ARM

CLIMATE RESEARCH FACILITY

Education and Outreach Lesson Plan

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Grade levels K-2

When Floating Ice Melts in the Sea

When Floating Ice Melts in the Sea

Approximate Time

Two 30-minute periods for experiment; additional time for teacher-directed completion of Student Record Sheet.

Objective

The student will investigate the effect of melting ice on sea level due to global warming as evidenced by analyzing the data from the class experiment.

Key Points to Understand

- Global warming is the rise in average temperature of the Earth.
- As global warming heats up the upper layers of the ocean, it will cause the melting of ice, which floats in the water near the Arctic and Antarctica.
- It is a common misunderstanding that the melting of the polar sea ice will cause the ocean level to rise.

Background Information

What is global warming? Our Earth's average temperature mostly stays the same from year to year. Sometimes it gets very cold in the winter and very hot in the summer. Some years may be a little hotter than normal where you live, but it may be a little cooler where other people live! So when you look at the average temperature everywhere on the Earth for a whole year, there is very little change. The current average global temperature is about 57 degrees Fahrenheit (14 degrees Celsius). If there is a rise in this average temperature, then we have global warming. In the last 100 years, the average temperature rose less than 1 degree. However, in 1995, which some say was the hottest year we have ever had, the average temperature went up half a degree.

As global warming heats up the upper layers of the ocean, it will cause the melting of the large amount of ice that floats in the water near the Arctic and Antarctica. Some think that with the melting of these icebergs even more water will enter the oceans and cause an additional rise in sea level; however; floating ice in the ocean has little effect on the sea level when it melts.

Key Vocabulary

- **Float**: To rest or remain on the surface of a liquid; buoyant.
- **Global Warming**: A rise in the average global temperature.
- **Melt**: To become liquid; dissolve.

- **Ocean/Sea**: The vast body of salt water that covers almost 3/4 of the Earth's surface. There are geographical divisions of this body, commonly given as the Atlantic, Pacific, Indian, Arctic, and Antarctic oceans.

Materials

- Large clear container (such as a clear bucket or plastic tub)
- Water (enough to fill the container 3/4 full)
- Ice cubes (enough to add to water to make container full)
- Measuring tape (with centimeters)
- Globe
- Student Record Sheet

Preparation

Before the lesson, gather materials and place them on a table in front of the class. Fill the large clear container 3/4 of the way full with water. Set ice cubes beside the container.

Management Tip

Students may need to fill in Student Record Sheets, as directed by the teacher, depending upon student needs. Worksheet can be modeled under a document camera or can be enlarged to poster size to be completed as a whole-class activity.

Procedure

1. Before beginning the experiment, ask students the following questions and have a class discussion.
   - What is global warming? How would global warming affect our lives where we live?
   - What is floating ice? Where might you find floating ice? (Melting icebergs near the Arctic and Antarctica). Bring out a globe and show students what the white land masses represent (glaciers) on the North and South Poles.
   - What do you think happens when floating ice melts into the sea/ocean? Will this affect the level of sea water?
2. Tell students that many people are concerned that as global warming heats up the upper layers of the ocean, it will cause the melting of the large amount of ice (polar ice caps) that floats in the water near the Arctic and Antarctica. People think that with the melting of these icebergs even more water will enter the oceans and cause an additional rise in sea level. Students will have an opportunity to test this idea today.
3. Place the ice cubes in the container full of water.
4. Gently fill the container with water until it is almost overflowing.

5. Measure the height of the water level. Have students record the water level on their Student Record Sheets.
6. Over the next few hours, observe and record the water level twice as the ice melts.
7. Measure the water level after the ice has melted (later in the day or the following day).

Closure and Evaluation

Ask students:

1. Does the water overflow when ice melts?
2. Do you think melting icebergs will make the sea level rise? Why?

Suggested Follow-Up Activities

- Study polar regions or polar ice caps, including climate, habitats, animals, flora and fauna, scientific explorations, etc.
- Make a map of the globe highlighting the areas with icebergs and melting ice.
- Interview adults about their view on global warming.
- Collect current newspaper articles related to global warming and the melting of icebergs in the Arctic and Antarctic.
- Write a report about an animal living on the polar ice caps that depends on the ice for their habitat.

Name:_____

Date:_____

Title:_____

When Floating Ice Melts in the Sea

Research Question: What do you think happens when floating ice melts into the sea/ocean? Will this affect the level of sea water?

Hypothesis

_____
_____
_____

Materials

- Large clear container
- Water
- Ice cubes
- Measuring tape

Data

Level of Water Over Time

	_0_ minutes ***Ice enters container***	**___ minutes** ***Ice melting***	**___ minutes** ***Ice melting***	**___ minutes** ***Ice has melted***
Level of Water (centimeters)	**____ centimeters**	**____ centimeters**	**____ centimeters**	**____ centimeters**

Conclusion

Based on what I observed during the experiment, I can conclude...

_____
_____
_____
_____