

Polar Resources: Secondary Grades

Compiled by Nicole LeRoux

Environmental Issues in the Polar Regions (9-12)

<http://www.nationalgeographic.com/xpeditions/lessons/05/g912/polarregions.html>

Students will learn about how environmental problems affect the polar regions, and they will create magazine ads to educate the public about these problems and to convince people to pay more attention to human impacts on the Arctic and Antarctic.

What's Eating You? (9-12)

http://www.oceanexplorer.noaa.gov/explorations/05arctic/background/edu/media/05arctic_w hatseating.pdf

FOCUS QUESTION: What are the relationships between sea ice, pelagic, and benthic communities in Arctic marine food webs?

Abrupt Climate Change (9-12)

<http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=1&DocID=323>

This lesson focuses on a current issue in science in order to help students understand the process by which scientific knowledge is developed and refined. The goal of science is to advance human understanding of the natural world and that sometimes means changing long-held views.

Other suggested resources from this online workshop

contributed by Alison Grotelueschen

I reviewed the lesson "**Abrupt Climate Change**." The first thing I noticed was that one of the links to the article "Abrupt Climate Change" (found in the Motivation section, as well as on the student e-sheet) was unavailable--"page not found" message. Then I noticed how much reading the students had to do in this lesson....the readings provided good info, but I am not sure how motivated the students would be to complete this lesson. There needs to be a more active approach. The introduction talks about the Nature of Science, but students don't actually "do" any science here--they just read (and read and read) about science.

I can see using this lesson in a modified format in the classroom. Instead of having all students do ALL readings I would do it in jigsaw fashion. Also, instead of reading about paleoclimatology, I would show some of the paleoclimatology slides (found in the extension part of the lesson) to the students and have them hypothesize about what is happening in each slide. Then I would have the students come up with their own definition of what paleoclimatology is and a description of what a paleoclimatologist does.

and response from Judy Lemus

Hi Allison,

Good points about the Climate Change lesson. Perhaps the reading could be broken up into smaller sections in the days leading up to the actual activity. I like your idea to use the slides instead of just the reading to bring in visual interest and invite inquiry. In terms of doing some actual science, I bet one could incorporate the use of satellite data to make comparisons between the paleoclimate and present day climate. I wonder if one group of students could create a set of mock data and graphs of 16O and 18O (and perhaps insolation) that another group could interpret the climate response for?

I just reviewed the lesson above:

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Students would have to have some knowledge of both the Arctic and Antarctic regions. If they don't, there is a link with a lesson that explores both region. The students create posters about one of the areas after researching. They would also have to have some knowledge base regarding current environmental problems/issues.

I especially like the extension phase of this lesson. See below:

Extending the Lesson: Have students create "environmental fact sheets" that could be given to members of environmental organizations, politicians, or the general public to educate them about specific environmental issues concerning the polar regions.

The fact sheets should describe the causes, effects, and predictions for the environmental problems students have learned about in this lesson.

COSEE-West Resources
International Polar Year Online Workshop - April 15 – 28, 2007

In my experience teaching marine science, students are fascinated by ocean-related careers; however, they fail to realize the amount of such careers available to them...most think of being an "animal trainer" at Sea World. The following lesson provides many different careers and a nice lesson to convey the info to the students. There is a link to the Monterey Bay Aquarium that provides a handful of careers, and there is another link that hooks you up with a plethora of careers.

Life at Sea: Careers in Marine Science (6-8)

<http://www.nationalgeographic.com/xpeditions/lessons/18/g68/thys.html>

This lesson will help students learn more about recent advances in the study of sea life and how the people who do this work may ultimately affect the sea, its health and inhabitants. Students will investigate different careers in ocean study.

The lesson says it is aimed at the middle grades; however, I can see it being used at the H.S. level. It may just have to be "beefed up" a bit, depending upon the level of your students.

contributed by Donald Reid

As a New Zealand science educator, with an interest and experience in **Antarctica**, I am well aware of the enthusiasm for students learning through practical tasks. But how is this achievable for the polar regions by those living in temperate zones? One solution is to use **webcams**. You can download a pdf of one such IPY / polar webcam activity from <http://www.informationmatters.co.nz>

I simply offer this idea of mine in support of science education and the IPY - but please give credit.

contributed by Holly Gray

If anyone is interested in reading an amazing book about global climate change research in the Arctic which is very well written and covers the historical and contemporary research in the village of Barrow, Alaska with an emphasis on different ways of knowing and the collaboration between the researchers and the local Inupiat community check out;

"The Whale and the Supercomputer" by Charles Wohlforth

Really it is a fascinating and entertaining read and covers so much!!!!

contributed by Thomas Michael Heitstuman

A couple of resources I found useful in teaching a leadership unit in my NJROTC courses based upon Shackleton's failed expedition to cross Antarctica.

Books

Endurance - Shackleton's Incredible Voyage by Alfred Lansing (one of my favorite books)

Shackleton's Way - Leadership Lessons from the Great Antarctic Explorer by Margot Morrell and Stephanie Capparell

Video

The Endurance: Shackleton's Legendary Antarctic Expedition film by George Butler and Sony Pictures

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contributed by Annette Felix

Shipwreck at the Bottom of the World: The Extraordinary True Story of Shackleton and the Endurance by Jennifer Armstrong.

It is a great book for high schoolers.

contributed by Tamie Lamp

This is a link to a united streaming video clip; here is the prologue to the video.

Despite incredible odds, these men challenged nature and themselves to explore the ends of the Earth. Their names Peary, Cook, Amundsen, and Scott will forever be synonymous with the unforgiving frozen regions they sought to conquer. Learn how these ambitious adventurers raced to reach the North and South Poles.

Even if you do not have a united streaming account, there is a 30 day free trial; it is an excellent resource.

<http://www.unitedstreaming.com/search/assetDetail.cfm?guidAssetID=E6491EB0-1D5B-44DF-B0D5-0DD5AD168AE3>

contributed by Judy Lemus

NPR Climate Connections on global warming

<http://www.npr.org/templates/story/story.php?storyId=9657621>