POLAR TREC
Learning Resources

Details

Completion Time: Less than a week
Permission: Download, Share, and Remix

Investigating Polar Science

Overview
Students will investigate the breadth and depth of science taking place in the Polar Regions by reading and learning about one PolarTREC expedition and sharing it with the class.

Objectives
- To expose students to the wide variety of science happening in the Polar Regions
- To help students understand the process of science by examining one polar science expedition
- To assist students in making a connection between polar science and the region where they live/their life

Lesson Preparation
No prior content needed. It may be helpful to have discussed the process of science and/or the scientific method, so students can relate this process to the expedition they are investigating.

Procedure
1. Go to: http://www.polartrec.com/expeditions. Then click on "completed expeditions" on the menu on the left side of the page. Alternatively, from the main www.polartrec.com page, click on Virtual Base Camp, then completed expeditions.
2. Have students look through the expeditions from 2012 to 2007 and choose one that they are interested in learning more about. Each student should choose a different expedition. Depending on the number of journals posted, have students read about 10 journal entries, focusing on the entries that discuss the science of the expedition. Some expeditions are shorter and will have fewer than 10 journals.
3. As students are reading the journals, they should answer the following questions and be prepared to present a summary of their expedition to the class the fol-

Materials

- Internet access
- Google Earth (optional)

lowing day. There are two versions for student questions below: Version A is more generalized (likely more appropriate for younger students), Version B focuses specifically on the process of science (perhaps more appropriate for older students).

Student Questions - Version A:

- List the title and location of the expedition. You will also need to be able to find this location on Google maps (when students present their summary, the student can type the location into Google Earth so students can see the location of the research site)
- In your own words, summarize the research project that was being conducted. What questions are the researchers trying to answer?
- What data, measurements and observations did the research team take? What technology was used to collect this data?
- Write 3 questions that you would like to ask the research team about their work and/or about working in a polar region?
- After reading the journals, what more have you learned about the process of science and/or a large-scale scientific investigation?
- Why do you think the work of your expedition is important? How might this work be relevant to your life and/or the location where you live?
- If you were part of this expedition, how would you further the work that has been done? In other words, what questions would you ask next? Come up with at least two questions that can be answered scientifically.

Student Questions - Version B:

- List the title and location of the expedition you are following. *You will also need to be able to find this location on Google maps (when students present their summary, the student can type the location into Google Earth so students can see the location of the research site)
- Observing:

1. Describe the purpose of the research.
2. Where are they researching?
3. Why is that location an important part of their research?
4. What science concepts are important in the project? Describe these concepts/ideas.

- Inferring and Forming Hypotheses:

1. What questions or hypotheses are they attempting to test or answer?

- Designing Controlled Experiments:

1. Describe their experimental design.
2. What variables are they attempting to control?
3. What is their experimental variable or group?
4. What was their sample size?

- Collecting and Analyzing Data:

1. What data did they collect?
2. What technology did they use to help in their data collection?
3. Are there any sources of error in their data collection?

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- Drawing Conclusions:

1. What did they learn from their research? Can any conclusions be drawn?
2. What is the broader context of their work (why does it matter/why is it important)?
3. What complications or difficulties did the team encounter?
4. Why might this work be important in the broader context of science and your life outside of the Polar Regions?
5. In a paragraph explain how this expedition has informed your understanding of the process of science and how scientists do science.

Extension

1. Have the class follow a current PolarTREC teacher and interact with the team through "Ask the Team" and live PolarConnect events.
2. Have students follow up with the research team they investigated by finding the researchers' website.
3. Have students look up current research papers connected to the project they were investigating and share with the class.

Resources

N/A

Assessment

Students will turn in their written answers to the questions provided and be graded on their oral summary presentation of their expedition.

Credits

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Learning Resources

National Science Education Standards (NSES)

Content Standards, Grades 5-8

Content Standard A: Science As Inquiry
a. Abilities necessary to do scientific inquiry
b. Understandings about scientific inquiry

Content Standard E: Science and Technology
a. Abilities of technological design
b. Understandings about science and technology

Content Standard G: History and Nature of Science
a. Science as a human endeavor
b. Nature of science

Content Standards, Grades 9-12

Content Standard A: Science As Inquiry
a. Abilities necessary to do scientific inquiry
b. Understandings about scientific inquiry

Content Standard E: Science and Technology
a. Abilities of technological design
b. Understandings about science and technology

Content Standard G: History and Nature of Science
a. Science as a human endeavor
b. Nature of scientific knowledge

Other Standards
N/A