NSDL/NSTA Web Seminar
Beyond Penguins and Polar Bears: Integrating Science and Literacy in the K-5 Classroom--Physical Science from the Poles

Wednesday, October 29, 2008
6:30 p.m. to 8:00 p.m. Eastern time
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…
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.
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 NSTA web seminar
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 college students.
E. I am an Informal Educator.
NSDL/NSTA Web Seminar
Beyond Penguins and Polar Bears: Integrating Science and Literacy in the K-5 Classroom--Physical Science from the Poles

Wednesday, October 29, 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. Physical properties of ice
2. Geography of ice
3. Teaching strategies and K-5 resources from *Beyond Penguins and Polar Bears*
States of matter: Solid, Liquid, Gas

Photo by Chris Linder, Woods Hole Oceanographic Institution

Photo by C. Landis, Byrd Polar Research Center

http://nsdl.org
Change in state (or phase) of water

Addition or loss of heat is required to change from one state to another.

http://www.geo.umn.edu/courses/1006/Fall00_night/H20_heating_curve.JPG

http://nsdl.org
States of matter
Stamp your answers.

A change of state does not mean a change in mass.

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<th>True</th>
<th>False</th>
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Solids can only melt with heat.

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Misconceptions:
States and Changes of Matter

Formative Assessment: Mass conservation
“Ice Cubes in a Bag” (Vol. 1)

Blue Ice Melt:
Ice can melt with pressure.

http://nsdl.org
Admiring snowflakes

Liquid water

Solid water

http://www.physicalgeography.net/fundamentals/8a.html

http://www.classzone.com

http://nsdl.org
Does the size of an ice cube affect the temperature at which it freezes?

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Misconception: The more water there is to freeze, the lower the temperature is required to freeze it.

Instead: The temperature of the freezing point is independent of the amount of liquid.

Formative Assessment: “Freezing Ice” (Vol. 2)
Density is the mass per unit volume of a substance.

Buoyancy is the force of a liquid pushing up to keep something afloat.
True or False: Stamp your answer

Water expands as it freezes because the molecules become larger.

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Misconceptions about Density & Buoyancy

Floating or sinking is based on an object’s weight. Water expands as it freezes because the molecules become larger.

Instead:
Floating or sinking is based on an object's density.

Water expands as it freezes because the molecules are locked into place in a crystalline structure.

http://nsdl.org
Formative Assessment: “Floating Logs” & “Floating High and Low” (Vol. 2)

Model and read about water and ice

http://nsdl.org
Let’s pause for questions from the audience....
Ice formation

Ice on land is usually from precipitation, unless it is freezing water that is present in saturated soil.

Ice forming on water develops at the liquid surface of the water...and therefore on the bottom of any ice layer at the surface.
Geography of Ice

Land-based ice:
- ice sheet
- ice field
- glacier
- ice stream

Ice on/in the ocean:
- ice shelf
- ice floe
- sea ice
- iceberg

A glacier in the Transantarctic Mts.  
http://photolibrary.usap.gov/index2.htm

Ross Sea ice edge, 1957  
http://photolibrary.usap.gov/index2.htm
Glaciers

Diagram: http://www.answers.com/glacier

Photo: Glenn Grant, NSF

http://nsdl.org
Ice Cores:
• Trap gases and wind blown materials
• Can show layering, especially dust layers in dry seasons
• Some date back to almost 800,000 years before present

http://oceanworld.tamu.edu/resources/oceanography-book/evidenceforwarming.htm
Land-based ice is perched above sea level. If it melts, the water drains downward, potentially adding water into the ocean. The water that reaches the ocean will thereby raise sea level.

Sea ice is already floating (displacing its mass) and it was formed from sea water. Melting of sea ice will not raise sea level appreciably.
Which comes first?

Concrete, hands-on experience

Abstract or real-world applications

Stamp one of the boxes

http://nsdl.org
Activities: States & Changes of Matter

Hands-on investigations and content area reading

**Water and Ice**

Students in grades K-2 observe water as it changes states.

**Heat Energy and Water**

Students in grades 3-5 investigate heat's effect on water.

http://nsdl.org
Activities: States & Changes of Matter

Polar Connections:
glaciers, icebergs, sea ice

How Do Snowflakes Become Ice?
Model glacier formation with marshmallows.

Do It Yourself Iceberg Science
Create icebergs with film canisters.

Sea Ice Set
A collection of images and video.

http://nsdl.org
Tie to the global Water Cycle

Don’t forget about ice and snow!

Density and Buoyancy: Grades K-2

Sink or Float?
Students determine whether objects sink or float in water. Include ice in various shapes and sizes!

Do It Yourself Iceberg Science
Create icebergs with film canisters, watch them float.
Density and Buoyancy: Grades 3-5

Water Molecule Pockets
Demonstrate liquid water’s molecular structure with a discrepant event and a model.

The Magic Trick with Ice
A discrepant event – an ice cube floats in water but not rubbing alcohol.
Nonfiction stories for students

Feature Story column of the magazine

Available at three grade levels (K-1, 2-3, and 4-5)

Available as text, illustrated book, and electronic book

http://nsdl.org
Let’s pause for questions from the audience....
Interested in learning more?

Beyond Penguins Web Seminar Series: November 13th--Energy and the Polar Environment

Beyond Penguins and Polar Bears Blog
http://beyondpenguins.nsdl.org/2008/10/29/physical-science-from-the-poles/

Beyond Penguins and Polar Bears, August 2008, Issue 5
http://beyondpenguins.nsdl.org
THANK YOU!

http://beyondpenguins.nsdl.org

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Go to http://nsdl.org and click on the K-12 audience page to:
• Download our Seminar Resource List
• Find resources from archived seminars

Learn about new tools and resources, discuss issues related to science education, find out about ways to enhance your teaching at: http://expertvoices.nsdl.org/learningdigitalK12
• Toshiba/NSTA ExploraVision Awards: How to Submit Quality ExploraVision Entries
  
  November 5, 2008

• NSTA: The Learning Center – Focus on Education Leaders
  
  November 12, 2008

• NSDL: Beyond Penguins and Polar Bears: Energy and the Polar Environment
  
  November 13, 2008
National Science Teachers Association
Dr. Francis Q. Eberle, Executive Director
Zipporah Miller, Associate Executive Director
Conferences and Programs
Al Byers, Assistant Executive Director e-Learning

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

LIVE INTERACTIVE LEARNING @ YOUR DESKTOP
Web Seminar Evaluation:

Click on the URL located on the Chat Window