NSDL/NSTA Web Seminar:

Beyond Penguins and Polar Bears
Integrating Science and Literacy
Seminar 1: Polar Geography

Tuesday, May 27, 2008
Agenda:

1. Introductions
2. Tech-help info
3. Web Seminar tools
4. Presentation
5. Evaluation
6. Chat with the presenters

http://nsdl.org
Supporting the NSDL Presenting Team is…

For additional Tech-help call:
Elluminate Support,
1-866-388-8674 (Option 2)

Jeff Layman
Tech Support,
NSTA
jlayman@nsta.org
703-312-9384
We would like to know more about you…

http://nsdl.org
How many NSTA web seminars have you attended?

A. 1-3
B. 4-5
C. More than 5
D. More than 10
E. This is my first web seminar

Use the letters A-E located at the top left of your actual screen to answer the poll.
Where are you now?

Note:
Alaska & Hawaii
Not to scale
www.50states.com
What grade level do you teach?

A. Elementary School, K-5.
B. Middle School, 6-8.
C. High School, 9-12.
D. I teach undergrad and/or grad students.
E. I am an Informal Educator.

http://nsdl.org
NSDL/NSTA Web Seminar
Beyond Penguins and Polar Bears: Integrating Science and Literacy in the K-5 Classroom--Polar Geography

Tuesday, May 27, 2008
Today’s NSDL Experts

Jessica Fries-Gaither, *Beyond Penguins and Polar Bears* Project Director and Elementary Resource Specialist, Ohio State University

Dr. Carol Landis, Education Outreach Specialist, Byrd Polar Research Center, Ohio State University

http://beyondpenguins.nsdl.org
Overview of Presentation

1. Characteristics of the Arctic
2. Characteristics of Antarctica
3. Teaching strategies and K-5 resources from *Beyond Penguins and Polar Bears*

http://nsdl.org
“The first step toward understanding the polar regions is to develop a sense of place about the Arctic and Antarctic that makes them as separate in our minds as Austria and Australia, New York and San Francisco, or the Himalaya and the Adirondacks.”

– Galen Rowell, *Poles Apart*
Poll Question!

Where does the Arctic begin?

A. The Arctic Circle
B. 10 °C isotherm
C. Where treeline begins
D. Geopolitical borders

http://nsdl.org
Where is the Arctic?

Several definitions:
1) Arctic Circle
2) 10 °C isotherm
3) Treeline
4) Political

“Where Does the Arctic Begin? End?”

Blog post
http://expertvoices.nsdl.org/polar
The Arctic: An ocean surrounded by land

**Arctic Ocean:** approximately 2 miles deep; ice cover ranges from 6 inches to 6 feet

**Land includes portions of 8 countries and territories**

Seasonal variation in Arctic pack ice

Tundra and permafrost

Photo by Chris Linder, Woods Hole Oceanographic Institution

Photo by Jef Maion, www.maion.com

http://nsdl.org
Arctic Weather and Climate

Mean summer temperature (°C)  Mean winter temperature (°C)

[Thermometer images showing temperatures below freezing for both summer and winter]
Plants: small shrubs, birch, alder, willow, grasses, mosses, and berries

Animals: terrestrial and marine mammals, birds, & fish

All images courtesy of U.S. Fish and Wildlife Service
Climate Change in the Arctic

Animation: Sea Ice Decline – Sept comparisons
National Snow and Ice Data Center

Age of winter sea ice in 2007-2008
Image courtesy of National Snow and Ice Data Center
Let’s pause for questions from the audience....
How big is Antarctica?

A. Twice as big as Alaska

B. About 1.5 times as big as the continental U.S.

C. About the same size as Africa

D. About half the size of the continental U.S.
Antarctic Circle, 66°34'S
Antarctic Polar Front (where the cold northward-flowing waters sink beneath the warmer waters of the sub-Antarctic)

British Antarctic Survey

From NIX (NASA Image Exchange)

http://nix.larc.nasa.gov/

http://library01.gsfc.nasa.gov/svs/a000987.mpg

NASA/Goddard Space Flight Center
Scientific Visualization Studio
Temperature trends in the last 50 years

Red = + 0.2 degrees C per year
Blue = - 0.2 degrees C per year
West vs. East

Make a fist with your right hand, but leave your thumb out. This resembles the shape of Antarctica.

West Antarctic Ice Sheets

East Antarctic Ice Sheet
Land surrounded by water... the Southern Ocean

About 8.8% of Earth’s ocean area
About 8.7% of Earth ocean volume

Ocean moderates coastal temperatures

Sea ice extends the solid area around Antarctica every winter.

*Image courtesy of British Antarctic Survey*
Antarctic Weather and Climate

Mean summer temperature (°C)

Coastal

Inland

Mean winter temperature (°C)

Coastal

Inland
Seasonal Variation in Daylight

Polar day — period in summer in which sun doesn’t set

Polar night — period in winter in which sun doesn’t rise

Stamp the month marking the middle of winter in Antarctica:

|------|------|------|------|-----|------|------|------|-------|------|------|------|

[Image of a tent and a glacier]
Living things on land

Adelie penguins

Emperor penguins

Wandering albatross

Skua

(like a large gull)

Weddell seals on ice shelf
Living things in the ocean
Physical Geography

Continental-scale features:
Potential for sea level rise

https://www.cresis.ku.edu/research/data/sea_level_rise/index.html
Let’s pause for questions from the audience....
Strategies for introducing the polar regions to elementary students:

- Content area reading
- Graphic organizers
- Nonlinguistic representations and kinesthetic experiences
- Reading, writing, and speaking
- Open inquiry and research
Develop student content knowledge through children’s literature and expository text

http://nsdl.org
Our **Virtual Bookshelf** lists children’s literature and suggestions for use.

A Sense of Place: Virtual Bookshelf

by Kimberly Lightle, Jessica Fries-Gaither, and Nancy Brannon

The Virtual Bookshelf provides a list of recommended children’s books that reflect the theme of the issue and offers ideas on how to integrate them across the curriculum.

Linking science instruction to children’s literature has become increasingly popular in recent years for a variety of reasons: the literature connection motivates students, provokes interest, students connect scientific ideas to their personal experiences, accommodates children with different learning styles, and promotes critical thinking. Whatever the reason, we know that books about science can capture even the most reluctant readers and writers. Students are naturally drawn to the colorful photographs and layouts of nonfiction science texts.

Using science books allows teachers to meet their reading and writing goals while filling a need to teach more science. Teachers can use books as a starting point for meaningful classroom discussions; some teachers even begin class by reading a poem or a picture book aloud, and extend the enjoyment of the literature. Some teachers project the book onto a screen so the students can read the text together. Picture books make wonderful writing prompts and can provide the launch for journal writing. Interdisciplinary thematic units can be broadened by use of children’s literature.

The titles listed in this month’s bookshelf reflect our focus on a sense of place about the polar regions. We’ve divided the titles into five categories. The first category, Going Places, includes books where animals and people are going on a journey. The next section provides books that will help students Compare and Contrast the two polar regions. The third and fourth categories provide general reference books on the Arctic Region and Antarctica. And because the name of the project is Beyond Penguins and Polar Bears, we had to highlight two of our favorite books on Penguins and Polar Bears.

ANTARCTICA - GENERAL REFERENCE

The four titles highlighted in this section examine Antarctica in more depth. Use these titles to complete the Antarctica column of this [graphic organizer](http://nsdl.org).


This book uses wonderful photographs to introduce the continent of Antarctica, looking at its geography, plant and animal life, weather, and human exploration. While the simple, concise main ideas make this book appealing to primary graders, the additional detail found on most pages makes this book appropriate for students in upper elementary as well.


This chapter book introduces the geography, topography, climate, flora, and fauna of the continent of Antarctica. The expository text is similar in style to what is found in an elementary textbook, but the pictures and spacing of text make this book more engaging. Each chapter begins with a question, making this book an excellent opportunity to practice questioning strategies such as Socratic.


Each two-page spread of this nonfiction book discusses a discrete topic about Antarctica. The book contains a large number of maps and atlas projections with explanations of the history of the continent, the climate, plants and animals, the natural resources, and the history of exploration. Also included are a glossary and index. The paragraphed, expository style text could provide an introduction to research projects, organizing information, and expository writing. The ability to project text on a screen could make this book more accessible for whole-class use.
**Graphic organizers** assess prior knowledge and help students organize information.

### Prior Knowledge

<table>
<thead>
<tr>
<th>What do you know about the Arctic?</th>
<th>What do you know about Antarctica?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>What questions do you have?</td>
<td></td>
</tr>
</tbody>
</table>

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**Note-taking and organizing information**

**Integrating Science and Literacy in the K-5 Classroom**

<table>
<thead>
<tr>
<th></th>
<th>Arctic</th>
<th>Antarctica</th>
<th>My hometown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geography &amp; Landforms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3 volunteers: Compare and contrast the Arctic and Antarctica

Arctic

Antarctica
We highlight integrated **science and literacy** lessons and activities.

### A Sense of Place - Issue 1, March 2008 - Science and Literacy - Lessons and Activities

**Science and Literacy Lessons to Develop a Polar Sense of Place**

by Jessica Fries-Gather

The lessons highlighted in this article integrate science knowledge with geographic skills. Students view images and webcams, read stories and articles, and use content knowledge about the polar regions. They demonstrate their knowledge through activities such as making maps and describing the similarities and differences between the polar regions. Students can further integrate literacy skills into the lessons by writing about the regions and creating their own maps and descriptions.

**A Vacation to the Polar Regions (Grades K-2)**

[http://www.nationalgeographic.com/xpeditions/lessons/05/g2/polar.html](http://www.nationalgeographic.com/xpeditions/lessons/05/g2/polar.html)

Students will learn about the characteristics of the Arctic and Antarctic by making maps and descriptions of the regions. They will plan a vacation to Antarctica and draw pictures or write stories depicting themselves on the trip. Students will then compare the regions by drawing pictures of both the Arctic and Antarctic and describing the similarities and differences.

**The National Oceanic and Atmospheric Administration (NOAA) has an online gallery of pictures of Antarctica, try the National Science Foundation’s [antarctica.gov](http://antarctica.gov).**

This lesson meets the National Geography Standards: Four and Five and the National Science Education Standards: Science in Personal and Social Perspectives content standard for grades K-4 and 5-8.

**To further integrate literacy skills into this lesson, try the following:**

### Expedition to the Poles (Grades 3-5)

[http://www.nationalgeographic.com/xpeditions/lessons/05/g35/expedition.html](http://www.nationalgeographic.com/xpeditions/lessons/05/g35/expedition.html)

Students will pretend they have just returned from a year in the Arctic or Antarctic. They will look at web sites about these regions and expeditions to them, and they will create posters illustrating their experiences. Students will conclude by writing paragraphs explaining what it would be like to visit the polar region that they did not focus on in this lesson. Use the feature story, **virtual bookshelf**, and downloadable **informational articles** (found in the virtual bookshelf) for student reading and research. Students can use a graphic organizer, such as this **table**, to record information.

This lesson meets the National Geography Standards: Four and Five and the National Science Education Standards: Science in Personal and Social Perspectives content standard for grades K-4 and 5-8.

### Exploring Compare and Contrast Structure in Expository Texts


This lesson focuses on identifying and analyzing the compare and contrast text structure within expository texts. First, students are introduced to the terms compare and contrast and asked to find similarities and differences between two common items. Next, students work in small groups to identify texts that are comparing and contrasting information. Students are then introduced to the Venn diagram as a tool that demonstrates similarities and differences and aids in learning new material.

This lesson meets **NCTE/IRA Standards:** 1, 3, 6, 12.
An example of science/literacy integration for grades K-2:

Students learn about the polar regions and draw pictures or write stories depicting themselves on a vacation to one of them.

Students draw a series of pictures to tell a story. They ‘read’ their story to others, transcribe their oral story into writing, and create an accordion book with drawings on the front and writing on the back.
An example of science/literacy integration for grades 3-5:

What Do People Know About the Arctic and Antarctic?

Students research the polar regions, interview people about the areas, and write compare/contrast paragraphs.

Exploring Compare and Contrast Structure in Expository Texts

Students learn to identify and analyze the compare and contrast text structure within expository texts.
Create **nonlinguistic** representations and provide **kinesthetic** experiences

Salt Dough Recipe:
- 2 cups flour
- 1 cup table salt
- 1 cup water

[NSDL logo]
http://nsdl.org
A SENSE OF PLACE - ISSUE 1, MARCH 2008

Place and Location are two of the five themes of geography and an article in this issue looks at this topic. Location answers the question, “Where am I?” while the study of place is about “What is this place like?” “How do I use this place?” and “How can place connect to my hometown?” This issue of Beyond Penguins and Polar Bears magazine explores the themes of place and location and how they are used in science, geography, literacy, and technology in education. Readers will find ideas for connecting ideas found in dramatically different areas as well as their own home. Get ready for a great sense of place!

Photo: Nuuk, Greenland. Copyright 2007 Thomas Overly.

http://beyondpenguins.nsdl.org
Open inquiry and research allows students to explore topics of interest.

**Task**: Explore the *Beyond Penguins and Polar Bears* magazine and find one interesting article/idea/strategy to share with the group.

How could you incorporate this into your classroom?

Write your responses in the chat.

http://nsdl.org
Interested in learning more about the polar regions?

More Beyond Penguins web seminars in fall 2008 and spring 2009

Beyond Penguins Tapped In Group:
June 4, 2008 at 7 pm Eastern
http://www.tappedin.org

Beyond Penguins and Polar Bears:
http://beyondpenguins.nsdl.org

http://nsdl.org
THANK YOU!

http://beyondpenguins.nsdl.org

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THANK YOU!

http://nsdl.org
Go to [http://nsdl.org](http://nsdl.org) and click on the K-12 audience page to:

- Download our Seminar Resource List
- Utilize our blog featuring our presenters for the Seminar Series sharing their insights on careers in science and science education:
http://learningcenter.nsta.org
National Science Teachers Association
Francis Eberle, Executive Director
Frank Owens, Associate Executive Director
Conferences and Programs
Al Byers, Assistant Executive Director e-Learning

NSTA Web Seminars
Flavio Mendez, Director
Jeff Layman, Technical Coordinator

LIVE INTERACTIVE LEARNING @ YOUR DESKTOP
• NASA JPL: Mars Exploration Rovers: Where Are They Now?  
  June 5, 2008

• NSDL: Enlightening Experiences with Energy  
  June 12, 2008

http://learningcenter.nsta.org
Web Seminar Evaluation:

Click on the URL located on the Chat Window
Outlet glaciers flow into the valley floor. In the spring & summer, melt water forms streams, which feed the lakes in the lowest part of the valley. The food webs are simple.
There are now 26 LTER sites in the U.S., plus 2 associated with the U.S. stations in Antarctica: Palmer Research Station on the Peninsula and McMurdo Dry Valleys region in the Transantarctic Mountains, near Ross Island.
Following scientists, December 2003:
The Center for Remote Sensing of Ice Sheets (CReSIS): https://www.cresis.ku.edu/

Several research areas
Developing improved models for prediction
Developing better sensors to put onboard satellites and aircraft
Developing a uncrewed aerial vehicle (UAV) (like a computer-controlled plane)
Systems to collect and transfer data
Analysis & synthesis of the data
http://www.mcmlter.org/lostseal/