Measuring Ice & Ocean Albedo

materials

For each team:
- *1 picture of a glacier (see below)*
- *2 aquarium tape thermometers*
- *desk lamp*
- *timer*

background

Albedo is a measure of how much light energy is reflected off an object and how much is absorbed and turned into heat energy. A light colored or shiny object will reflect more light than a dull, dark colored object. (An ideal white body would register as 1.0 and black as 0) Albedo plays an important role in heating the earth. Land and water heat up more than snow and ice. The Polar regions count on a high albedo to keep their region cold. As more of the ice melts in global warming, more heat is absorbed by the ocean and the land mass of Greenland and Antarctica. This causes more melting of the ice sheets and sea ice and in science is called a positive feedback.

activity time:
20 minutes

directions

1. Check the thermometers for the same color reading on both. Warm the colder thermometer with finger pressure if they are not the same.
2. Place the picture of the glacier face up under the lamp.
3. Slide one thermometer face up under the glacier picture under the white ice.
4. Slide the other thermometer under the dark land area.
5. Set the timer for five minutes.
6. Turn on the lamp and wait for the timer to go off to read the thermometers.

discussion

- What were the temperature readings?
- Which one was the coolest?
- Why was one cooler than the other? (White reflects more of the light waves than the dark colored area. The absorption of the light waves increases the temperature.)
- When does this happen to you? (Summer shirts that are black are hot!)

vocabulary

Albedo - a measure of how much light energy is reflected off an object and how much is absorbed and turned into heat energy.

Reflect - to send back light, sound or heat to its point of origin (where it came from).

related activities

"The Albedo Effect"

alignment to national science standards

Unifying Concepts and Processes, Standards A, B, E, F, G

alignment to kansas science standards

Science as Inquiry: K-2: 1.1.1,1.1.3,1.1.4,1.1.5; 3-4: 1.1.1,1.1.3, 1.1.4; 5-7: 1.1.1,1.1.3,1.1.4, 1.3.1
Physical Science: K-2: 2.1.2, 2.1.3; 3-4: 2.1.2, 2.1.3, 2.1.4, 2.2.1; 5-7: 2.1.1, 2. 3.1, 2.4.1, 2.4.3
Earth Science: 3-4: 4.1.1; 5-7: 4.1.1, 4.1.2, 4.2.1
Science and Tech: 3-4: 5.2.3
History and Nature of Science: K-2: 7.1.1; 3-4: 7.1.1