

Global Precipitation Measurement Mission

Name: _____

Date: _____

Period: _____

Climate Change Inquiry Labs: Sea Ice and Temperature Lab Instructions

Even though sea ice occurs primarily in the polar regions, it influences our global climate. Sea ice has a bright surface, so much of the sunlight that strikes it is reflected back into space. As a result, areas covered by sea ice don't absorb much solar energy, so temperatures in the polar regions remain relatively cool. If gradually warming temperatures melt sea ice over time, fewer bright surfaces are available to reflect sunlight back into space, more solar energy is absorbed at the surface, and temperatures rise further. This chain of events starts a cycle of warming and melting. This cycle is temporarily halted when the dark days of the polar winter return, but it starts again in the following spring. Even a small increase in temperature can lead to greater warming over time, making the polar regions the most sensitive areas to climate change on Earth.

Text excerpted from: <http://nsidc.org/cryosphere/seaice/>

Objective: Students will investigate the effect of the simulated reduction of arctic sea ice on ocean temperatures.

Hypothesis: I think that a container simulating **less** arctic sea ice will have a water temperature _____ compared to a container with **more** simulated sea ice.
(higher, lower or the same)

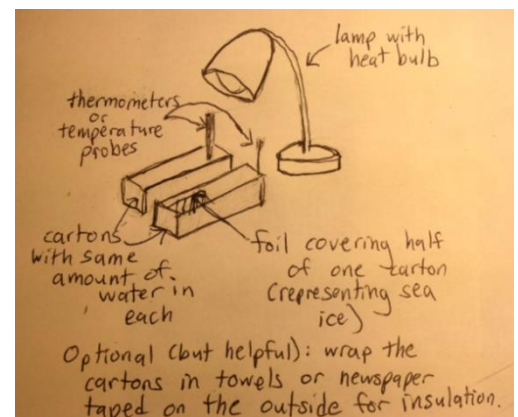
I think the difference between the temperatures will be _____ degrees.

Materials

- flat containers (two) - plastic bins, cut open cardboard cartons, or something similar
- thermometers or temperature probes (2) • tape • towels for insulation (optional, but helpful)
- heat lamp and bulb • graduated cylinder or measuring cup and water
- aluminum foil (to represent sea ice)

Procedure

1. Set up the experiment as shown in the diagram at right. Make sure you use the same amount of water in each container, and that you place the lamp equally between the two containers.
2. Record the starting temperatures for the two containers. Turn on the heat lamp. NOTE: The bulb and lampshade may get quite hot, so use caution.
3. Record the temperature of the water in each container after about 30 minutes.



→ While you're waiting, complete the questions on the back of the paper.

developed by the



Global Precipitation Measurement Mission

GPM.NASA.GOV / EDUCATION

TWITTER.COM / NASA_RAIN

FACEBOOK.COM / NASA.RAIN

	Starting temperature	After _____ minutes	Change in temperature
No sea ice			
Half sea ice (simulated by aluminum foil)			

After the experiment: Was your hypothesis supported by the data? _____

Explain why this might be the case. _____

→ While you're waiting, visit <http://nsidc.org/cryosphere/seaice/index.html> to learn more about sea ice.

How is sea ice different from other types of ice? Name some of those other forms of ice. _____

How does sea ice affect the movement of ocean waters? _____

How does the salt in ocean water affect the way it freezes? _____

Can you drink melted sea ice? Why or why not? _____

→ Continue reading about the characteristics and formation of sea ice from the National Snow and Ice Data Center, or visit the links below until the experiment is complete.

Life at the Edge: An interactive map showing the extent of sea ice in the Arctic Ocean in 2000, and its predicted extent in 2050 and 2100. Also has snapshots of the animals that are affected as the ice melts. <http://ngm.nationalgeographic.com/2007/06/vanishing-sea-ice/sea-ice-interactive>

Inuit siku (sea ice) Atlas: Learn what the native people of Canada call different parts of the sea ice, and what they know about the importance of sea ice and the changes that are occurring. http://sikuatlas.ca/sea_ice.html