Name: _____ Date: _____ Period: _____

Climate Change Inquiry Labs: Melting Ice and Sea Level Rise

Lab Instructions

A scientific report endorsed by the United Nations states that unless greenhouse gas emissions are curtailed, average global temperatures may rise between one and three degrees Celsius (two and five degrees Fahrenheit) in the next 100 years. The ramifications of a temperature change even at the low end of this range would be severe. A one-degree Celsius (two-degree-Fahrenheit) change in temperature is predicted to result in a one-meter (three-foot) rise in sea level, which would displace millions of people in coastal cities and low-lying islands.

[Excerpted from PBS Learning Media Background Essay for *Mountain of Ice: If the Ice Melts*.]

Objective: Students will investigate which type of ice (land ice or sea ice) poses a greater threat to sea level rise if large-scale melting due to climate change occurs.

Hypothesis: I think that melting _____ will cause the sea level to rise higher.
(sea ice or land ice)

Materials

Large graduated cylinders (two) water ice cubes funnel

Procedure

1. Place about 10 ice cubes in one of the graduated cylinders, then fill it about three-quarters of the way full with water. (Simulating sea ice.)
2. Fill up the other graduated cylinder to the exact same level as the first graduated cylinder.
3. Place the funnel in the top of the second graduated cylinder and put the same number of ice cubes in it as you did in the first cylinder. (Simulating land ice.)
4. Wait 15-30 minutes for the ice to melt and observe how much the water level has increased in both graduated cylinders.

Rise in water level in sea ice graduated cylinder: _____

Rise in water level in land ice graduated cylinder: _____

→While you're waiting, complete the questions on the back of the paper.

After the experiment: Was you hypothesis supported by the data? Explain. _____

_____

_____

_____

_____

Mountain of Ice: If the Ice Melts - http://www.pbslearningmedia.org/asset/ess05_int_icemelt/

How much would sea level rise if the Western Antarctic Ice Sheet melted? _____

How much would sea level rise if the Eastern Antarctic Ice Sheet melted? _____

Choose one of the regions: U.S. East Coast, Florida, Northern Europe, or Southeast Asia. What observations do you have about the differences between the three scenarios – Western Ice Sheet melting, Eastern Ice Sheet melting, and conditions 20,000 years ago. _____

Regions Vulnerable to Sea Level Rise - http://serc.carleton.edu/images/eslabs/cryosphere/areas_risks_from_sea.png

According to the map, what areas of the world will be most threatened if sea level rises by a few meters? _

Describe the consequences the United States may face if sea level rises by a few meters. Give specific examples of coastlines, cities, industries, and habitats that would be impacted. _____

Extension:

The plot only shows coastal areas that are at or near current sea level. There are also island nations at risk of entirely disappearing as a result of sea level rise. Do an Internet search to find at least one example. Then answer the following questions:

- What is the name of the island nation? _____
- What is the nation's average elevation? _____
- What is the nation's population? _____
- How soon does this nation expect to be affected by sea level rise? _____

Adapted from EarthLabs: Future of the Cryosphere. http://serc.carleton.edu/eslabs/cryosphere/7a.html