

Global Climate Change and Sea Level Rise

Objectives

In this lesson, you will

1. learn that ice formations on land will cause a rise in sea level when they melt, whereas ice formations on water will not cause a rise in sea level 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.
4. practice some of the steps involved in a science investigation.



Materials

- two identical clear trays per group
- modeling clay per group
- 1 ruler per group
- 1 tray of ice cubes per group
- 1 liter of water per group
- Science Notebook

Vocabulary

- **global climate change:** the alteration of average global temperature, rainfall, and wind patterns as a result of increased atmospheric greenhouse gases
- **greenhouse gases:** gases in Earth's atmosphere that absorb and reradiate heat near the surface of the planet
- **density:** a measurement of compactness. For solids, this is usually measured as mass per unit volume. For substances dissolved in water, this is usually measured as parts per thousand or million.
- **displacement:** the forced relocation of water due to a submerged or partially submerged object occupying fluid space

Activity

Is there a lot of ice in the world? Is the ice on land or on water? Does it matter whether the ice is on land or water? Will one or both cause sea level to rise when they melt? Which type of melting will cause a greater increase in sea level?

Directions/Procedures

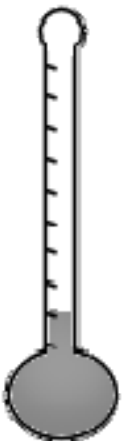
Place half of the clay into one side of each box. Form the clay to represent land rising out of the ocean. In one box, form a level place at the highest part as shown below. Make rivers on the land if you like.



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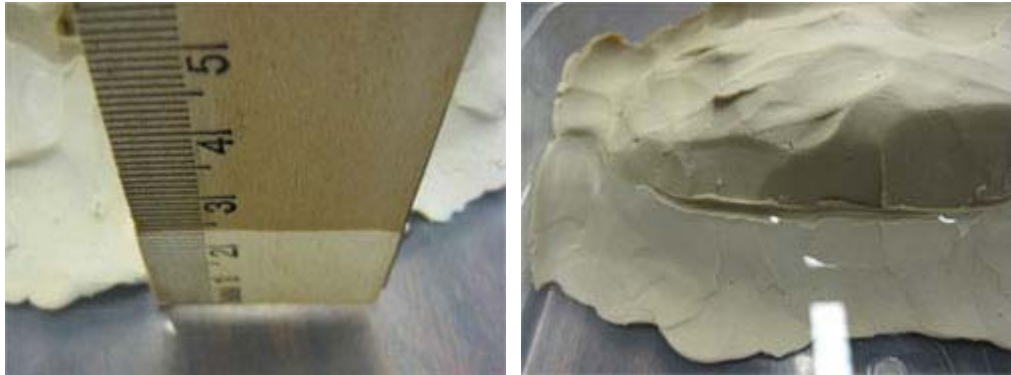
1. Place as many ice cubes as possible on the level place formed with the clay in the first box.
2. Place the same number of ice cubes next to the clay in the second box, so that they are resting on the bottom of the container.



3. Pour water into the container where the ice is resting on the bottom until the ice floats. Be sure the ice is floating, not resting on the bottom. If this occurs, add more water.

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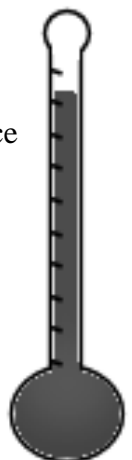
4. Pour water into the second container with the ice resting on the clay (be careful not to disturb the ice cubes) until the water levels in the two containers are approximately equal.
5. On the Sea Level Rise Worksheet, record initial measurements of water height (in mm) using a ruler.



6. Leave the setup. Take measurements every 30 minutes and record the results on their worksheets.



7. Measure new water heights and make observations about what occurred once the ice melted.
8. Answer the following questions in the conclusion on the worksheet.
 - o In which “situation” did the water level rise more?
 - o How do the results compare with your predictions?
 - o Why do you think this happened?



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Date: _____

1. Is there a lot of ice in the world?
2. Is the ice on land or on water?
3. Does it matter whether the ice is on land or water?
4. Will one or both cause sea level to rise when they melt?
5. Which type of melting will cause a greater increase in sea level?



Measurements:

Time (min)	Water Height (mm)	
	Floating Ice	Landlocked Ice
At set up		
30 min		
45 min		
60 min		

6. In which “situation” did the water level rise more?
7. How do the results compare with your predictions?
8. Why do you think this happened?