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Glaciers or Sea Ice? What Makes the Oceans Rise?

Topic:

Global Warming
Rising Sea Ice levels
density/ water displacement
Impacts of sea level rising on coastal Alaskan communities

Completion Time:

Teacher prep- time to freeze ice cubes
1class period (85 minutes)

Permission:

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Grade Level:

grades 8-12, Earth Science or general Science

Overview:

This activity works best for students who don't have a lot of lab experience and learn best through hands on activities. It allows them to not only investigate an aspect of global warming (rising sea levels), they will also get practice with making predictions and writing a hypothesis as well as understanding basic scientific concepts such as water displacement.

I would have students perform this lab activity as part of a series of experiments that explore the affects of global warming on oceans. This could be just one station as there isn't a great deal to do other than let the ice melt.

Objectives:

Students will develop and extend their understanding of the role of melting glaciers on rising sea levels.

Materials:

- 2 plastic shoeboxes
- Water
- 10 ice cubes
- Painters tape
- Stones

Procedure:

1. Students will create a hypothesis. Which will cause a higher sea level rise, melting sea ice, melting glaciers, or will they affect it the same

2. Place an equal amount of rocks on one side of each of the shoe boxes.

3. Fill the container with water so that the rocks are only partially covered.

4. Place 5 ice cubes in the water of one container. Place 5 ice cubes on the rocks (out of the water) in the other.

5. Mark the water level with painters tape or sharpie.

6. Let the ice cubes melt and mark the new sea level

7. Students will revisit their hypothesis and write a conclusion.

Evaluation:

1. Students would be graded based on a basic science lab rubric.
2. As a post lab evaluation, students could construct a concept map linking human activities to global warming to sea ice changes and other causes and affects of rising ocean levels.

Extensions:

Students could also explore the rates of melting in saltwater ice compared to freshwater ice. They could investigate the affects of melting sea ice on salinity and temperature of ocean water. Students could also explore the properties of sea ice, how it forms, and the difference between first year ice and multiyear ice. Lastly, they could investigate albedo and ice.

Resources:

International Polar foundation; www.educapoles.org
Global Precipitation Measurement Mission; gpm.nasa.gov/education

NASA Video: “Melting Ice, Rising Seas” (http://www.youtube.com/watch?v=VEuEqgdJXHg)

Standards:

State of Alaska Science Standards

[9] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating*

[9] SA1.2 hypothesizing, designing a controlled experiment, making qualitative and quantitative observations, interpreting data, and using this information to communicate conclusions

SB1 Students develop an understanding of the characteristic properties of matter and the relationship of these properties to their structure and behavior.

Author / Credits

Teacher Shannon Keegan created this lesson plan as a capstone project for the 2014 teacher training course entitled: *Climate Change: Seeing, Understanding, and Teaching*, held in Denali National Park. The course is facilitated by the Arctic Research Consortium of the U.S. (ARCUS) in partnership with [Alaska Geographic](http://www.alaskageographic.org/) and the [National Park Service](http://www.nps.gov/dena/index.htm).