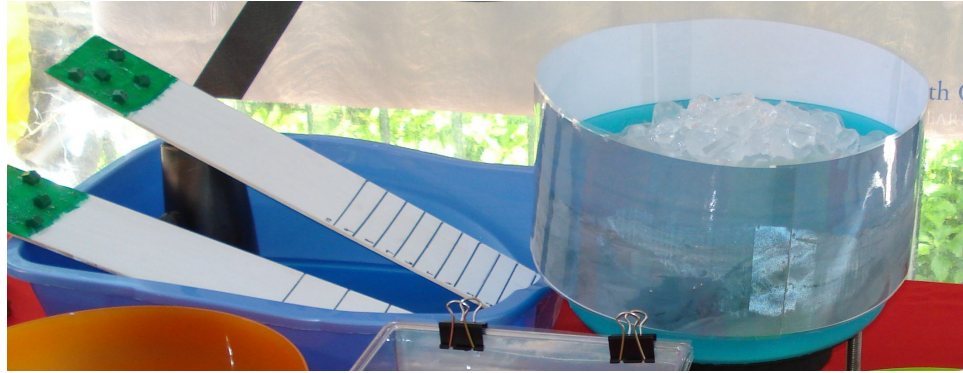


SEA LEVEL ACTIVITY 1

THE OCEANS CONNECT US ALL TO THE ICE IN THE POLAR-REGIONS HANDS ON ACTIVITY



*Edited from:

http://www.ldeo.columbia.edu/edu/polareducation/Activities/Bindschadler_sm.pdf

Background: Mountain glaciers together with the Greenland and Antarctic Ice Sheets are made of large amounts of ice. This ice is part of the Earth's total water storage, and together with oceans, lakes, streams and groundwater makes up our **hydrosphere**. Ice that melts from the glaciers and ice sheets ultimately flows into the global oceans. Annually if there is more ice melt than new snow added to these icy regions more water will be added to the world's oceans, causing sea level to rise and we will see the effect along our shorelines. How it effects the shorelines will depend on several things, but an important factor is the steepness of the shoreline.

Goal: Coasts with two different slopes are presented along with a distant ice sheet that slowly melts, raising sea level. Since the slopes are different (at a ratio of one to two) one coastline will see the impact twice as quickly as the other. An additional goal is to show that water moves from Ice Sheets to oceans.



Materials:

At home alternatives noted in italics

- Jug of water colored blue
- Ice – cubes or crushed works fine – Needs a fair amount of ice
- Lightweight container, *such as a large mixing bowl, or a disposable aluminum tray*, to be a Polar Region,
- You can print out a photo to tape around Antarctica/Polar Region or you can just label it on the outside of the container “Polar Ice Sheet”
- Any rectangular bin, *such as a dishwasher tub, cat litter tray, or casserole dish*, to represent the world's oceans

- Two flat plywood boards to represent shoreline. *Alternative: cut up plastic container or Tupperware lids*
- A prop to go behind the one with the tightest spacing to raise it higher (see photo above) – *a brick or a rock*
- Toys or props as desired to simulate houses on the shorelines
- A Small ruler (cms preferably)

Set up Shorelines: Using two sections of thin plywood or thin plastic of equal length create samples of two different shorelines. Draw lines to mark sea level – be sure to space lines on the board so that one is twice the distance as the other i.e. 1.5 cm apart on one board and 3 cm apart on the second board. Boards can be decorated with monopoly houses and vegetation. If you like you can print out images of shorelines to add around the edges of the tub representing the different landmasses that will be impacted by changing sea level.

Set the small incline boards in the dishpan or tub. The two boards should be propped at differing inclines for differing shorelines, with the one with tighter spacing set with an incline at twice the angle of the other board. This can be done with a brick or object behind one board (see photo).

Note: Although not included in the picture, we would suggest you tape a small ruler (cms) onto the inside wall of the tub to serve as a “tide marker”. This will show how many cms of water are added to sea level.

Set Up Polar Ice: The polar ice sheet is a round plastic tub that is elevated and filled with ice and a small hole drilled in one corner. We inserted a drainage fitting from the hardware store so we could open and close the hole but you don't need to (you can insert a bit of straw and close around the hole with modeling clay or playdough). Place the round polar ice tub or the container you use for your polar ice sheet on an elevated surface (wooden blocks or books work OK) with the small hole set out so that it drains into the dish tub to represent the polar ice sheets melting into the global oceans. You can print out a polar image, cut and tape it together and wrap it around a plastic tub. Now fill the tub with ice.

Alternative: if you don't want to drill a hole in the container, you can pour the melt water into the rectangular bin every 5 minutes. Discuss with the student that when the ice sheets melt, the water runs off of the land and enters the water, raising sea level.

Activity: Slowly add some of the blue tinted water into the Antarctic display. Watch as it melts some of the ice and flows into the global ocean raising water level. What is the effect on the two different shorelines?

Discussion: The demonstration shows vulnerability of low lying flat areas such as waterfront communities at sea level or marshes, where the ocean moves inland more quickly than along a shore that is steeper. Lines drawn on the two shores emphasize how much more inland ‘intrusion’ will occur for the shallower shore. Additionally, it is an opportunity to emphasize that the oceans are connected to the ice sheets through water movement in the hydrosphere.

Note: This activity links well to the following activities: “Just How Much Ice is There in the Polar Ice Sheets” which looks at where the potential for a rise in sea level is; “Time Traveling With Sea Level” which looks at sea level through several geologic time periods; and “Predicting Future Sea Level Rise” which asks students to consider what has happened with sea level in their region over the past 100 years, and to consider where they think it might go in the next 100 years.