



Glacial Landforms

This activity shows students how glaciers can mold the landscape. It is a good introduction to any field trip in Maine!

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Grades 3-4
(could be adapted for up to 7th grade)

Time 30 – 60 minutes

Teacher Background and Resources
this lesson was partially adapted from:
wneo.org/dirtylittlesecrets/lessonplans

Materials

ice cube trays
water
sand, soil, small rocks, gravel
paper plates
modeling clay
cooler or an accessible fridge/freezer
paper towels (this lab can get messy)

Preparation (do the night before)

1. Obtain enough ice cube trays to make one ice cube for every student.
2. Put a layer of sand and soil in the bottom of ½ of the spaces in the ice cube tray. In the other ½, put small rocks and gravel (preferably sharp pieces). Freeze a few ice cubes (without sand or gravel) as the “control” samples.
3. Fill all the space to the top with water and freeze overnight.

PreActivity Discussion

1. Ask and discuss: “What is a glacier?”, “Do we have glaciers in Maine now?”, “Was there ever a glacier here in Maine? When?”
2. Ask and discuss: “How big were glaciers?” Have them try to guess how tall they were (they were 1-2 miles thick 20,000 years ago).
3. Ask and discuss: “How do we know there have been glaciers in Maine?”, “What might happen to the land when a huge mass of ice containing rocks and soil moves over it?”

Activity

1. Hand out paper plates to work on (to protect the desks).
2. Hand out a lump of modeling clay to each student and have them mold it into a flat rectangle (at least 2-3 times bigger than an ice cube) on top of the paper plate. If you can, layer the clay with 2 different colors (one thin layer on top).
3. Have the students mold tiny pre-ice age ‘plants’ on the flat surface of the clay by pinching up small bits of it.
4. Have them draw a picture of what their landscape looks like now.
5. Hand out the ice cubes (a.k.a. glaciers) and have them place the ice cube on top of the clay, sediment side down.
6. Instruct the students to push down hard on the ice cubes and see what happens to the clay.
7. Instruct the students to drag the ice cube back and forth across the clay, in the ‘long’ direction of the rectangle only. They may need to push down on the ice pretty firmly.
8. Continue this until some of the ice cubes melt.
9. After the ice cubes melt, have them draw a picture of what they see.
10. Gather the plates together in groups based on what kind of ice cube they started with (soil/sand vs. rocks/gravel vs. just ice).
11. Have them make observations about how their landscapes (clay) changed:
 1. plants got bulldozed
 2. the earth surface got slightly depressed
 3. the earth surface got cold and hard, from the ice
 4. the ice melted and left water in depressions on the surface of the clay and the plate
 5. the earth surface got scratched in the direction of the glacier motion
 6. the earth surface got holes in it from rocks in the glacier
 7. sediment was deposited on top of the clay and plate

8. the glaciers that didn't have sediments or rocks didn't affect the clay as much.
12. Discuss "real" glacial evidence. "What would we look for outside if we wanted to find evidence of glaciers?" If possible, go outside and look for glacial features (or bring rocks to school that have glacial striations on them).
13. Discuss climate: "Would a glacier be able to survive through a Maine summer?", "What do you think summers were like 20,000 years ago when glaciers existed in Maine?" (summer were probably $\sim 6^{\circ}\text{C}$ cooler back then).