



TEACHERS AND RESEARCHERS EXPLORING AND COLLABORATING

PolarTREC Lesson Resource

A Day in the Field: Collecting Ice Cores

Bridget Ward

Weddell Seals: Growing Up on Ice

PolarTREC Expedition Page

<https://www.polartrec.com/expeditions/weddell-seals-growing-up-on-ice>



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Overview

Students will engage in a virtual field experience on Huascarán Mountain in Peru, learning about how ice cores are collected and stored.

Lesson Preparation

Refer to Lesson Materials

- Copies of Worksheets
- Computers for students

Procedure

1. Read National Geographic Encyclopedia Entry Paleoclimatology and answer questions
2. Watch video Recovering Ice Cores (link in Resources).
3. Complete virtual field experience (link in Resources).
4. Homework: Have students complete the design challenge. Building a model that keeps ice cubes from melting for 24 hours.

Extension

Have students analyze ice core “samples”.

Transferability

- Virtual field experience can be completed in VR headset.
- Ice cube challenge can be done in a smaller time period with specific materials.

Resources

- Paleoclimatology Encyclopedia Entry

Resource Details

Date

23 June 2020

Region

Arctic

Antarctic

Completion Time

About 1 period

Grade

High school and Up

Permission

Download, Share, and Remix

Location

Huascarán Mountain, Peru

Organization or Publication

<https://virtualice.byrd.osu.edu/hua>

Expeditions

Weddell Seals: Growing Up on Ice

Author(s)

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Related Members

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Related Resources

Ice Cores - A Cool Way to Study the Past

Polar Detectives: Using Ice
Core Data to Decode Past
Climate Mysteries

Ice Cores: Modeling Ice
Sheets

Materials

Student Worksheet (Lesson
Materials)

Computers

VR Headset if available

Topic

Tools and Methods

Climate Change

Tools and Methods

Paleoscience

Climate Change

Tools and Methods

Snow and Ice Science

Paleoscience

Climate Change

Climate Change

Tools and Methods

Engineering Design

Climate Change

Environmental Studies

General Environmental
Studies

Polar Science

General Polar Science

Polar Careers

General Polar Careers

<https://www.nationalgeographic.org/encyclopedia/paleoclimatology-RL/>

- Recovering Ice cores video



- Ice Core Virtual tour <https://virtualice.byrd.osu.edu/huascarán/>

Assessment

- Completed worksheet
- Ice cube challenge build

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National Geographic Encyclopedia Entry Paleoclimatology Questions

1. What do paleoclimatologists study?

2. What is a proxy?

3. Complete the chart below

Proxy type	What do scientists learn from it?
Dendrochronology	
Shells Diatoms Foraminifera	
Ice Cores	

4. How does studying the past help scientist predict the future?

The Paleoclimatology encyclopedia entry introduced multiple proxies that scientists' study, this activity focuses on the collection of ice cores. Watch the video "Recovering Ice Cores" to learn more about what an ice core is and how scientists collect ice cores.

While viewing the video record 5 challenges scientist face while harvesting, transporting, and preserving Ice Cores:

1.

2.

3.

4.

5.

It is your turn to venture out with the Ohio State University research team! Go to the website <https://virtualice.byrd.osu.edu/huascarán/> and travel to Peru to climb Huascarán Mountain. This is a virtual tour of a research site where ice cores are collected. Use the directions below to guide your exploration and answer the questions about your observations.

A. Click the x to close out of the white rectangle window on the opening screen.

B. Look around all the images you will see are 360-degree views.
The blue arrows take you to different locations.



The circles provide more information.



C. Click on the information circle by the gentlemen sitting in the snow.

1. Lonnie Thompson is the expedition leader; what qualifications can you infer he has to make him a good expedition leader? (Read his information bubble to learn more about him)

D. Click the blue arrow “to Refuge” to go down the mountain.

E. Click on the information circle on the building.

2. At what altitude is the Refugio Don Bosco- Huascarán?

3. It states “you can see the clouds surrounding the dual peaks of Huascarán. This was not a good day to climb!” How do you think these weather delays impact scientists’ work?

F. Click on the information circle near the group of people, read it, then click on the blue text box.

4. This is the scientists’ base camp, look around and click on the information circle. “If you were part of this expedition what equipment and gear would you want to take along?” (List at least 5 items)

G. Begin climbing up the mountain. Click on the blue arrow “to Refuge”. Click the arrow “to Summit”. Click the arrow “to Summit”. Click on the information circle.

5. You are now ascending the mountain with the team, what are 3 pieces of equipment needed to help them make the climb, include how each piece of equipment is used.

H. Continue the climb. Click the arrow “to Summit”.

6. The team takes a break at 19, 177 feet, why do you think it is important they consume coffee and food at this location?

I. Continue the climb. Click the arrow “to Summit”. Click the information circle.

7. Scientists are working to collect an ice core at this location. Explain one thing you find interesting about this research site:

J. Click the arrow “inside Tent”. Click the information circle by the man working.

8. “What kind of information do you think team members are recording about each core?”

K. Click the information circle above the long cylinders, read it, then click on the blue text box.

L. Click on the information circle in the room.

9. Where are you and what is stored in this room?

M. Click the arrow “to cold room”. Click the information circle.

10. Why do you believe it is important that a portion of the ice core is archived?

N. Click the arrow “to clean room”. Click the information circle.

11. Why do you believe it is important for the ice samples not to be contaminated by dust?

O. Continue your journey up to the summit. Click the arrow “to Freezer”. Click the arrow “Back to Huascarán”. Click the arrow “To Drill”. Click the arrow “to Summit”.

12. What are weather conditions like at the summit of the mountain, how do you know? (provide 3 specific items in the image that you are using as evidence to make these claims)

P. Click the information circle.

13. What is unique about the ice core the scientists are drilling at this location?

14. “Why would work and travel be difficult in this location during blizzard-like conditions?”

Q. Click the arrow “inside Tent”.

15. How does this drilling field site differ from the drilling field site below? (other than it being 2,520 feet higher)

16. Write a journal entry about your day in the field as a scientist working to collecting an ice core. (3-5 sentences)

Homework: The Ohio State research team you were just working with has been harvesting ice cores from the Huascarán Mountain in Peru, you have discovered that the ice storage units you place on the Yak's back to get the ice core samples down the mountain have been damaged. There is no way a refrigerator truck or other modern transportation can be brought up the mountain to help, Oh No!

You must find a way to keep the ice cores frozen while the pack animals carry them down the mountain. You must use the materials you have with you to solve the problem.

Challenge: Using materials at home, develop a container that will keep an ice cube from melting for 24 hours. (Do not use a cooler or fancy water bottle)

Email a picture of your transport system and an explanation of your design to your teacher. In the email include if it worked or not, if it did not work explain a modification you think would help stop the ice cube from melting.