



# Ice and Sea Level Change

## materials

- Plastic cups - 1 per group
- Ice cubes - 2 per group
- Ice Sheets-thin sheet of ice made in baggie or Tupperware
- Rulers - 1 for each group
- Markers - 1 for each group
- Small pitchers of warm water
- Aquarium with colored water
- Large plastic cup upside down for ice sheet to rest on

There are two kinds of ice in the Polar Regions, sea ice and land ice. Sea ice forms from ocean water and is about 1 meter thick after a cold winter. Some of the sea ice melts each summer. Land ice forms on land from precipitation that falls and accumulates on the ground. Layers of snow build up, causing pressure on the snow crystals beneath and the air is pushed out. Eventually the snow is compacted into layers of ice. This ice becomes a glacier that acts like a river, flowing downhill. Once the glaciers meet the ocean, they break off and become floating icebergs. This activity helps students understand which ice is causing the sea level to rise.



## directions

1. Using a globe, show Antarctica (91% of world's ice) and Greenland (8% of world's ice).
2. Explain that ice sheets can be as much as 2 miles thick (give example of how far that is from school).
3. Set up aquarium or container with the ice sheet resting on the upside down cup.
4. Partially fill container with colored water and mark the sea level with marker.
5. Place the lamp over the ice sheet in container and turn it on.
6. Ask what will happen to the level of water as the ice melts?
7. Ask for prediction about the aquarium's sea level.

activity time:  
**45 minutes**

## Student Activity

*Which causes sea level rise, melting land ice or melting sea ice?*

1. Ask each pair of students to mark a 4 centimeter line on their cup.
2. Tell students pour warm water to that line, checking their accuracy at eye level.
3. Announce that an ice sheet has calved (broken off a chunk).
4. Ask for hypothesis for "What will happen to your sea level if you add an iceberg?"
5. Ask each pair to put an ice cube in their glass and mark the new level.
6. Let ice melt in cup. Report changes in sea level in their cups.
7. Check the demonstration aquarium for sea level changes.



## discussion

- Why did the sea level change in the glass?
- Why did the sea level change in the aquarium?
- Why did the sea level not change once the ice melted in the glass? (The ice already took up the space in the water. When it melted, it just filled in that space which is called displacement.)



## extension

Students can measure their sea level differences and record them as a class for an average sea level rise. This information could be graphed as well. Two or more icebergs could be added to the cup and a sea level rise could be estimated from their results.



## related activities

"Floating a Bergy Bit"  
"Blue Ice Cube Melt"



## vocabulary

**Ice sheet** - ice that covers land that is more than 50,000 kilometers (12 million acres) and is very thick

**Sea level** - the measurement of the place where the water meets the land, halfway between high and low tide

## alignment to national science standards

Unifying Concepts and Processes, Standards A, B, D, E

## alignment to kansas science standards

**Science as Inquiry:** K-2: 1.1.1, 1.1.3, 1.1.5; 3-4: 1.1.1, 1.1.2, 1.1.3, 1.1.4; 5-7: 1.1.1, 1.1.3, 1.1.4, 1.2.2, 1.3.1

**Physical Science:** K-2: 2.1.1; 3-4: 2.1.1, 2.1.4; 5-7: 2.2.1

**Earth Science:** 5-7: 4.3.1, 4.4.2, 4.4.3

**History and Nature of Science:** K-2: 7.1.1; 3-4: 7.1.1