research? What institution are they associated with? What is their background, especially in relation to Antarctic research?
2. Field of Research: What is the title of this project? What are the primary research questions of this project? Is this pure or applied science?
3. Project Logistics: This may be more difficult to determine, but what kind of logistics are involved in this project. For example, if they are checking on and fixing weather stations, do they need helicopter support or other aircraft support to get to their sites? If they are living in McMurdo, do they need dormitories and food and lab space? If they have a field camp, do they need holes drilled, fish houses or camp houses hauled out on the sea ice or put up on the ice sheet? Can you determine how these are heated? Do the best you can with logistics, but don't worry if you can't get as many details as you would like.
4. Timing of Research: When is the field work done in Antarctica? Do they need daylight but solid sea ice so they go in the spring? Do they need dark skies so they have to overwinter? Do they need warmer weather and/or melted sea ice so they go later in the summer season?
5. Importance of Research: Why is this research relevant? What are they learning and how does it benefit humans and the environment? What did you find the most interesting about this project and why?

Each slide should have a picture if possible and a minimum of words. Use index cards or a paper with notes for each slide so you can add more information orally. Do not clutter your slides with words. Keep the slides visually interesting yet uncluttered. Most of the information will be provided orally from additional notes.

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