

Details



Completion Time: More than a week

Permission: Download, Share, and Remix

Chill Out-All About Ice in the Bering Sea

Overview

Through activities, video observation, experimentation and the construction of a Remotely Operated Vehicle (ROV) students will learn about the chemical and physical properties of sea ice.

Objectives

Students will be able to answer main questions of where sea ice is, how it is formed, why the ice is important, how it is classified by indigenous people and scientists, how scientists study ice and what they learn from it, and how changes in the Bering Sea ice affect us.

Lesson Preparation

Background information:

http://nsidc.org/arcticseaicenews/2008_faq.html

<http://seaice.alaska.edu/gi/links>

http://www.arcus.org/search/seaiceoutlook/outreach/education_resources.php

<http://nsidc.org/arcticsea>

Procedure

- Describe the steps needed to complete the lesson. Can use 5 E Model or other model.
- Watch video at <http://vimeo.com/12092651>
- Students will make a Local Knowledge Chart (like a KWL chart) about the importance and uses to Bering Sea/ Arctic communities who live in the ice areas.
- Discuss snow vs. ice and ways that ice is created. Low temperature freezes water, pressure exerted on snow compresses it.
- Pull up a map on the Smart Board, have 4-5 students use the blue marker to outline where they think the extent of summer sea ice in the Arctic is, then switch to green marker and have another 4-5 students outline where they think the winter ice typically grows to.
- Use link <http://www.youtube.com/watch?v=Sc-aS0r->

Materials

- Computer with Internet access and video projector
- Butcher paper and markers for chart
- Smart Board OR Map of Alaska (or Transparency of map of Alaska)
- water samples
- ice classification photos
- Materials to make a ROV (either from Sea Perch or MATE site) (see Resources section)

wZNI to show the extent of sea ice over time.

- Sea Ice Classification- Have students use indigenous taxonomy chart to identify sea ice: http://www.gi.alaska.edu/~eicken/he_teach/GEOS615icenom/tek/intro.htm (Inuit Classification)
- Have students use scientific chart to classify ice: http://www.arcticclimatemodeling.org/subject_sea_ice_dynamics.html
- Hawaiian (Rain)-Maggie will use rain to identify words that Hawaiians use to classify the different kinds of rain.
- How are the indigenous taxonomy and scientific taxonomy of ice the same? Different?
- Ice assessment-Compare and contrast an indigenous way of identifying ice with a scientific way of identifying ice
- How Science is done. Using a ROV that is student made, students will make regular sampling of ice/water.
- ROV assessment-Build, modify, and create a protocol for a ROV to collect ice/ocean water. See resources section for ROV information.
- Link to ice core layering activity <http://www.polartrec.com/resources/lesson/ice-cores-modeling-ice-sheets>
- Obtain a water sample and use a refractometer and other scientific tools to find salinity, pH, temperature, turbidity, and dissolved oxygen. Use accepted scientific protocols. Post data on database of project for shared use by participating schools. Use inquiry to develop hypotheses, and to analyze data over time.
- Scientific methodology assessment- Sample and analyze ocean water/ice at a site and contribute the data to a database that is accessible by schools participating in Chill Out Cultural and Scientific Learning Experience.

Resources

Materials to make a ROV either from Sea Perch (<http://seaperch.mit.edu/>) or MATE (http://www.marinetech.org/rov_competition/index.php) websites.

Extension

This lesson is meant as a lesson in the chemical and physical properties of sea ice. The natural extension of this lesson would be to integrate the biology of living things. This is but one component of the Bering Sea ecosystem.

Credits

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National Science Education Standards (NSES)

Content Standards, Grades K-4

Content Standard A: Science As Inquiry

- a. Abilities necessary to do scientific inquiry
- b. Understandings about scientific inquiry

Content Standard B: Physical Science

- a. Properties of objects and materials

Content Standard E: Science and Technology

- a. Abilities of technological design
- b. Understandings about science and technology
- c. Abilities to distinguish between natural objects and objects made by humans

Content Standard F: Science In Personal and Social Perspectives

- b. Characteristics and changes in populations
- d. Changes in environments
- e. Science and technology in local challenges

Content Standard G: History and Nature of Science

- a. Science as a human endeavor

Content Standards, Grades 5-8

Content Standard A: Science As Inquiry

- a. Abilities necessary to do scientific inquiry
- b. Understandings about scientific inquiry

Content Standard B: Physical Science

- a. Properties and changes of properties in matter
- b. Motions and forces
- c. Transfer of energy

Content Standard C: Life Science

- d. Populations and ecosystems

Content Standard D: Earth and Space Science

- a. Structure of the earth system

Content Standard E: Science and Technology

- a. Abilities of technological design

- b. Understandings about science and technology

Content Standard F: Science In Personal and Social Perspectives

- b. Populations, resources, and environments
- e. Science and technology in society

Content Standards, Grades 9-12

Content Standard A: Science As Inquiry

- a. Abilities necessary to do scientific inquiry
- b. Understandings about scientific inquiry

Content Standard B: Physical Science

- b. Structure and properties of matter
- d. Motions and forces

Content Standard C: Life Science

- d. Interdependence of organisms
- e. Matter, energy, and organization in living systems

Content Standard D: Earth and Space Science

- b. Geochemical cycles

Content Standard E: Science and Technology

- a. Abilities of technological design
- b. Understandings about science and technology

Content Standard F: Science In Personal and Social Perspectives

- a. Personal and community health
- b. Population growth
- c. Natural resources
- d. Environmental quality
- f. Science and technology in local, national, and global challenges

Content Standard G: History and Nature of Science

- a. Science as a human endeavor
- b. Nature of scientific knowledge
- c. Historical perspectives