



Global Climate Change and Sea Level Rise(5th-8th Grade)

Adapted from California Academy of Sciences

Time: ~90 minutes

Materials: 2 identical clear food storage boxes (approximately 6 inches square) per group, 8 sticks of classroom modeling clay per group, 1 ruler per group, 1 tray of ice cubes per group (may need to start storing ice cubes ahead of time), 1 liter of water per group, student worksheet

Standards:

SC.5.N.1.1 Define a program, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.5.N.1.2 Explain the difference between an experiment and other types of scientific investigation.

SC.5.E.7.2 Recognize that the ocean is an integral part of the water cycle and is connected to all of Earth's water reservoirs via evaporation and precipitation processes.

SC.5.L.7.5 Describe how, when the environment changes, differences between individuals allow some plants and animals to survive, and reproduce while others die or move to new locations.

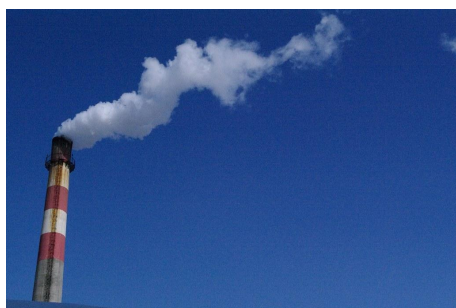
SC.6.E.7.6 Differentiate between weather and climate.

SC.912.L.17.4 Describe changes in ecosystems resulting from seasonal variations, climate change and succession.

SC.912.L.17.4 Recognize the consequences of the losses of biodiversity due to catastrophic events, climate change, human activity, and the introduction of invasive, non-native species.

I. Learning Objectives - Students will be able to:

- Plan, carry out, and interpret results of a scientific investigation.
- Explain why melting land ice causes sea levels to rise, but melting sea ice does not.
- Recognize the far-reaching effects of global climate change.



II. Discussion:

- Have a discussion about global climate change and sea level rise. Ask students:
 - Where is there a lot of ice in the world?
 - Is the ice on land or on water?
 - Will one or both cause sea level to rise when they melt?

Tip: You can cover the explanation for why ice is less dense than water (and therefore floats) here, or you can wait until after the experiment.

- Guide students through the development of a question about the melting of ice and sea level rise.

Which type of melting will cause an increase in sea level? Have each student record the question and a prediction on the worksheet.

- Tell the students that they will be working in groups to design an experiment to answer their question.
- Introduce the materials. Give as much or as little guidance about how to use the materials as is appropriate for your class.

Tip: if appropriate for your class, discuss the importance of controlling variables that are not being tested.

- Have students discuss their ideas with their small groups. Afterwards, discuss each group's ideas as a class. Make sure each group has a workable experimental design (see suggested procedure below). Have each student describe and/or draw their group's experimental design in the "methods" section of the worksheet.

III. Procedures: *This procedure is only a suggestion - it's okay if your students come up with something slightly different. Check to make sure they are investigating the correct question and control the variables they are not testing (i.e., each container should contain the same number of ice cubes, the same amount and arrangement of clay "land," and should start with approximately equal water levels).*

1. Place half of the clay into one side of each box. Form the clay to represent land rising out of the ocean.
2. Place about 6 ice cubes on the "land" in the first box. 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 is floating (NOT resting on the bottom).
4. Pour water into the container with the ice resting on the clay until the water levels in the two containers are approximately equal.
5. Have students measure and record initial measurements of water depth (in mm). They may wish to draw a line in the clay at the initial water level.
6. Leave the setup. Students should measure the water depth every hour (or other regular interval) and record the results, until the ice is completely melted.

IV. Interpret the Data:

- Have each group graph their results on the board, on chart paper, or on butcher paper (see sample graph below) and display the graphs so everyone can see.
- *Tip: You may wish to draw the axes ahead of time so the students can simply fill in their data. Younger students might find it easier to place Post-It notes on the board (1 Post-It per mm water depth) to form the bar graph, instead of drawing the graph. With older students, you may wish to make a line graph instead of a bar graph.*
- Lead a discussion about the results, using the information in the "Background for Educators" section to help students understand their results.
- Have each student write a conclusion on their worksheet summarizing what happened and why.

V. Wrap Up: Have another discussion about global climate change. Use the following questions to generate discussion:

- Why might we be concerned about sea level rise? *(Coastal areas will be flooded. People will lose their homes. Some fresh water resources will become too salty to use. Habitat loss will occur.)*
- What can we do to help slow this process by using less fossil fuel? *(Take public transit instead of driving, eat local foods, turn off lights and electrical equipment when not in use, plant a tree, reduce, reuse and recycle.)*

Sea Level Rise Worksheet

Name: _____

Date: _____

1. Question:

2. Prediction:

3. Methods:

4. Measurements (results):

Time (hours)	Water Height (mm)	
	Floating ice	Landlocked ice
0		
1		
2		
3		

Comments or notes:

5. Conclusions and Discussion:

