



Ice Cores

High School Grades

Lesson Summary

Students will create their own climatic timelines and construct an ice core sample that reflects the sequence of events depicted in their timelines. Students will learn that ice cores are one of many ways to collect paleo-climatic data.

Prior Knowledge & Skills

- Analytical skills
- Knowledge of ice cores

AAAS Science Benchmarks

The Nature of Science

Scientific Inquiry

The Physical Setting

Processes that Shape the Earth

NSES Science Standards

Science as Inquiry

Abilities Necessary to Do Scientific Inquiry

Understandings About Scientific Inquiry

NCGE Geography Standards

Physical Systems

Standard 7

Teaching Time: 1.5 - 3 hours

Materials

- Frozen orange juice containers, 3 for each group
- Access to a freezer of freezing outside temperatures
- Snow or shaved ice
- Paper
- Colored pencils
- Camera (optional)
- Materials to add to the snow to create various layers. Groups will decide what these materials are.

Advanced Planning

Preparation Time: ~30 minutes

1. Review the instructions
2. Gather the necessary supplies.
3. Prepare the snow or shaved ice

Recommended Reading: (online)

- *Learning from Polar Ice Core Research* from Environmental Science and Technology Copyright © 1999 American Chemical Society
<http://pubs.acs.org/hotartcl/est/99/apr/learn.html>

Dispatches from WBUR
Greenland: by Dan Grossman & WBUR
Bay Breeze Educational Resources

<http://www.wbur.org/special/dispatches/greenland/>



VIKINGS

INUIT

WILDLIFE

ICE CORES

DISPATCHES

TEACHER GUIDES

Viking Mystery

Ice Cores

Inuit Culture

ICE CORES TEACHER GUIDE

Overview:

In this activity, students will learn how and why scientists drill ice cores in Greenland. They will use this knowledge to create an ice core that demonstrates how natural and human factors affect climate. Designed as an Environmental Science lesson for students in grades 6-8 as well as advanced elementary grades and lower high school grades.

Required Materials:

Frozen orange juice containers, 3 for each group of students
 Access to freezer or freezing outside temperatures
 Snow or shaved ice
 Paper
 Colored pencils
 Camera (optional)

Materials to add to the snow to create the various layers. Students will determine what these items will be in their groups. They should be easily acquired items that can be brought in from home.

Activity:

1. Divide the class into small groups and send them on an information hunt to learn about ice cores. Tell students to go to the [Ice Core section](#) of WBUR's Greenland site, as well as Daniel Grossman's [The Drilling Site](#) and [Striking Bottom](#) dispatches. After the groups have finished gathering information, have them share what they learned with the rest of the class.
2. Tell groups to choose one of the following topics and create a poster based on the information they gathered.
 - Ice and ice ages
 - Drilling for ice cores
 - Ice Laboratories
 - What scientists learn from ice cores
3. Send students to the National Geophysical Data Web site [Climate History: Exploring Climate Events and Human Development Beyond 100,000 Years](#). Tell students to search the time periods for examples of natural and human activities that have affected the climate.
4. Create a class list of natural and human activities that affect the climate. This information may come from web sites, newspapers, students' knowledge or other sources. The list should include items such as volcanic activity, droughts, air pollution sea storms, radioactive fallout from Chernobyl, or anything else that students find.
5. Divide the class into small groups for this activity. Tell groups to create a climate timeline that includes both natural and human created events that have an impact on the climate. The timeline should include 7-10 events. Explain to students that the timeline doesn't have to be historically accurate and should instead be a timeline of

their own creation.

6. Tell groups that they are going to create an ice core that will simulate the climate changes they have outlined in their climate timeline.
7. Help students layer snow in orange juice containers to create an ice core that reflects their timelines. Ask groups to brainstorm ideas of how they will create each ice layer. For example, if they placed the existence of sea storms on their timeline, they might add some salt to the snow for that particular layer of ice, a very thin layer might signify a drought, ashes might be added to the layer for volcanic activity, and so on. Tell students that the items they add to the snow should be everyday materials that can be brought in from home like pepper, ashes, food coloring, or any appropriate item that the students can imagine.
8. After students have collected the materials they need for the project, begin constructing the ice cores. Groups may use multiple cans to recreate how actual ice cores are broken into sections. Remind students to add the layers in the reverse order as they appear on the timeline. Tell students to make sure that they pack each layer of snow tightly into the orange juice can. If the snow begins to melt between layers, it may be necessary to place the containers in the freezer until frozen. The construction of the ice cores can take place over several days.
9. After the final layer has been added, freeze the cans overnight. Tell students to remove their ice cores from the cans. Ask students to make a drawing on their ice core, take a measurement of each layer of the core, and write a description of each layer. If you have a camera for the classroom, take pictures of the ice core layers.
10. After all of the groups have completed recording their information, ask them to write down the climate events that were included in their ice cores on separate pieces of paper. Ask them to mix up the order of the papers and place them all face up next to the ice core. Have groups take turns looking at the other groups' ice cores and guessing which events go with which ice layer. Ask each student to write an explanation of how natural events and human activities can affect the climate, what information scientists learn from studying ice cores and why this information is valuable.

Standards: www.mcrel.org

Standard 6, Understands relationships among organisms and their physical environment, Level III Grade: 6-8

Contact Us

We'd appreciate hearing from you, please send us an email at webmaster@wbur.bu.edu to tell us about your experience using the WBUR Greenland Teacher Guides in your classroom. WBUR's Greenland Teacher Guides were prepared by [Bay Breeze Educational Resources](#).

Resources: Ice Core Section - <http://www.wbur.org/special/dispatches/greenland/icecores/>
Drilling Site - <http://www.wbur.org/special/dispatches/greenland/dispatches/0717.asp>
Striking Bottom - <http://www.wbur.org/special/dispatches/greenland/dispatches/0720.asp>

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