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NSDL/NSTA Web Seminar

Beyond Penguins and Polar Bears: Energy and the Polar Environment

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Thursday, November 13, 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

Supporting the NSDL Presenting Team is…

For additional Tech-help call:

Elluminate Support,

1-866-388-8674 (Option 2)

Jeff Layman

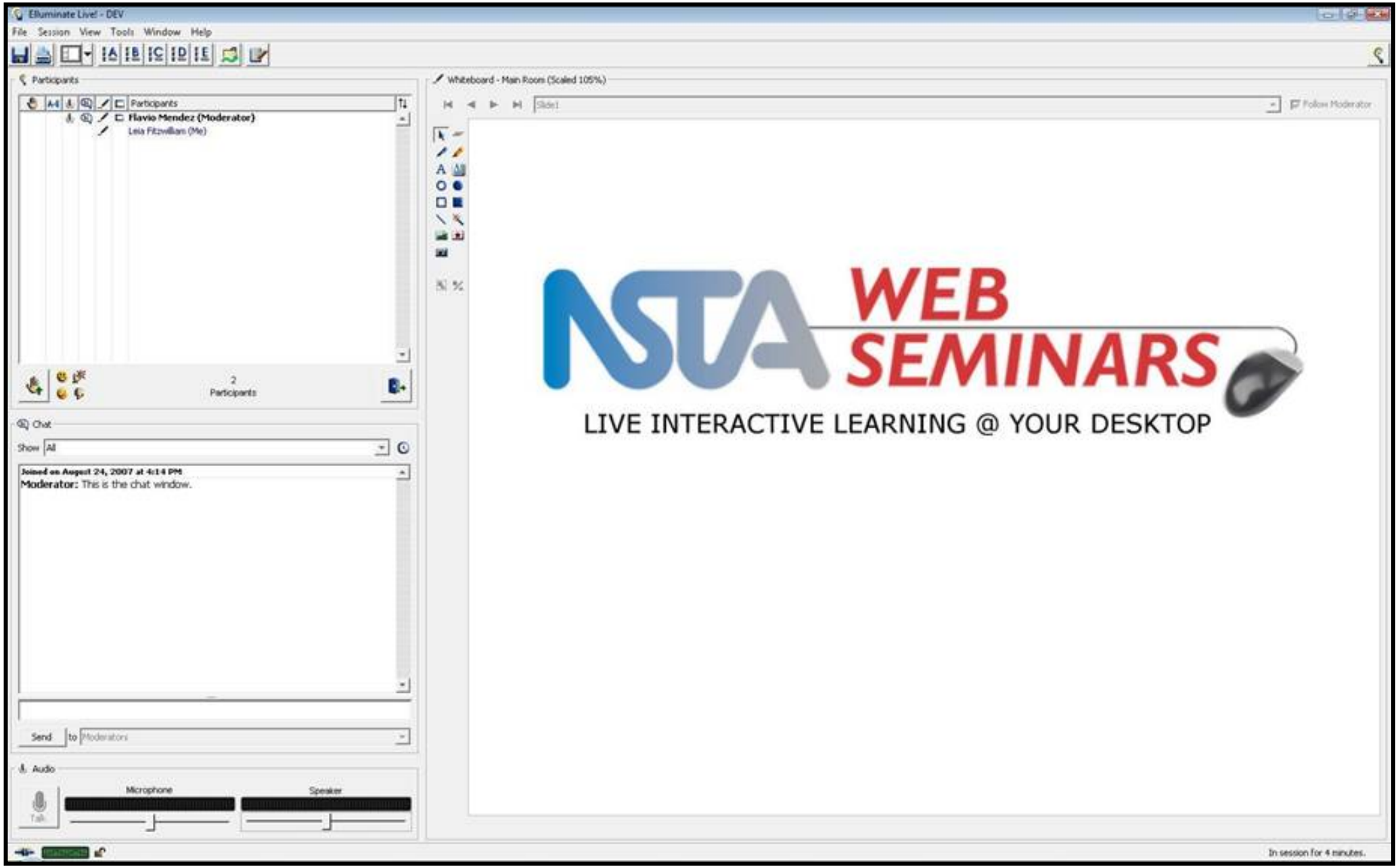
Tech Support

NSTA

jlayman@nsta.org

703-312-9384

Screenshot


Elluminate Live! - DEV
File Session View Tools Window Help
Participants
Participants
Flavio Mendez (Moderator)
Leia Fitzwilliam (Me)
2
Participants
Chat
Show All
Joined on August 24, 2007 at 4:14 PM
Moderator: This is the chat window.
Send to Moderators
Audio
Microphone
Speaker
Talk
Whiteboard - Main Room (Scaled 105%)
Slide1
Follow Moderator
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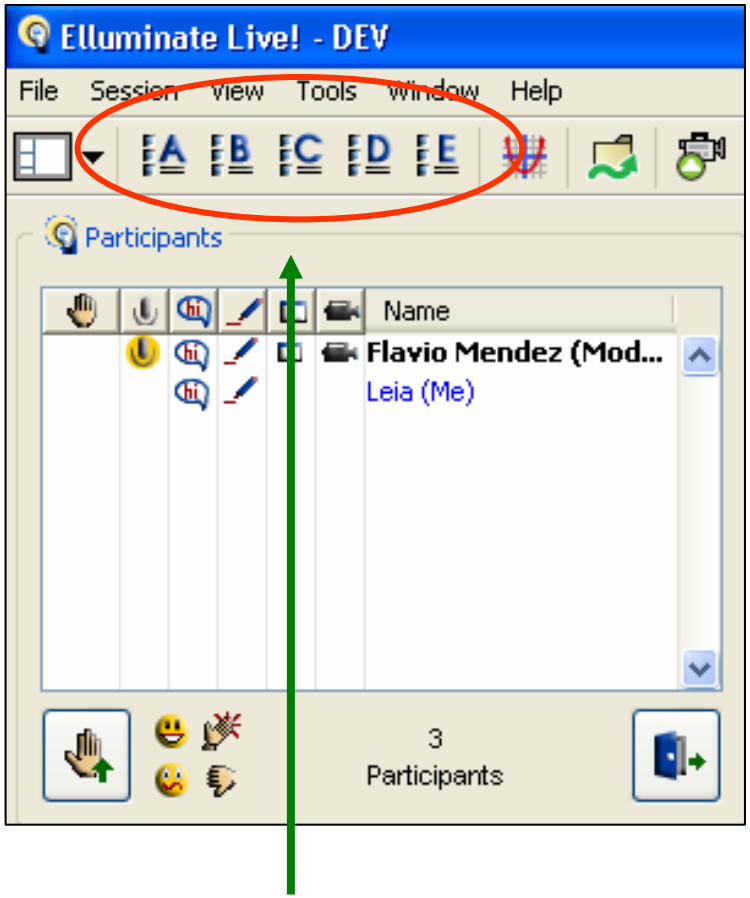
In session for 4 minutes.

We would like to know more about you…

How many NSTA web seminars have you attended?



Use the letters A-E located at the top left of your actual screen to answer the poll

A. 1-3

B. 4-5

C. More than 5

D. More than 10

E. This is my first NSTA web seminar

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How many NSTA web seminars have you attended?

A. 1-3

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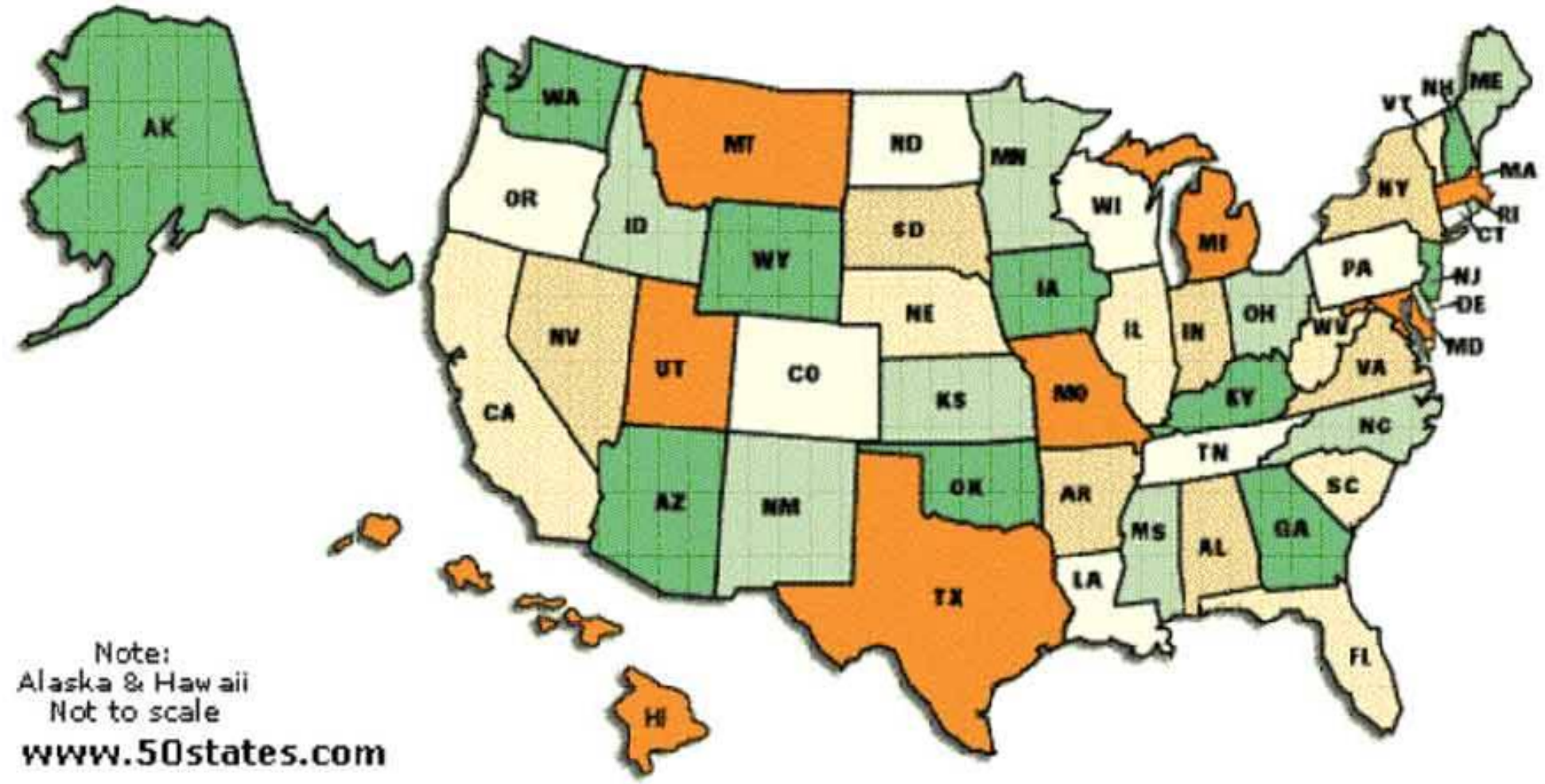
Where are you now?



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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.

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NSDL/NSTA Web Seminar

Beyond Penguins and Polar Bears: Energy and the Polar Environment

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Thursday, November 13, 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

BEYOND PENGUINS AND POLAR BEARS

http://beyondpenguins.nsdl.org

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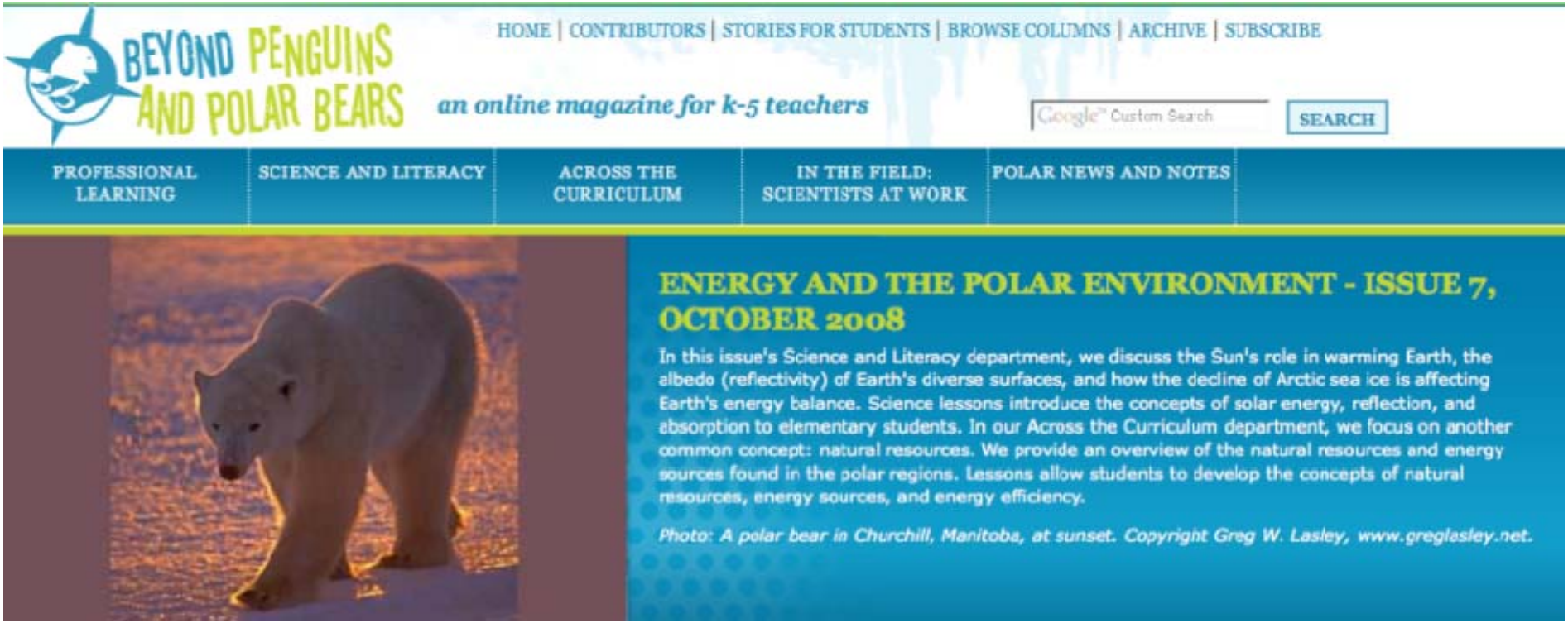
Overview of Presentation

1. Seasons, a refresher
2. Earth's energy balance
3. Albedo & sea ice, a climate feedback
4. Teaching strategies and K-5 resources from *Beyond Penguins and Polar Bears*

Featuring material related to: "Energy and the Polar Environment" Issue 7, October, 2008



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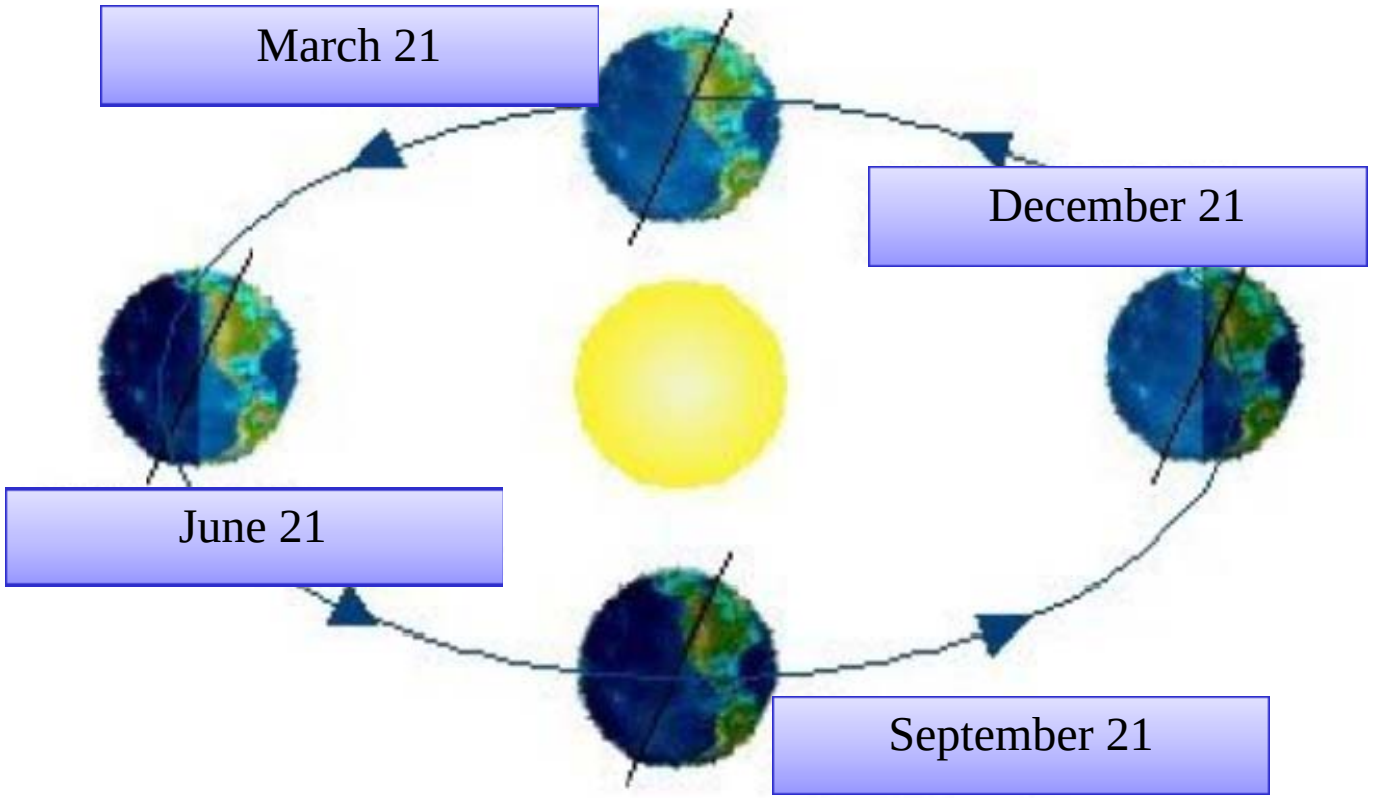
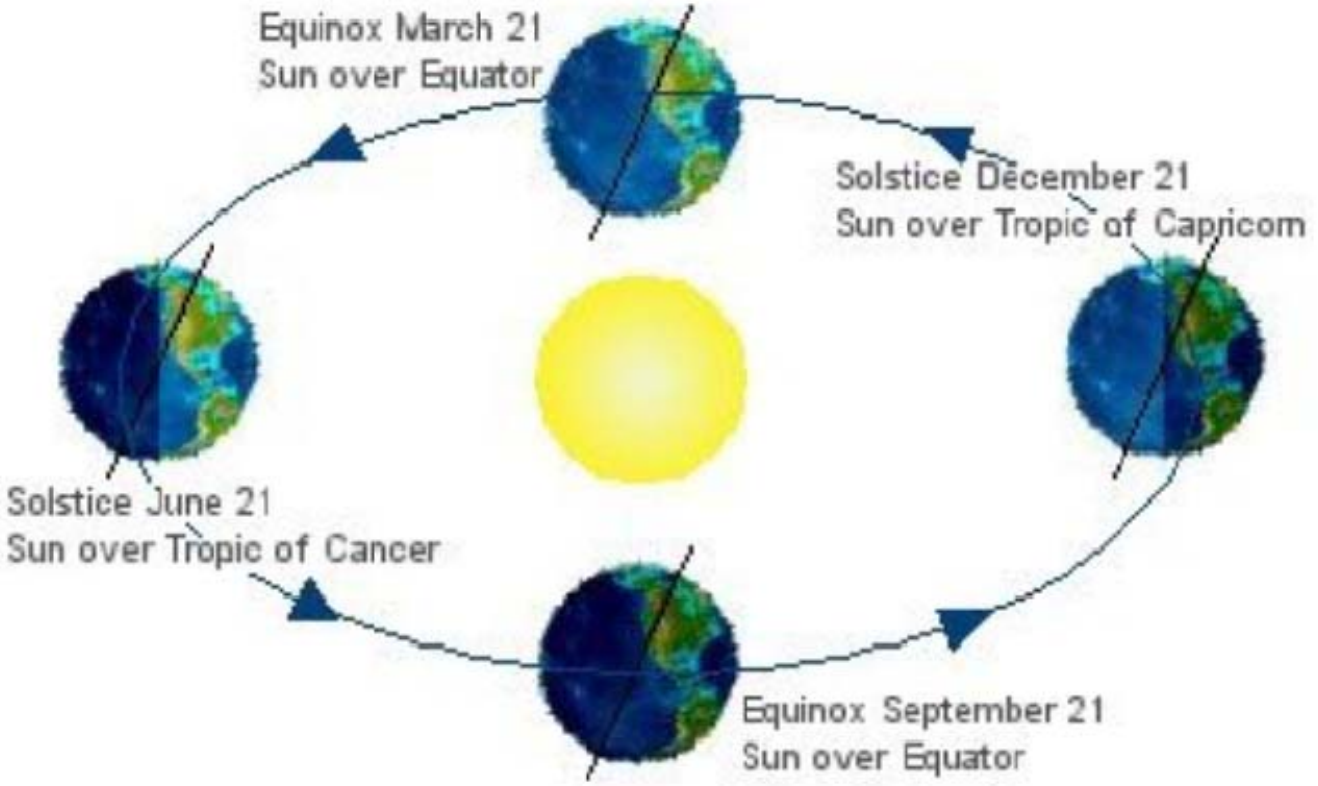
Earth's seasons: Stamp on the diagram where the Sun is overhead on the Equator



Earth's seasons



Sun overhead on the Equator at the equinoxes

Sun overhead at 23.5 N or S at the solstices

Intensity of solar radiation

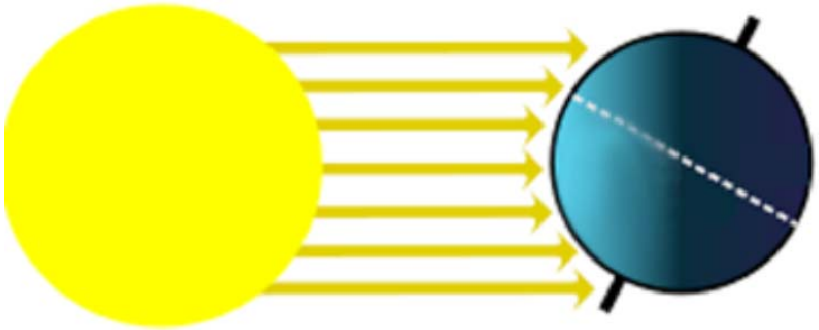
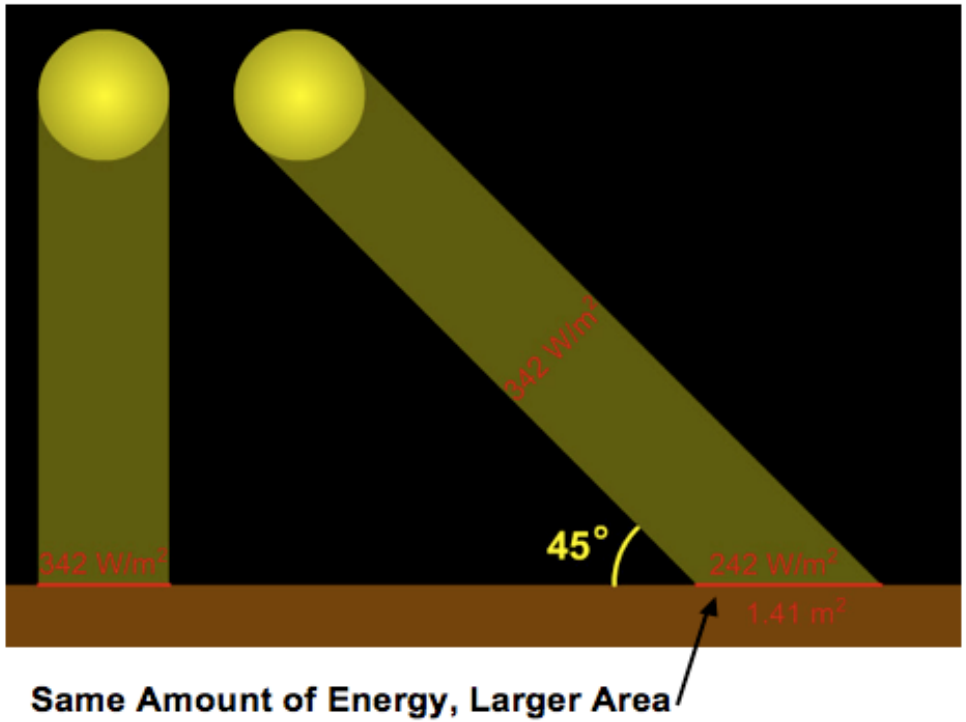


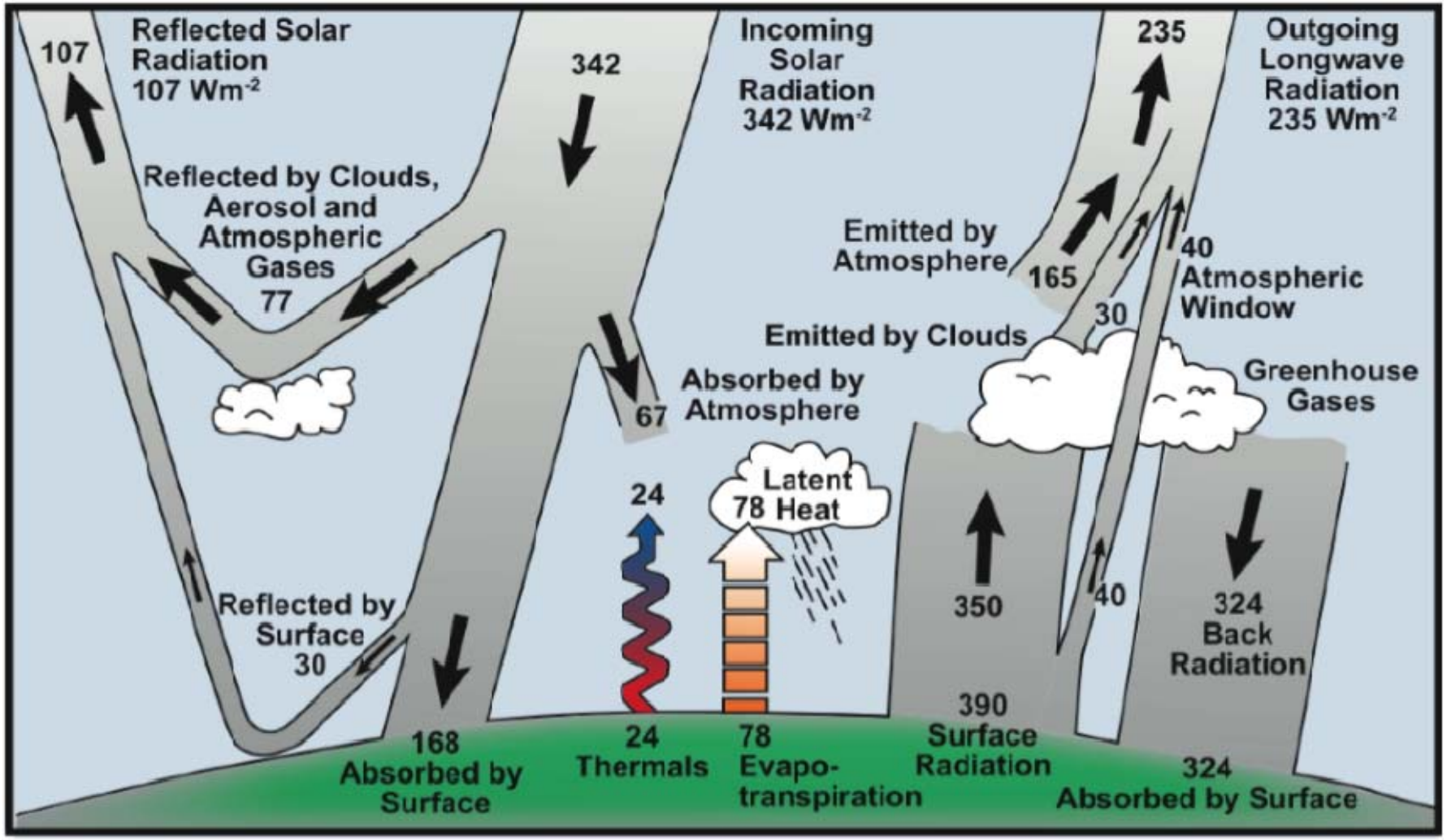
Image adapted from Wikipedia



Most direct rays = most intense energy per unit of area

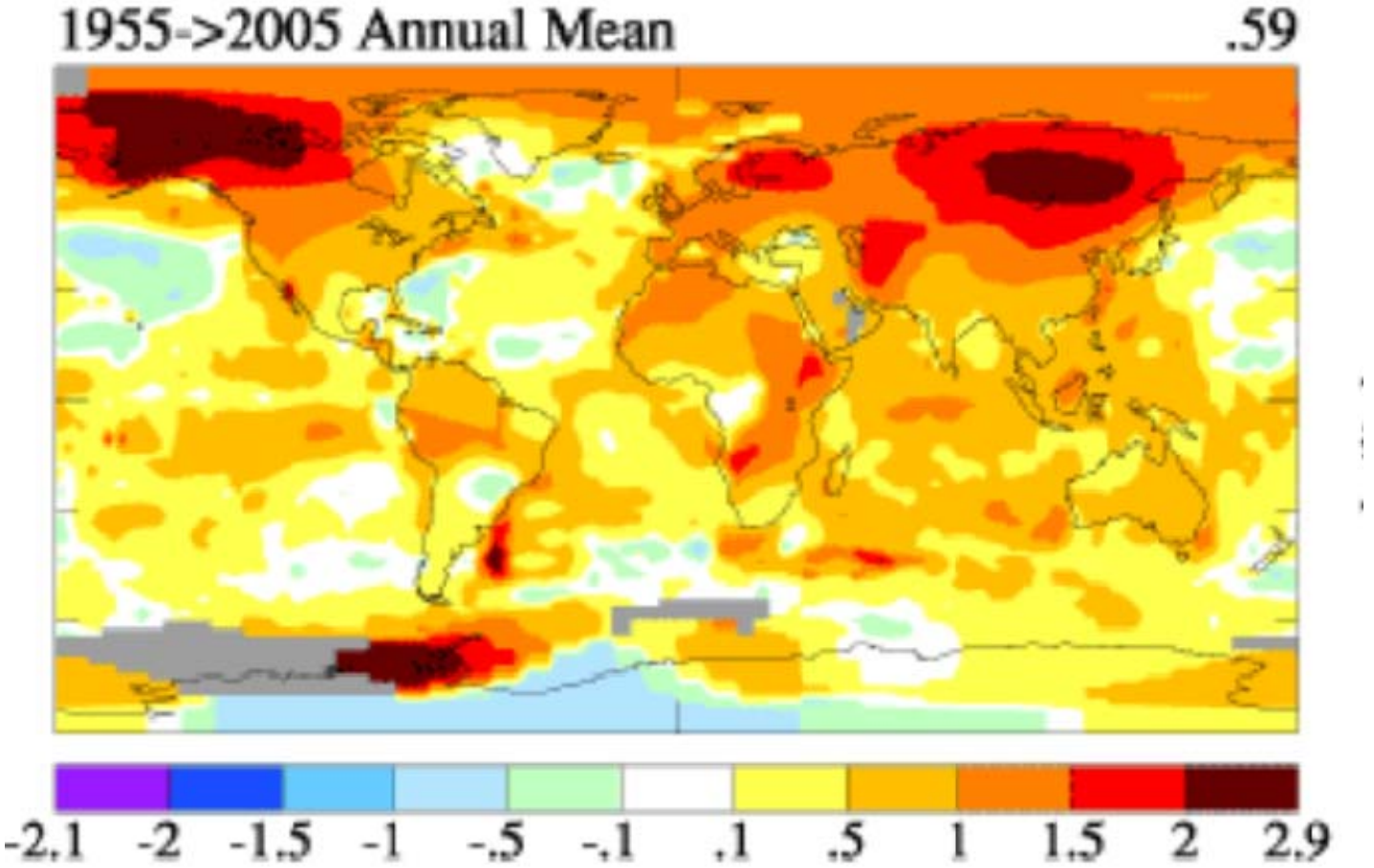
Less direct = less energy per unit of area on the Earth's surface

Earth's Energy Balance (the global picture)



From: ipcc-wg1.ucar.edu/wg1/FAQ/fig/FAQ-1.1_Fig-1.png

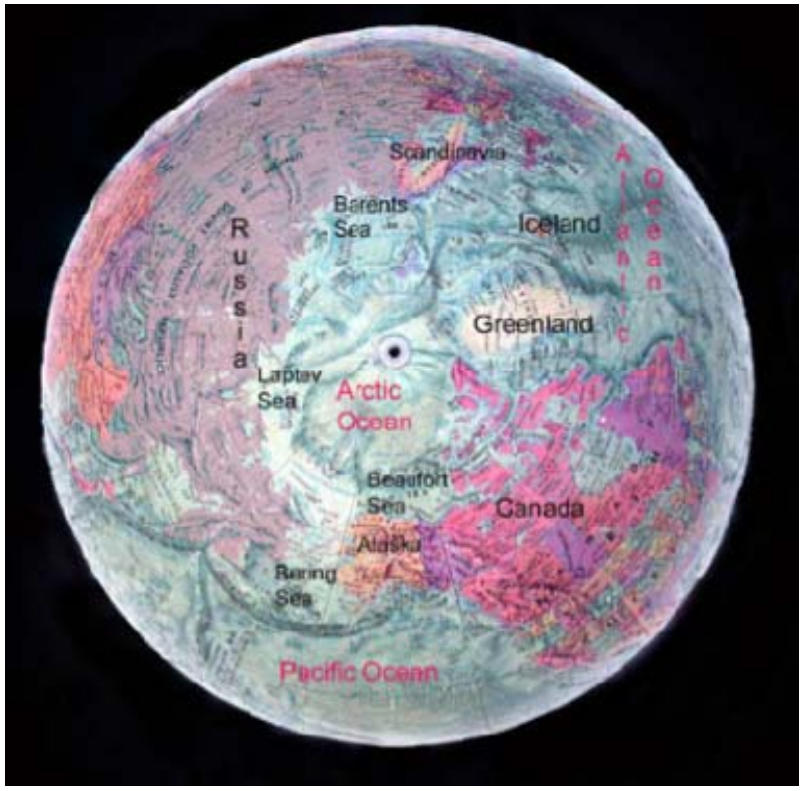
Regional Differences



Annual temperature change over the last 50 years, based on station data (NASA GISS)

Let’s pause for questions from the audience….

N & S Hemispheres are different in amounts of land vs. water



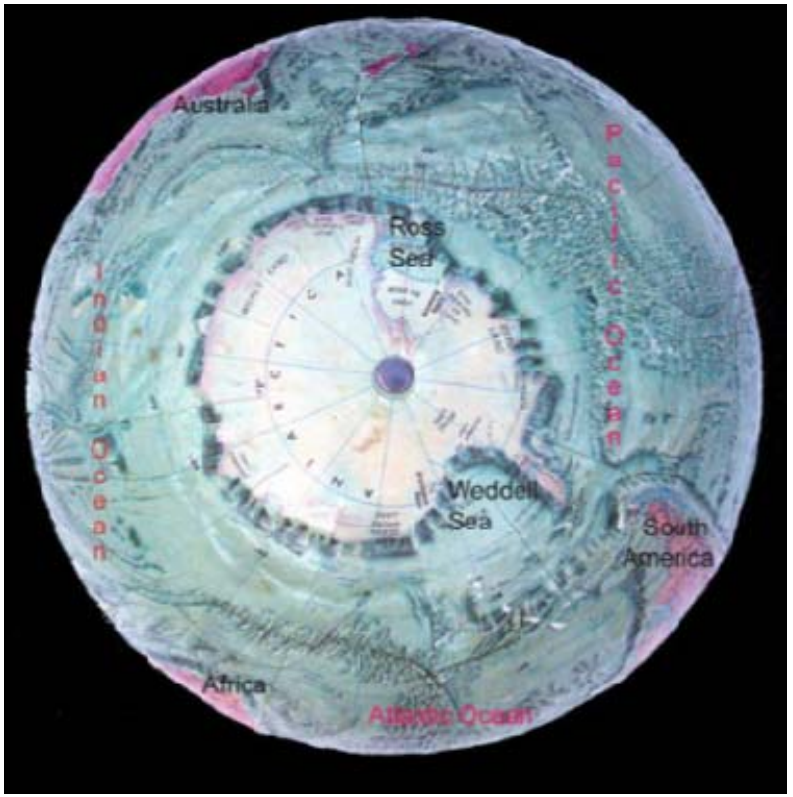


Image from: http://www.marinebio.net/marinescience/01intro/woocean.htm

Poll Question:

Why are the Polar Regions expected to warm more strongly in response to anthropogenic (human produced) climate change than the rest of the planet?

A. The atmosphere is colder so even a slight warming will be obvious.

B. The atmosphere there is colder and thus holds more water vapor, an important greenhouse gas. So the enhanced greenhouse effect is stronger there.

C. They are more prone to positive (amplifying) feedbacks due to their more extensive snow and ice cover.

D. The weather is usually more consistent there, so recent variations from the norm (average) are just more noticeable.

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Albedo - “Reflectivity” of a surface

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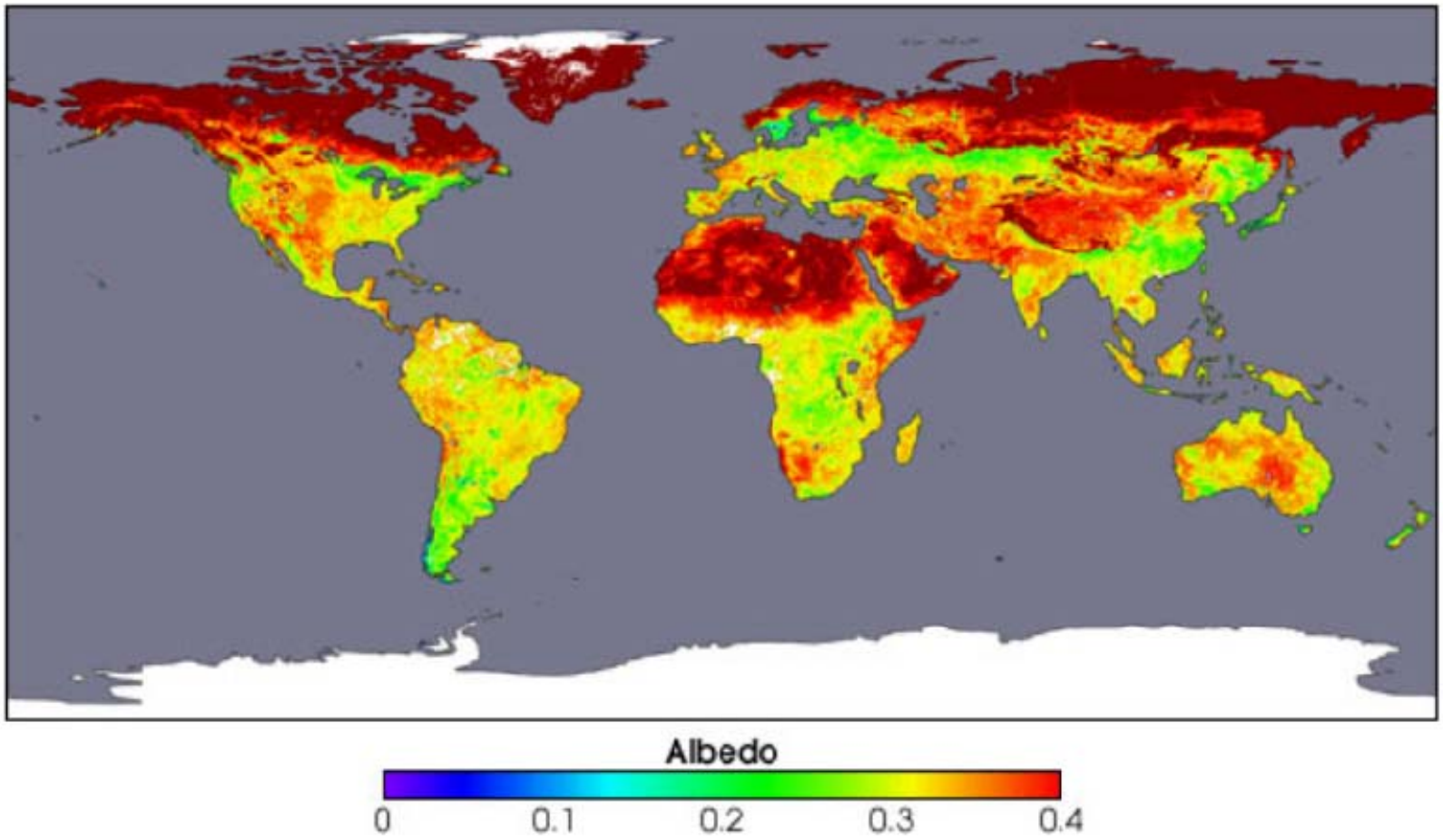
Reflectivity of different surfaces



http://veimages.gsfc.nasa.gov/3411/modis_albedo.jpg

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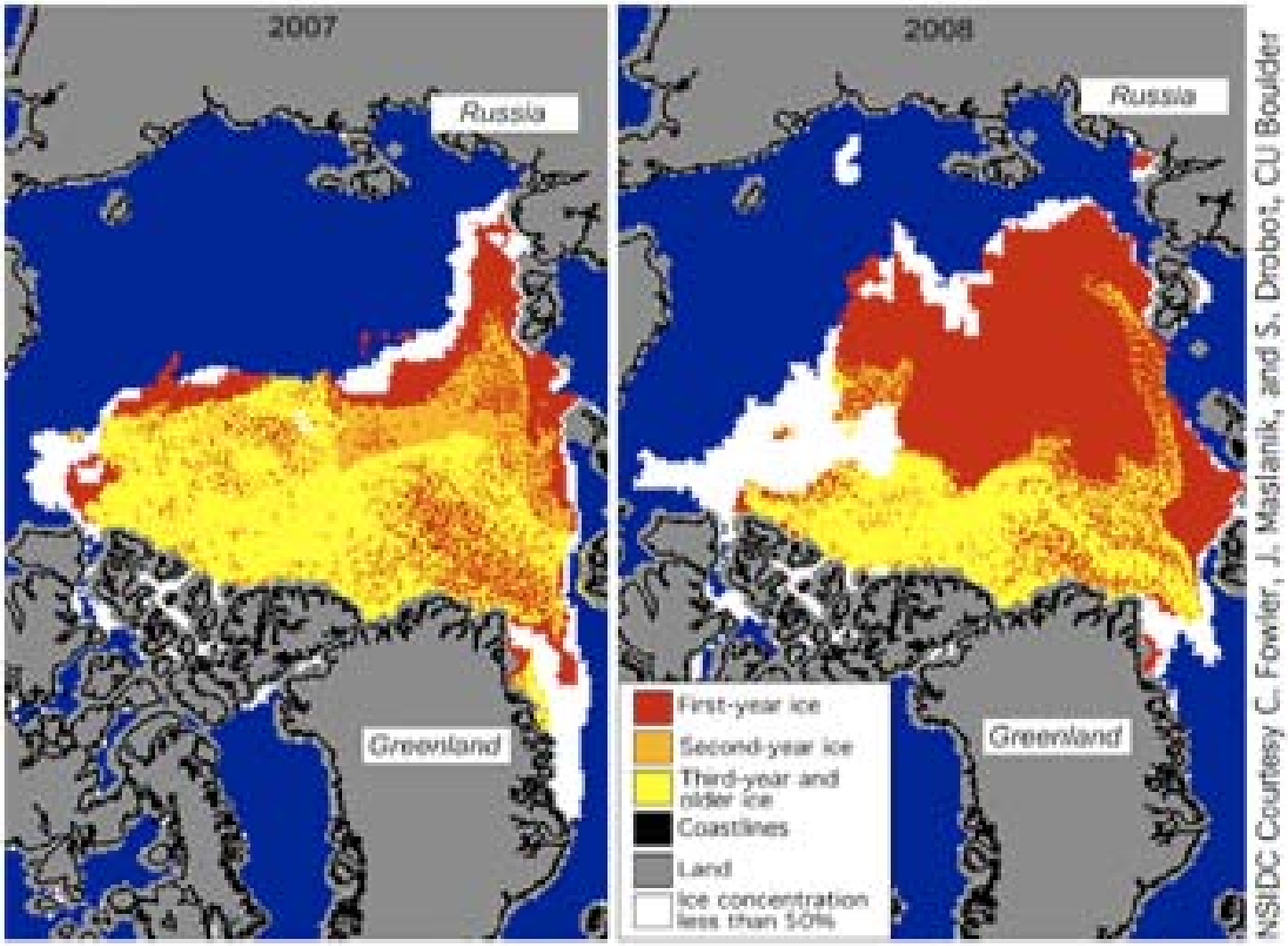
Lowered albedo in the Arctic- a positive feedback to climate

From: http://svs.gsfc.nasa.gov/goto?10021

As sea ice melts, the open ocean will absorb more of the Sun's energy, and then re-radiate heat back to the atmosphere.

Arctic sea ice age, at the end of the 2007 and 2008 melt seasons



http://nsidc.org/news/press/20081002_seaice_pressrelease.html

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Let’s pause for questions from the audience….

Let’s look at student misconceptions around these concepts and strategies for integrating science and literacy instruction...

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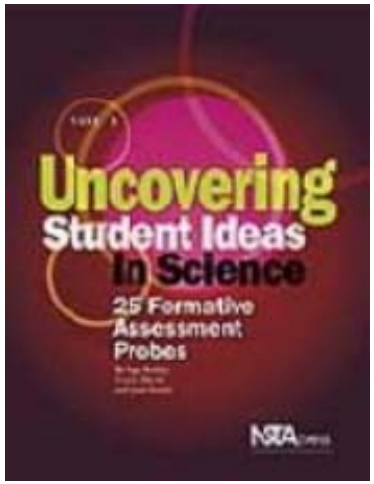
True or False: Stamp your answer

Only shiny objects reflect light.

True	False

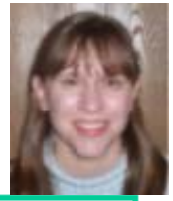
Misconception: Only shiny objects reflect light.



Formative Assessment:
"Can It Reflect Light?" (Vol. 1)

Instead: All visible objects reflect some amount of light. The amount of light reflected depends on the color and texture of the object. The **albedo** of an object is a measure of how much light it reflects.

Target this misconception by...



Observing light reflecting off smooth and rough aluminum foil; compare to bouncing ball on smooth and rough pavement

List: What reflects light? Does not? Explain your answers

Use lessons that introduce vocabulary such as *transparent*, *translucent*, *opaque*, *reflection*, and *refraction*
Teach Engineering: Investigating Light (Grades 3-5)
Teach Engineering: Light Scavengers (Grades 3-5)

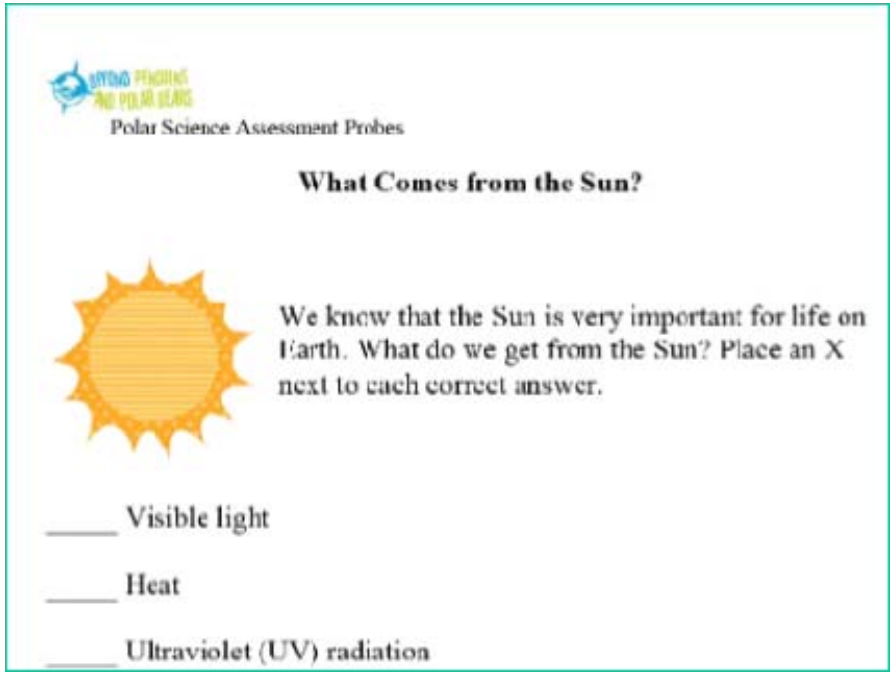
Avoid talking about reflection only in the context of mirrors

True or False: Stamp your answer

The Earth does not receive heat from the Sun directly.

True	False

Misconception: The Sun directly heats the Earth.



Polar Science Assessment Probes

What Comes from the Sun?

We know that the Sun is very important for life on Earth. What do we get from the Sun? Place an X next to each correct answer.

____ Visible light

____ Heat

____ Ultraviolet (UV) radiation

Formative Assessment Probe: “What Comes From the Sun?”

In Energy and the Polar Environment – Issue 7, October 2008 (Misconceptions article)

Instead: Absorbed solar radiation is converted to thermal energy.

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At the elementary level, this explanation of the Sun's role in warming the Earth is developmentally appropriate.

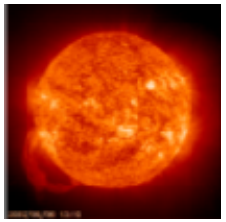
Instead of expecting conceptual change:

www.psypress.com

Use a variety of objects and colors to show that objects absorb and reflect light differently

Use real world examples to help students connect light absorption and increase in temperature

Instead of "*The Sun heats the Earth*," say "*The Sun's energy heats the Earth*."



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Be mindful of your language and explanations

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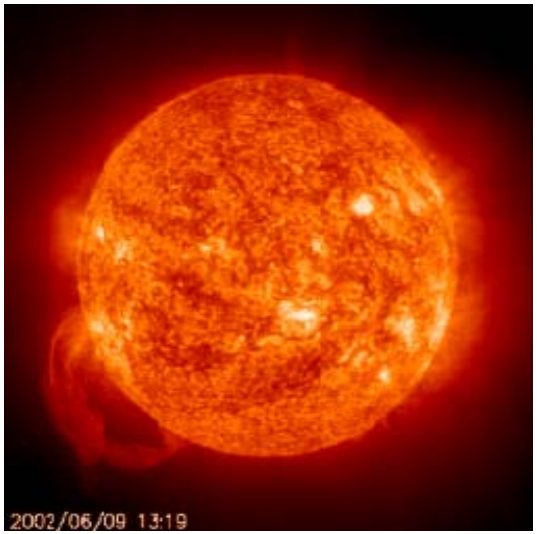
Lessons about Solar Radiation

The Warmth of the Sun:
Students in grades K-2 are introduced to the Sun's role in warming Earth's land, air, and water.

Our Super Star:
Students in grades K-5 learn about the Sun and create solar ovens to cook s'mores.

Using Thermometers:
Students in grades K-2 learn to use thermometers to measure temperature. Pair with *The Warmth of the Sun*.



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Absorption and Reflection: Light and Dark Colors

What Color Absorbs the Sun's Energy Best?

Students in grades K-2 place ice cubes on different colors of construction paper, set them in the sun, and see which ice cubes melt fastest.

Investigating Radiation

Students in grades 3-5 investigate how different surfaces (light and dark colored soil, water) absorb heat.

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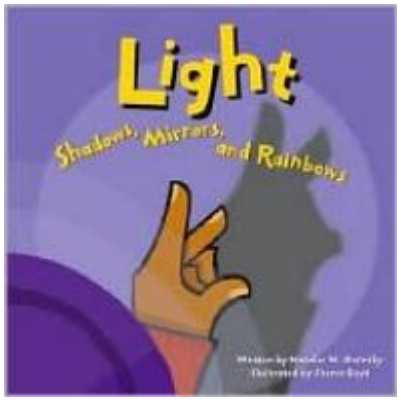
Poll Question

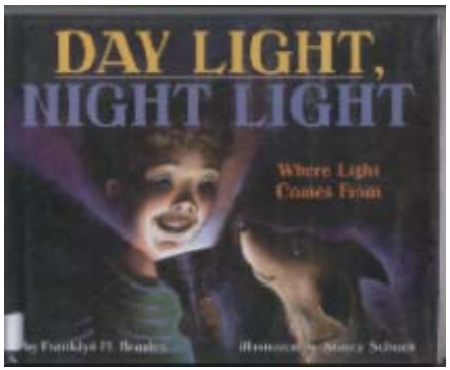
How do you integrate science and literacy?

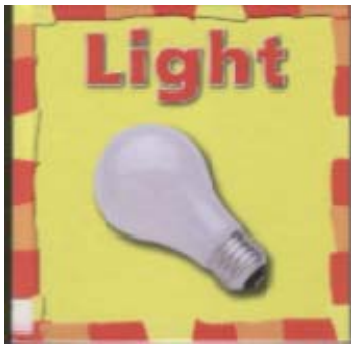
A. I introduce concepts with picture books
B. My students read from a textbook and answer questions.
C. My students use science notebooks.
D. I teach reading strategies while reading science text.
E. I don't integrate science and literacy.

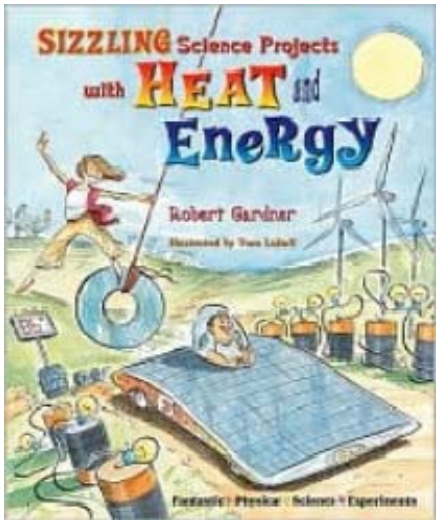
Integrating Literacy

Content area reading: Virtual Bookshelf









Question-and-Answer books
- Gather information from nonfiction text and the Internet
- Organize with KWL charts, and create a book.

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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

Now paired with a nonfiction reading strategy each month

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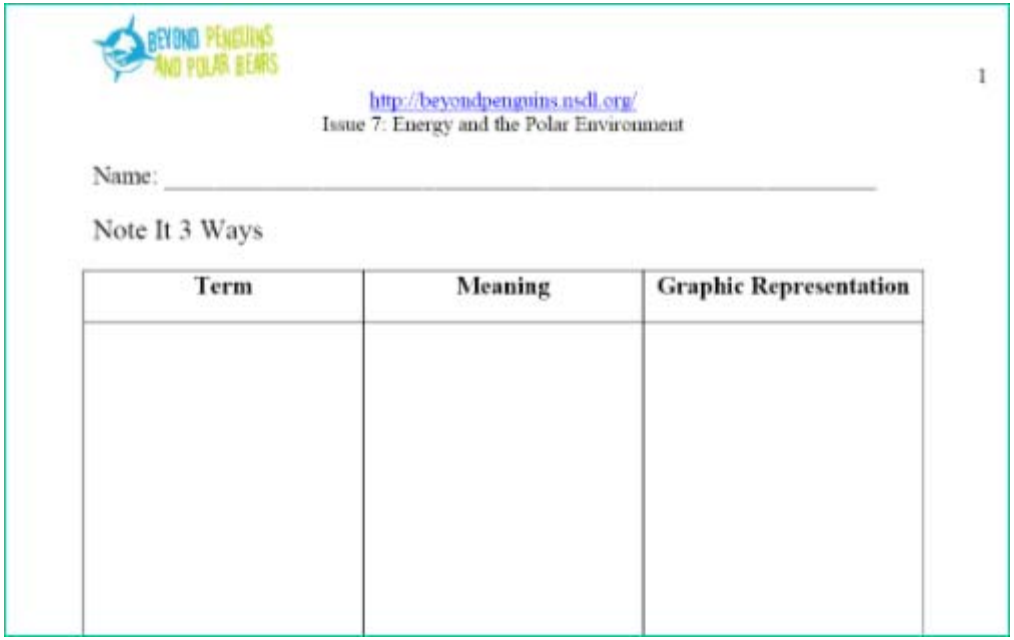
Literacy Strategy: Note Taking

Teach students to take notes by recording key words, paraphrased definitions, and by creating graphic representations of information.

Template specifically designed for use with nonfiction stories for students



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http://beyondpenguins.nsdl.org/
Issue 7: Energy and the Polar Environment

Name: _____

Note It 3 Ways

Term	Meaning	Graphic Representation

Content knowledge article available

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Beyond Penguins Web Seminar Series:
Next seminar: Spring 2009

Beyond Penguins and Polar Bears Blog
http://expertvoices.nsdl.org/polar/2008/11/13/web-seminar-energy-and-the-polar-environment/

Beyond Penguins and Polar Bears, October 2008, Issue 7
http://beyondpenguins.nsdl.org

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- 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

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- *AAAS: Intro to the Atlas of Science Literacy*

November 18, 2008

- *FDA: Teach Science Concepts and Inquiry with Food*

December 2, 2008

- *NSDL: Chemistry Comes Alive III: Water*

December 9, 2008

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Click on the URL located on the Chat Window