



NSDL/NSTA Web Seminar
**Beyond Penguins and Polar Bears:
Energy and the Polar Environment**



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:

Illuminate Support,

1-866-388-8674 (Option 2)

Jeff Layman
Tech Support
NSTA

jlayman@nsta.org
703-312-9384

Screenshot

The screenshot displays the Edlluminate Live web seminar interface. The main window is titled "Whiteboard - Main Room (Scaled 105%)". The whiteboard content features the NSTA logo in blue and red, followed by the text "WEB SEMINARS" in large red letters, and "LIVE INTERACTIVE LEARNING @ YOUR DESKTOP" in black. A mouse cursor is positioned to the right of the text. The interface includes a "Participants" list on the left showing "Flavio Mendez (Moderator)" and "Leia Fitzwilliam (Me)". Below the list is a "Chat" window with a message from the moderator: "Joined on August 24, 2007 at 4:14 PM. Moderator: This is the chat window." The bottom of the interface shows audio controls for "Microphone" and "Speaker". The status bar at the bottom right indicates "In session for 4 minutes."

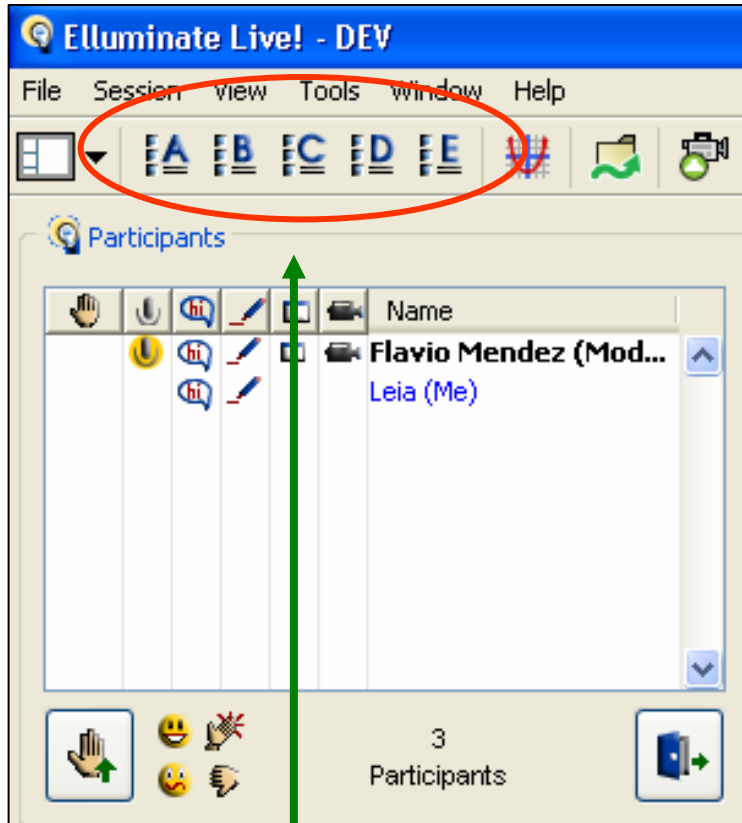


We would like to know more about you...





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 NSTA web seminar

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



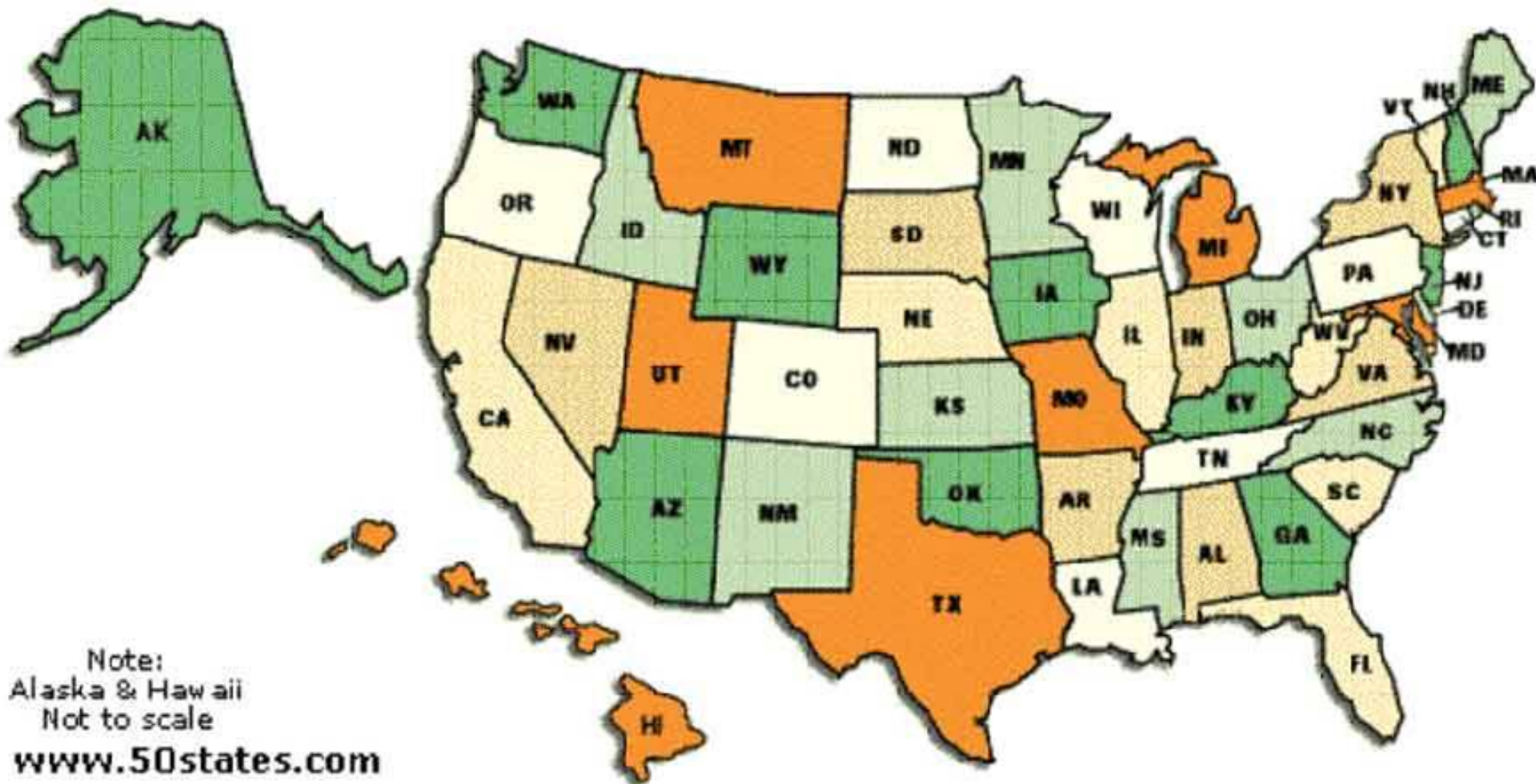
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have you attended?



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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:
Energy and the Polar Environment



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



<http://beyondpenguins.nsd.org>




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




 **BEYOND PENGUINS
AND POLAR BEARS**
an online magazine for k-5 teachers

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**ENERGY AND THE POLAR ENVIRONMENT - ISSUE 7,
OCTOBER 2008**

In this issue's Science and Literacy department, we discuss the Sun's role in warming Earth, the albedo (reflectivity) of Earth's diverse surfaces, and how the decline of Arctic sea ice is affecting Earth's energy balance. Science lessons introduce the concepts of solar energy, reflection, and absorption to elementary students. In our Across the Curriculum department, we focus on another common concept: natural resources. We provide an overview of the natural resources and energy sources found in the polar regions. Lessons allow students to develop the concepts of natural resources, energy sources, and energy efficiency.

Photo: A polar bear in Churchill, Manitoba, at sunset. Copyright Greg W. Lasley, www.greglasley.net.

<http://beyondpenguins.nsd.org>

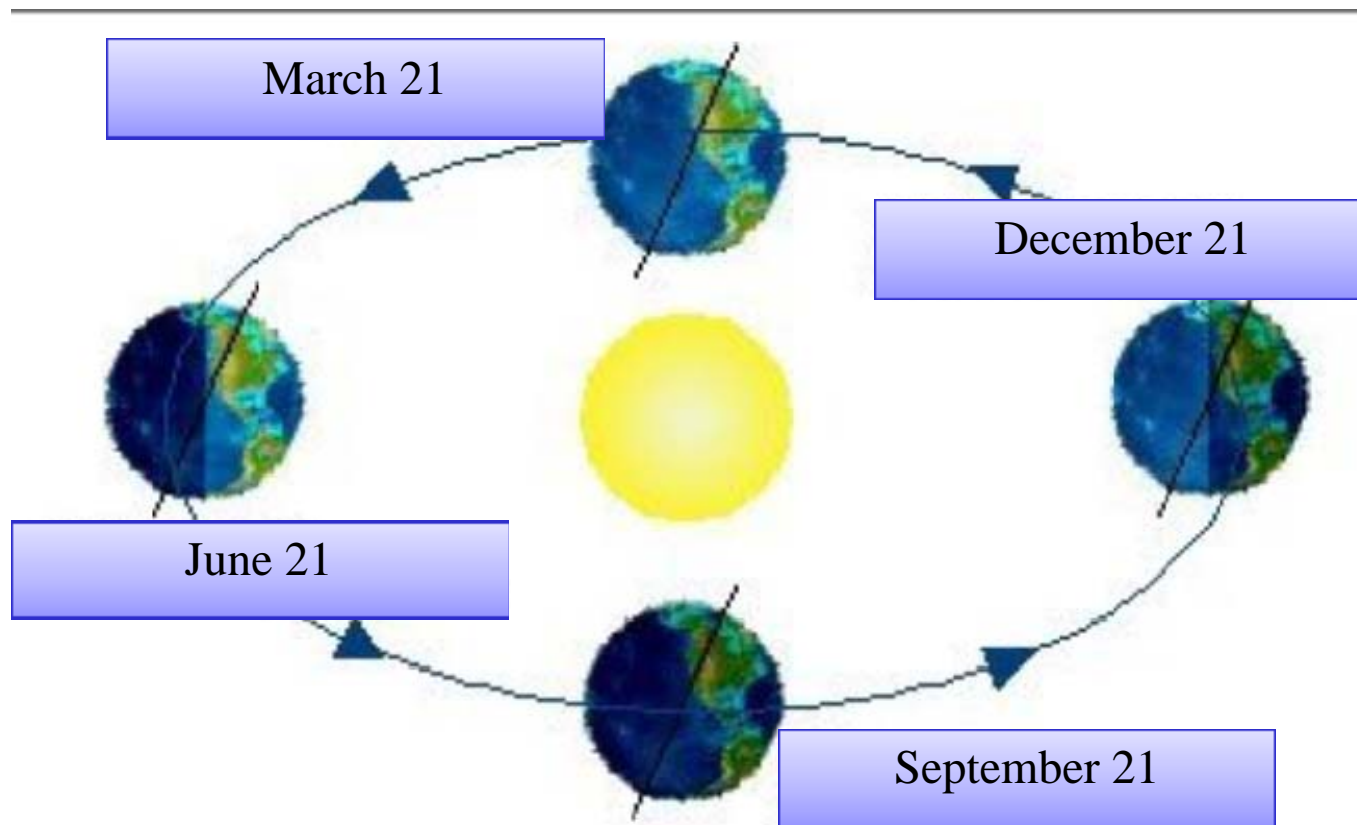


<http://nsdl.org>



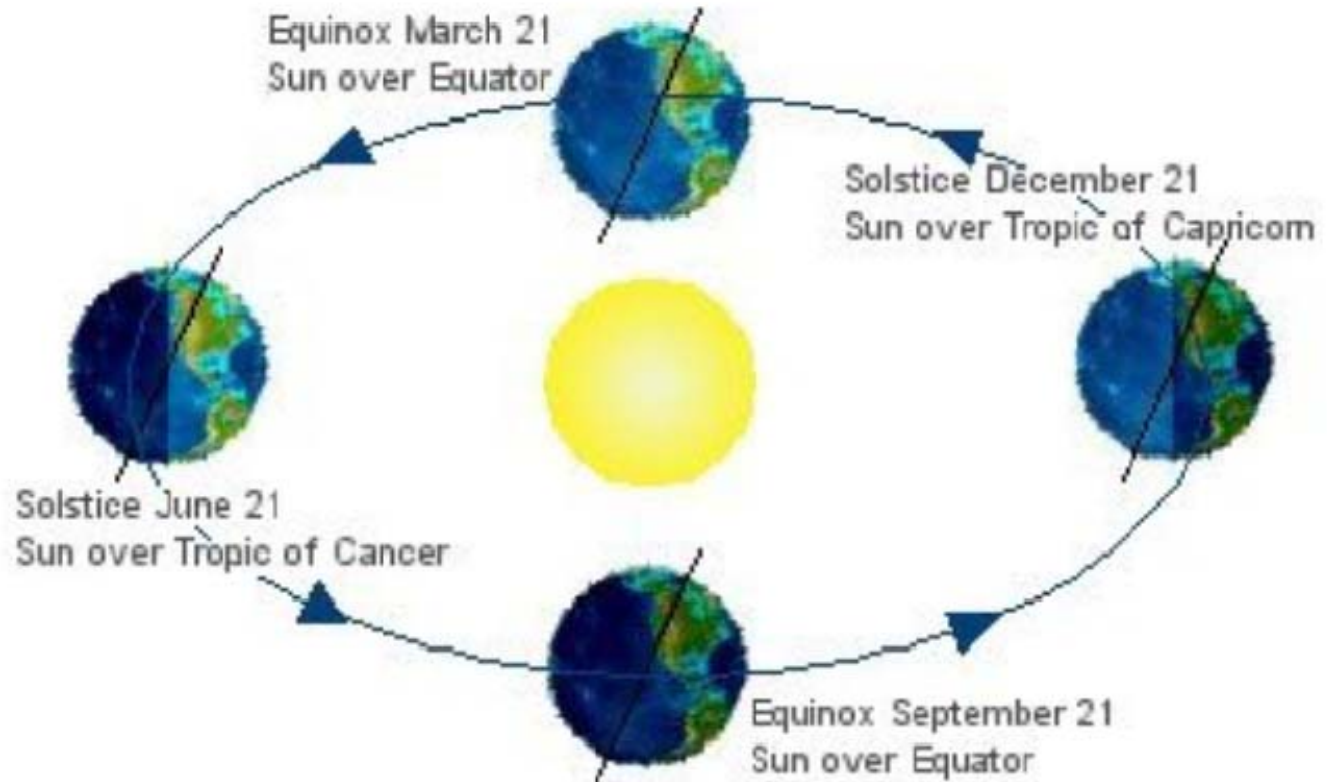


Earth's seasons: Stamp on the diagram where the Sun is overhead on the Equator





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

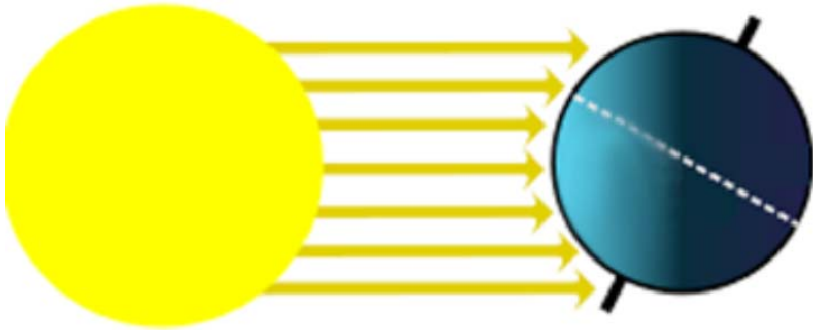
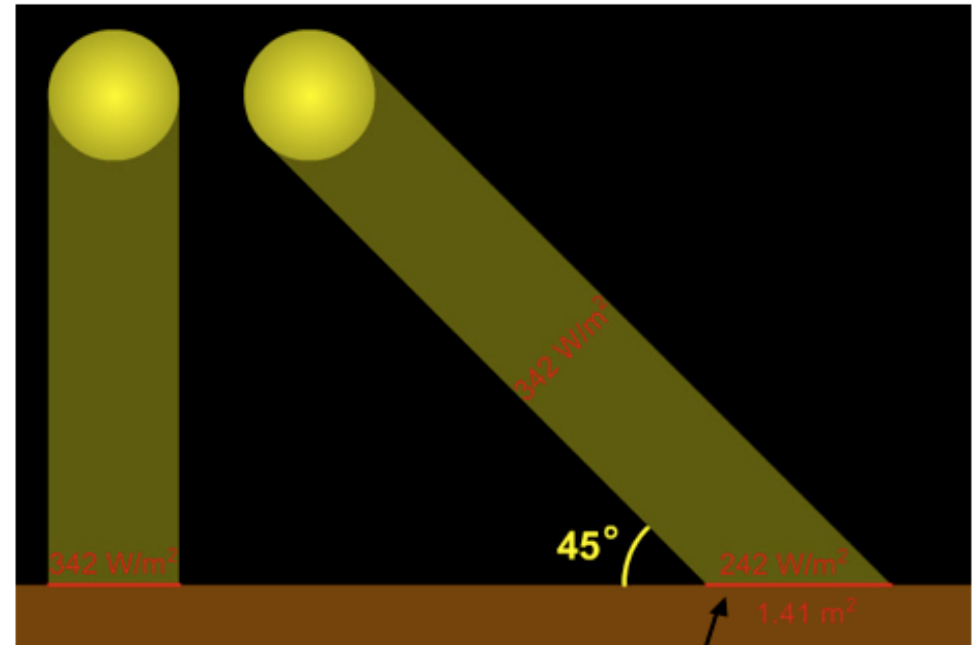


Image adapted from Wikipedia



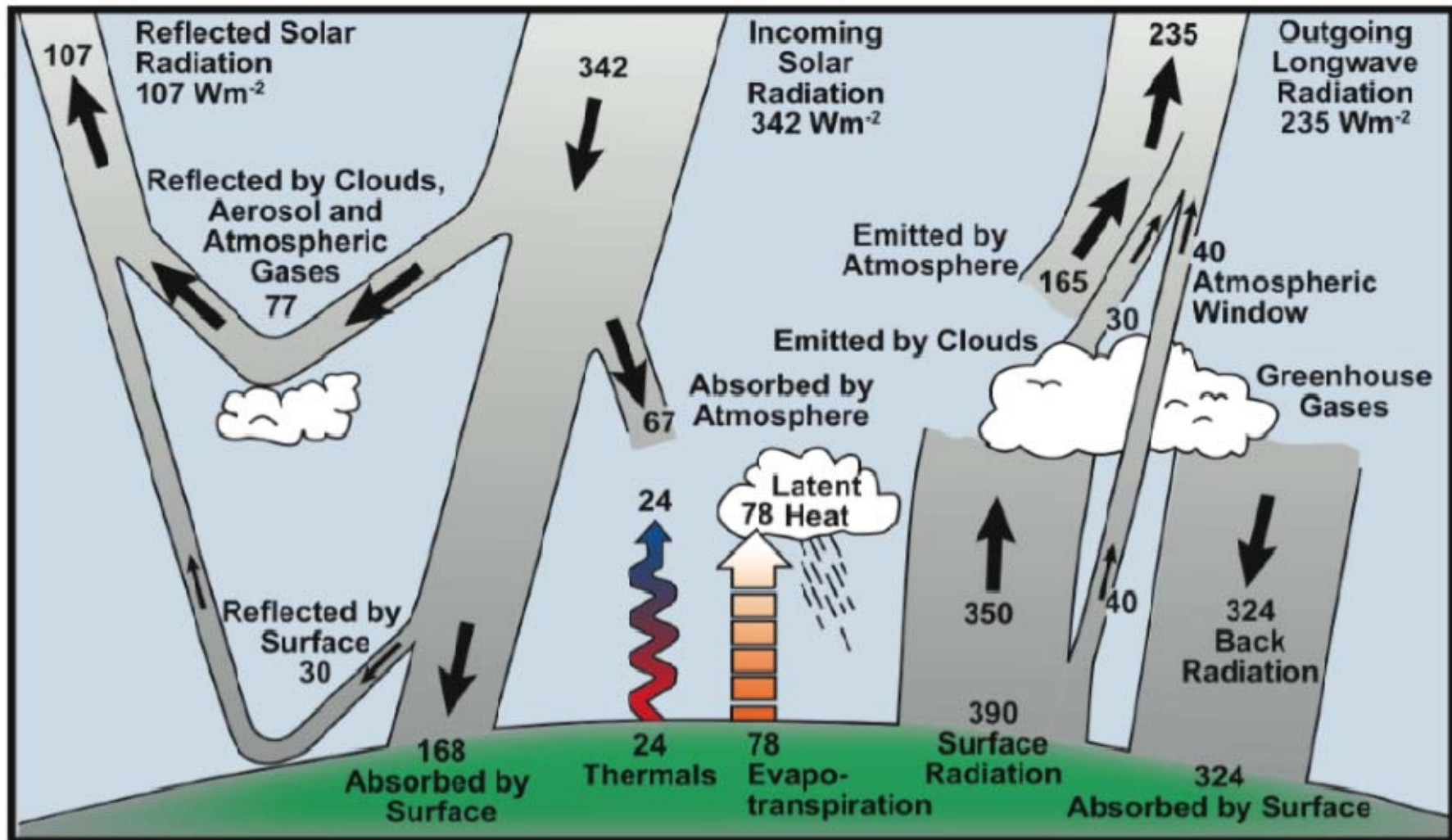
Same Amount of Energy, Larger Area

Most direct rays = most intense energy per unit of area

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



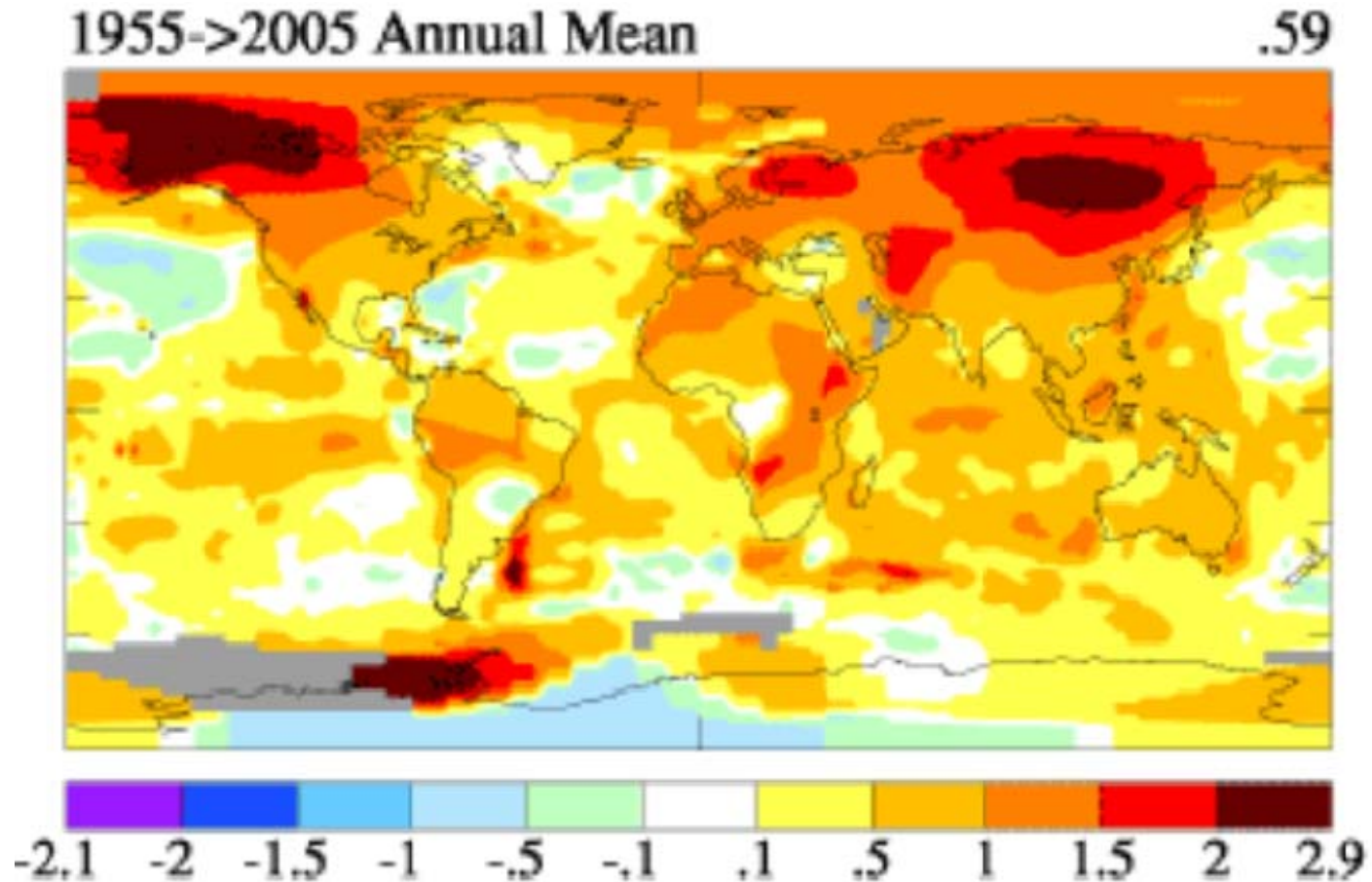
Earth's Energy Balance (the global picture)



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

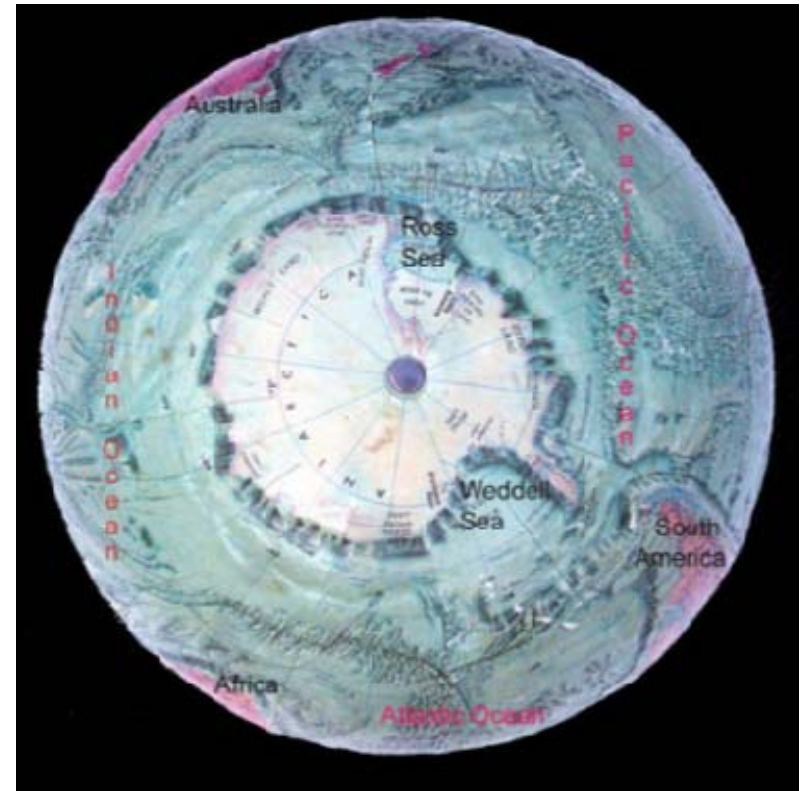
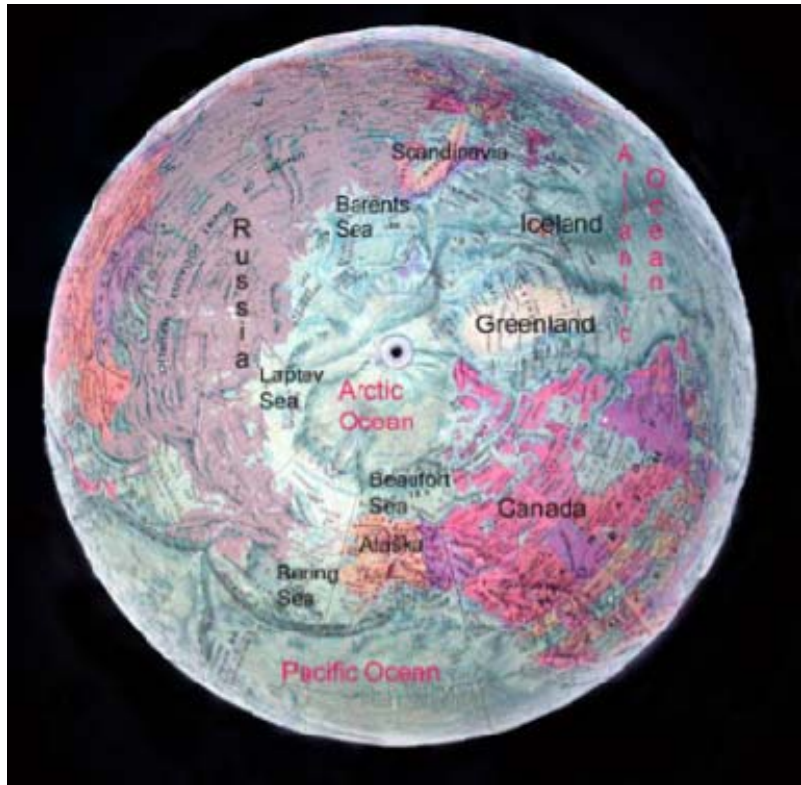


Image from: <http://www.marinebio.net/marinescience/01intro/woocan.htm>



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



<http://svs.gsfc.nasa.gov>



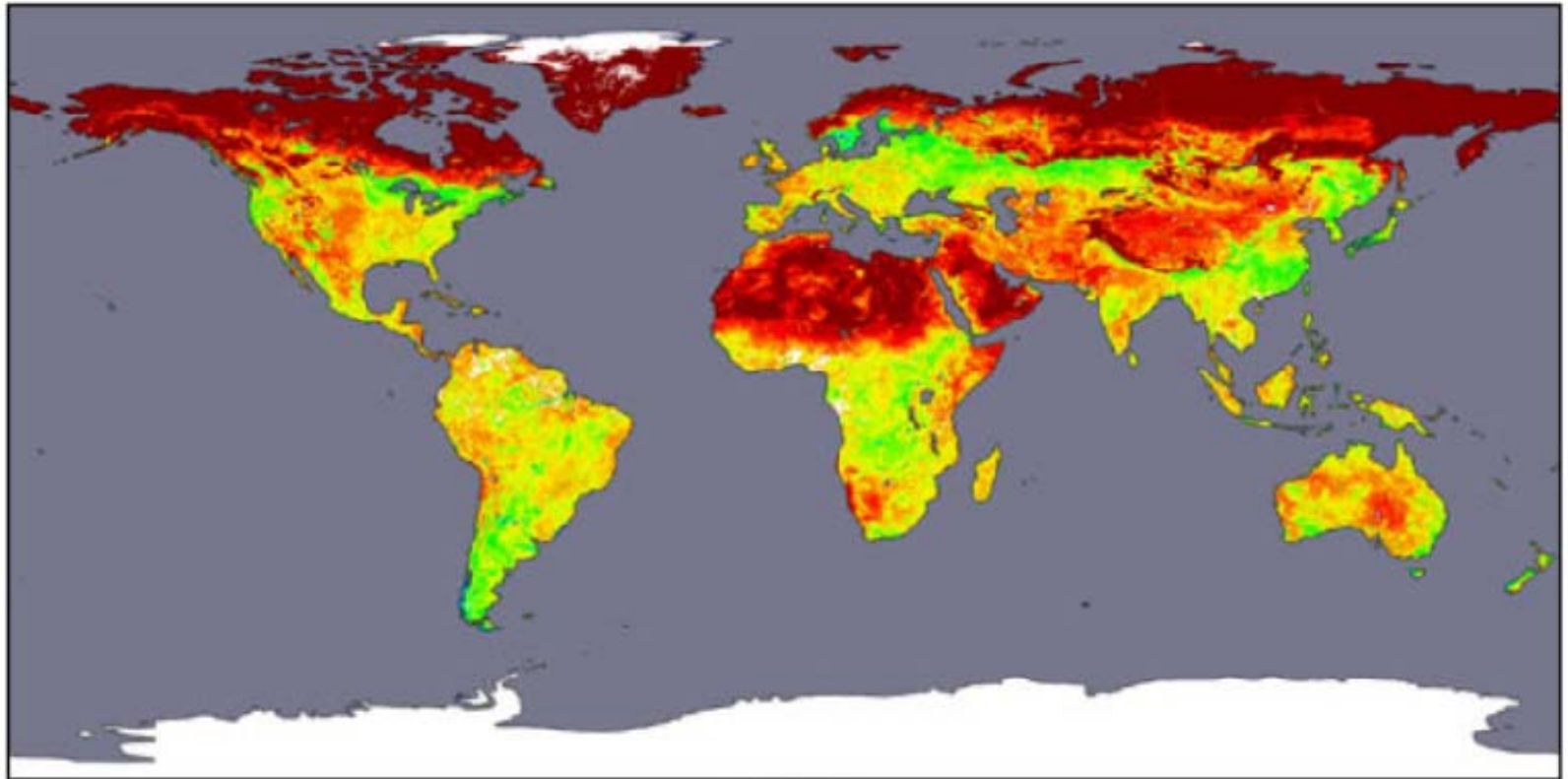
<http://nsdl.org>



<http://beyondpenguins.nsdl.org>



Reflectivity of different surfaces



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



Lowered albedo in the Arctic- a positive feedback to climate

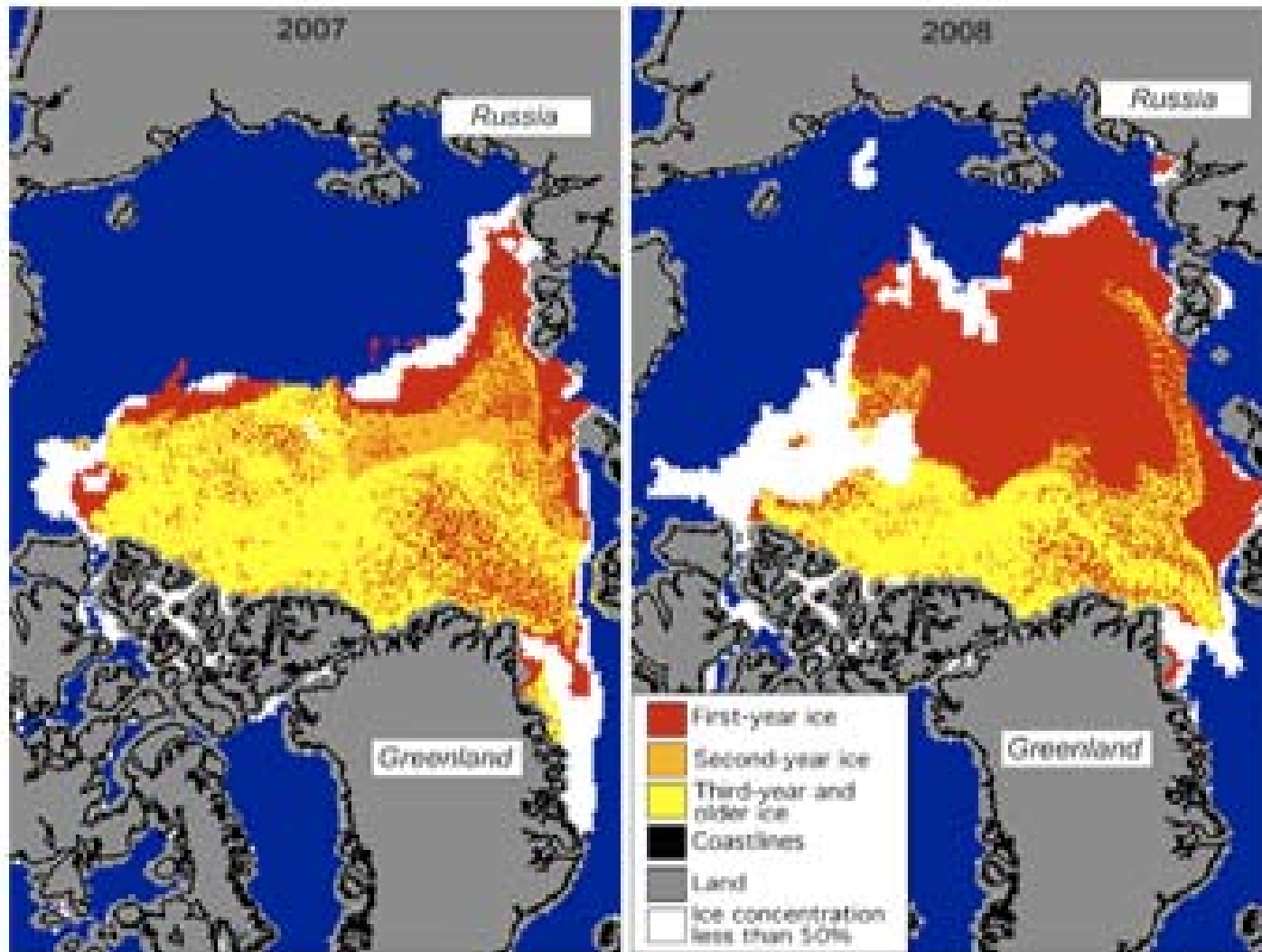


From: <http://svs.gsfc.nasa.gov/goto?10021>

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



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



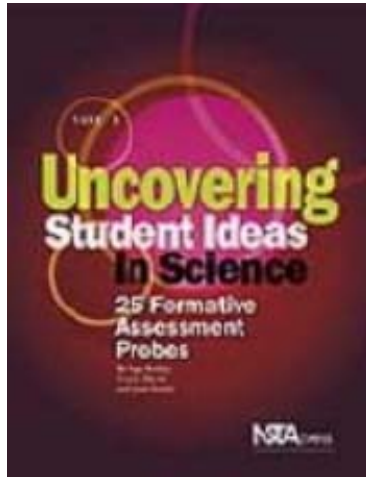
Only shiny objects reflect light.

True

False

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.



<http://nsdl.org>



<http://beyondpenguins.nsd.org>



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.



 **BEYOND PENGUINS AND POLAR BEARS**
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.




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

Instead of expecting conceptual change:



www.psympress.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*."



nasa.gov

Be mindful of your language and explanations

Lessons about Solar Radiation



The Warmth of the Sun:

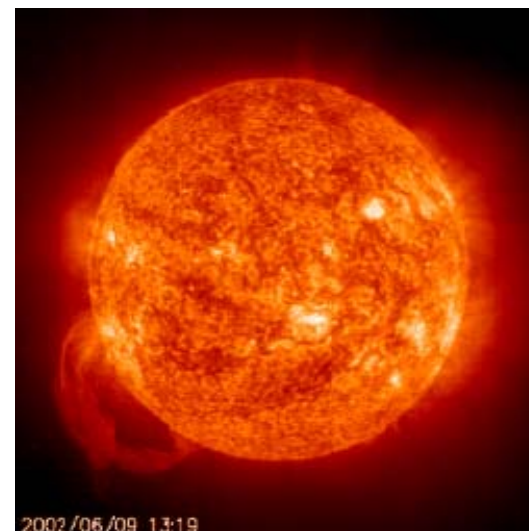
Students in grades K-2 are introduced to the Sun's role in warming Earth's land, air, and water.

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.



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.



<http://nsdl.org>



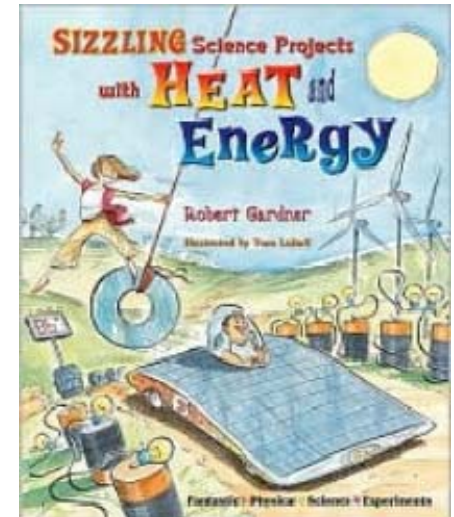
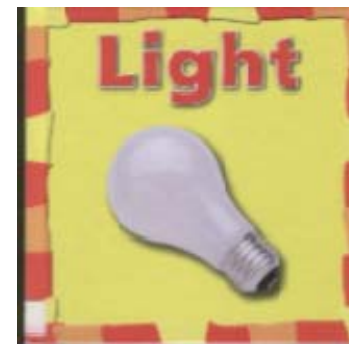
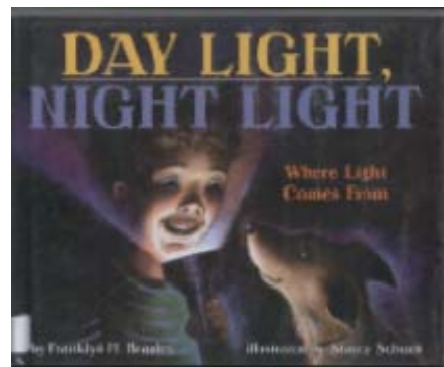
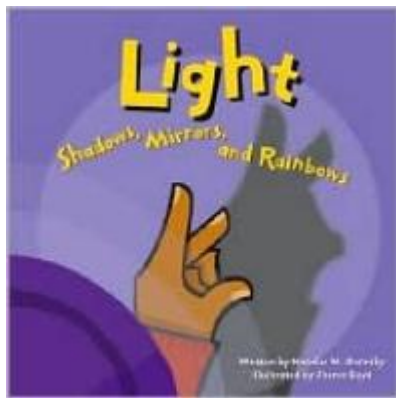
<http://beyondpenguins.nsdl.org>



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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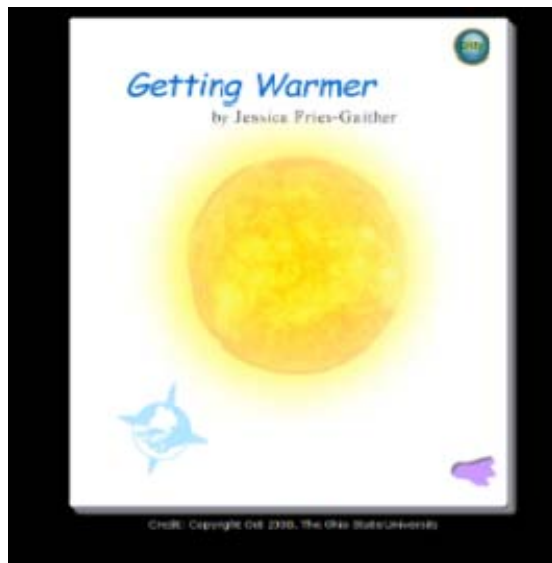
Nonfiction stories for students



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

Content knowledge article available

The screenshot shows a page from a resource titled "BEYOND PENGUINS AND POLAR BEARS". It includes the URL <http://beyondpenguins.nsd.org/> and the issue title "Issue 7: Energy and the Polar Environment". Below this is a line for "Name: _____" and the heading "Note It 3 Ways". A table with three columns is provided: "Term", "Meaning", and "Graphic Representation". The table has one empty row for data entry.

Term	Meaning	Graphic Representation



Interested in learning more?



Beyond Penguins Web Seminar Series:
Next seminar: Spring 2009



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



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



<http://nsdl.org>



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>



<http://nsdl.org>





<http://www.elluminate.com>



Welcome to Your Professional Development

The Learning Center is NSTA's e-professional development portal to help you address your classroom needs and busy schedule. You can gain access to more than 2,600 different resources that cater to your preference for learning. Over 700 hundred resources, such as journal articles, science objects and web seminars are available **for free**. A suite of practical tools such as My Library, My Transcript, and My Professional Development Plan and Portfolio tool help you organize, personalize, and document your growth over time.



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- [Life Science](#)
- [Physical Science](#)

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- [Middle School](#)
- [High School](#)
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By State Standards

Many resources now permit you to select your grade, standard document, and state to view the standards that align to the resource you've selected.

Do-It-Yourself Learning

Learn at your own pace online with these 1-2 or 6-10 hour interactive activities.

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Learn online from certified instructors with your colleagues. 1-2 hour seminars, week and month long courses are available. Earn state and university credit.

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- [Books](#)
- [Book Chapters](#)

In Person Experiences

Attend an NSTA workshop in person to learn hands-on techniques with other teachers. Earn state and university credit.

Multimedia Overview

[View Overview of the NSTA Learning Center](#)

Flash Player Required

Free Learning Resources



[Plate Tectonics: Layered Earth](#)

2 hr
Do-It-Yourself
Science Object

Science OBJECTS



[Oceans Effect on Climate and Weather: Global](#)

<http://learningcenter.nsta.org>



- *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

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





Web Seminar Evaluation:

Click on the URL located on the
Chat Window