

IPY/NSTA Symposium: The Fragile Ice Friday, March 30, 2007

8:00 AM – 8:25 AM

Welcome, Introductions, Goals for the Symposium

Al Byers, Assistant Executive Director of Government Partnerships and e-Learning, NSTA
Flavio Mendez, Symposia and Web Seminars Program Manager, NSTA

- About NSTA Symposia
- Agenda/Goals
- Forms/Logistics/Introductions

Dr. Mary Albert, Senior Research Engineer, U.S. Army Cold Regions Research and Engineering Lab

Dr. Don Perovich, Research Geophysicist, U.S. Army Cold Regions Research and Engineering Lab

Brian Campbell, Hydrospheric/Cryospheric Science and Education Specialist, NASA Goddard Space Flight Center

Sandy Shutey, Science Teacher, Butte High School in Butte, Montana

8:25 AM – 9:05 AM

Climate Detectives: Clues to the Past from Glaciers and Ice Sheets

Dr. Mary Albert

Learning Outcomes:

After participating in the presentation,

- Participants will explain what glaciers and ice sheets are, and locate Earth's two ice sheets on a globe.
- Participants will explain how snow accumulation over long times creates a climate record.
- Participants will describe at least 2 different ways that evidence found in an ice core can be used to infer important indicators of recent and past climate.

9:05 AM – 10:05 AM

Activity 1: Ice Cores: the Detective's Magnifying Glass

Sandy Shutey and Dr. Mary Albert

Learning Outcomes:

After participating in the activity,

- Participants will demonstrate how to model snow accumulation to build a record of the environment.
- Participants will demonstrate how to retrieve an ice core from their model.
- Participants will describe how to analyze evidence in the core and explain what they found.
- Participants will describe how to access real ice core data to make their own graphs.

10:05 AM – 10:20 AM

Break

10:20 AM – 11:00 AM

A Frozen Ocean in a Changing Climate

Dr. Don Perovich

Learning Outcomes:

After participating in the presentation,

- Participants will describe key features of the Arctic sea ice cover.
- Participants will describe the albedo and the ice-albedo feedback.
- Participants will explain how sea ice is an indicator and potential amplifier of climate change.

11:00 AM – 12:00 PM

Activity 2: Floating Ice Vs. Land Ice

Brian Campbell and Dr. Don Perovich

Learning Outcomes:

After participating in the activity,

- Participants will state the difference between melting rates of floating ice and land ice.
- Participants will describe how sea level rise is affected by melting land ice and melting floating ice.
- Participants will decide how activity results can be used to predict changes in ice levels in the Arctic and Antarctic.
- Participants will describe how performing simple measurements can lead to understanding the complex polar regions.

12:00 PM – 12:10 PM

The International Polar Year 2007-8: How Teachers and Students Can Become Involved

Dr. Mary Albert

Learning Outcomes:

After participating in the presentation,

- Participants will describe the goals of the International Polar Year (IPY) program.
- Participants will identify how they can involve their classes in IPY activities.

12:10 PM – 12:30 PM

Final Words

- Post-assessment form
- Evaluation form/Survey/Credit info
- NSTA Web Seminars
- Raffle of door prizes

National Science Education Standards Addressed: Content Standards, 5-8

Content Standard A:

Abilities Necessary to do Scientific Inquiry

- Develop descriptions, explanations, predictions and models using evidence.

Understanding about Scientific Inquiry

- Different kinds of questions suggest different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models.

Content Standard B:

Physical Science

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

- Properties and Changes of Properties in Matter
 - A substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties.
- Transfer of Energy
 - Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.
 - The Sun is a major source of energy for changes on the Earth's surface. The Sun loses energy by emitting light. A tiny fraction of that light reaches the Earth, transferring energy from the Sun to the Earth. The Sun's energy arrives as light with a range of wavelengths, consisting of visible light, infrared, and ultraviolet radiation.

Content Standard D:

Earth and Space Science

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

- Structure of the Earth System
 - Water, which covers the majority of the earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle." Water evaporates from the earth's surface, rises and cools as it moves to higher elevations, condenses as rain or snow, and falls to the surface where it collects in lakes.
 - Clouds, formed by the condensation of water vapor, affect weather and climate.
 - Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the oceans holds a large amount of heat.
- Earth's History
 - Fossils provide important evidence of how life and environmental conditions have changed.

**Content Standard E:
Science and Technology**

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

- Abilities of Technological Design
 - Design a Solution or Product. Students should make and compare different proposals in the light of the criteria they have selected. They must consider constraints—such as cost, time, trade offs, and materials needed—and communicate ideas with drawings and simple models.
 - Implement a Proposed Design. Students should organize materials and other resources, plan their work, make good use of group collaboration where appropriate, choose suitable tools and techniques, and work with appropriate measurement methods to ensure adequate accuracy.

**Content Standard F:
Science in Personal and Social Perspectives**

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

- Personal Health
 - Natural environments may contain substances that are harmful to human beings. Maintaining environmental health involves establishing or monitoring quality standards related to use of soil, water, and air.
- Populations, Resources, and Environments
 - Causes of environmental degradation vary from region to region and from country to country.
- Science and Technology in Society
 - Science influences society through its knowledge and world view. Scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment. The effect of science on society is neither entirely beneficial nor entirely detrimental.

**Content Standard G:
History and Nature of Science**

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

- Science as a Human Endeavor
 - Women and men of various social and ethnic backgrounds--and with diverse interests, talents, qualities, and motivations--engage in the activities of science, engineering, and related fields such as the health professions. Some scientists work in teams, and some work alone, but all communicate extensively with others.