

Anne Allard-Wainwright
COSEE-West Workshop on Climate Change
December 2008

(Gr 6-8) LESSON PLAN: “IceHunters: Welcome to the Cryosphere!”

TIME: Two (45 min) class days for the background ice activities
Two (45 min) class days for the research activity/presentations

BACKGROUND:

1. Students will have previously studied the Hydrosphere and are capable of creating simple powerpoint presentations.
2. Students will complete the following Cryosphere activities in class prior to the research portion of this lesson.
 - a. Ice Activity #1: Physical Properties of Ice
Taken from <http://www.sd5.k12.mt.us/glaciereft/glac3-8.htm>
 - b. Ice Activity #2: Observing Glacier movements
Based on activities from the following website
<http://www.northstar.k12.ak.us/schools/joy/denali/OConnor/formed.html>
 - c. Ice Activity #3: Washington Glacier hunt (view with 3-D glasses built by using plastic light gel film and “glasses” cut from file folders/tagboard!!!)
<http://3dparks.wr.usgs.gov/mtrainier/>

CONTENT STANDARDS:

Science as Inquiry

Content Standard A:

As a result of activities in grades 5-8, all students should develop

- Abilities to do scientific inquiry
- Understanding about scientific inquiry

History and Nature of Science

Content Standard G:

As a result of activities in grades 5-8, all students should develop understanding of

- Science as a human endeavor
- Nature of science
- History of science

OBJECTIVES:

1. Students will be able to identify the major components of the Cryosphere: Arctic, Antarctic, Iceberg, Ice shelf, Ice sheets, Permafrost, Sea Ice, Glaciers, Ice Caps.
2. Students will understand that scientific research on the cryosphere is ongoing and be able to describe a current research project.

LESSON VOCABULARY:

Arctic
Antarctic
Iceberg
Ice shelf
Ice sheet
Permafrost
Sea Ice
Glacier
Ice Floe

MATERIALS:

1. All lab supplies for lab activities #1-3 (see “background”)
2. Online access/projector for 7 min video: “Tour of the Cryosphere”
<http://www.gsfc.nasa.gov/mediaviewer/Cryosphere/index.html>
3. Copies of Student Papers

PROCEDURE:

1. Ice Activity #4: Cryosphere Fieldtrip via the Web
 - d. Online access for 7 min video: “Tour of the Cryosphere”
<http://www.gsfc.nasa.gov/mediaviewer/Cryosphere/index.html>
View video as a class and review the parts of the “Cryosphere”
Students complete Web Activity 1 questions at student computer stations or as a class (depends on computer availability)
2. Ice Activity #5: Modern Polar Explorers and Research in the Cryosphere
Using the www.nsidc.org website to prepare a mission update reports to class

EXPLORER TEAM 1: “IceTrek”: Scientists explore the lifecycle of a drifting Antarctic iceberg.
<http://nsidc.org/icetrek/>

EXPLORER TEAM 2: “Antarctic Megadunes”: Scientists travel to the edge of the earth to understand fantastic formations.
<http://nsidc.org/antarctica/megadunes/>

EXPLORER TEAM 3: “Arctic Ice Floes Dynamics”: In the 1970’s, researchers camped on ice floes to study how sea ice moves and changes

<http://nsidc.org/data/aidjex/>

Presentation Requirements:

Given access to an on-line computer and printer, students will produce a minimum 1-page paper answering the basic questions of their specific polar mission.

WHO?

WHERE?

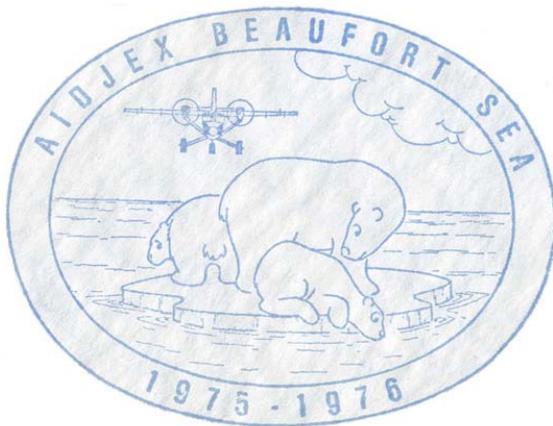
WHAT?

HOW?

WHY?

In addition, students make a 5 slide PowerPoint series, including text and images of their assigned cryosphere mission to share with their classmates.

3. Ice Activity #6. Design a Mission Patch



Patch design above taken from nsidc website: <http://nsidc.org/data/aidjex/>

Requirements:

- Drawn to size on a white sheet of blank paper
- Color using colored pencils
- Include information from your assigned EXPLORER MISSION
 - Mission title
 - Dates of Mission
 - Relevant picture to the mission (be able to explain)
- Drawn freehand or you may use clip art to cut/paste images you find
- Keep drawings/ ideas SIMPLE.....too much detail makes patches hard to sew and SEE!!!
- Write a short paragraph under your patch design explaining why you chose the images in your design....

(Teacher notes)

** Other potential Extension activity: Extreme Research: Then and Now

<http://nsidc.org/arcticmet/gallery/>

Life on a Russian North Pole Drifting Station in 1937

** Other potential Extension activity: Arctic Literary Links: “Endurance” The Voyage of Ernest Shackleton (nonfiction) or Madeline L’Engle (fiction)

STUDENT MATERIALS/HANDOUTS

See below for student pages #1-3

More RELATED TEACHER LINKS:

NOVA: Mountain of Ice

<http://www.pbs.org/wgbh/nova/vinson/glacier.html>

More Glacier activities

<http://www.northstar.k12.ak.us/schools/joy/denali/OConnor/colorblue.html>

and

<http://www.askkids.com/web?q=what+are+glaciers%3F&search=&qsrc=0&o=0&l=dir>

Alaska Satellite facility

<http://www.asf.alaska.edu/>

WEB ACTIVITY 1:

Answer the following questions using information from the online video watched in class <http://www.gsfc.nasa.gov/mediaviewer/Cryosphere/index.html> and from the website www.nsidc.org

PART ONE: Cryosphere Background

1. [What is the cryosphere?](#)

2. [Why does the cryosphere matter?](#)

3. [Where is the cryosphere?](#)

4. [What is in the Cryosphere?](#)

WEB ACTIVITY 2: Student “Mission Update” Presentations (2 parts)

Part One: Ice Activity #4: Modern Polar Explorers and Research in the Cryosphere

ASSIGNMENT #1:

Using the www.nsidc.org website to prepare a mission update reports to class
Your mission will be assigned to you by your teacher. CIRCLE YOUR MISSION
BELOW:

EXPLORER TEAM 1: “IceTrek”: Scientists explore the lifecycle of a drifting Antarctic iceberg.

<http://nsidc.org/icetrek/>

EXPLORER TEAM 2: “Antarctic Megadunes”: Scientists travel to the edge of the earth to understand fantastic formations.

<http://nsidc.org/antarctica/megadunes/>

EXPLORER TEAM 3: “Arctic Ice Floes Dynamics”: In the 1970’s, researchers camped on ice floes to study how sea ice moves and changes

<http://nsidc.org/data/aidjex/>

Presentation Requirements:

Given access to an on-line computer and printer, write a newspaper reporter style paper (minimum 1-page, 12 pt font, single spacing) answering the basic questions of the specific polar mission you were assigned to web research.

WHO?

WHERE?

WHAT?

HOW?

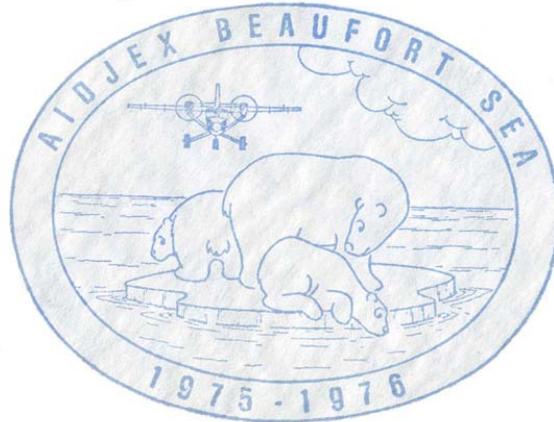
WHY?

In addition to your newspaper report, create a 5 slide PowerPoint series, including text and images of the cryosphere mission to share with your classmates.

(see next page for Assignment #2: Design a Mission Patch)

WEB ACTIVITY 2: Student “Mission Update” Presentations (2 parts)

ASSIGNMENT #2: Design a Mission Patch
Look at the example below:



○ Patch design above taken from nsidc website: <http://nsidc.org/data/aidjex/>

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EXTRA CREDIT ASSIGNMENT:

Extreme Research: Then and Now

<http://nsidc.org/arcticmet/gallery/>

Life on a Russian North Pole Drifting Station in 1937

STUDENT WEBSEARCH (Teacher Key w/links)

PART ONE: Cryosphere Background

1. [What is the cryosphere?](#)

The frozen regions of our planet

2. [Why does the cryosphere matter?](#)

The frozen regions of our planet reflect radiation, cool our planet, affect ocean circulation, provide fresh water for living things, and influence climate.

3. [Where is the cryosphere?](#)

[The Arctic](#)

[Antarctica](#)

[And in between](#)

4. [What is in the Cryosphere?](#)

[Snow](#)

[Ice](#)

[Sea ice](#)

[Glaciers](#)

[Ice shelves and icebergs](#)

[Frozen ground](#)