

Sea Ice, Glaciers and Sea Level Rise

Background:

There is scientific consensus that global climate is changing, and that our poles (both north and south) are warming. This warming is having an affect on all that snow and ice. While both sea ice and glaciers are melting at increasingly rapid rates, melting sea ice will not have much (if any) affect on sea levels. Glaciers, on the other hand, can significantly influence global sea levels. This is because sea ice is already floating in the ocean, and thus will not add any more volume to the seas when they melt. Glaciers are located on land, and have not yet added their bulk to the ocean. This activity will explore how melting ice can impact sea level.

Objectives:

In this lesson, students will:

1. Observe that glacier melt will cause sea levels to rise and that sea ice will not cause a rise in sea levels when they melt.
2. Learn that ice is less dense than water.
3. Learn that ice displaces water equal to the mass of the ice.

Vocabulary:

Global climate change
Greenhouse gases
Density
Displacement
Climate
Thermal Expansion

Materials (per group):

2 clear cups
2 ice cubes of similar size
water
2 popsicle sticks
marker

Procedures:

1. Place one ice cube in one cup. Leave the other cup empty for the moment.
2. Fill both cups with water until the water level is even in both. One cup will have an ice cube in it, while the other will just have water.
3. Set both popsicle sticks over the cup without an ice cube. Set them far enough apart so that they are not touching, but that you can still rest the second ice cube on top of them.
4. Set the second ice cube on top of the popsicle sticks.
5. Wait for both ice cubes to melt.
6. Measure the water level after both ice cubes have melted.

The initial lesson is pretty structured. There is no room for inquiry or critical thinking. In the following exercise, please think of two modifications to this lesson plan. In one of the modifications, think about how this lesson can have some of the scaffolding removed so that it can be more inquiry-based, yet isn't a free-for-all for those students who may not be ready for that. In your second modification, please think about how this initial lesson plan can be completely inquiry with no scaffolding.

Some Inquiry, Some Scaffolding

All Inquiry, No Scaffolding