Glacier A-Go-Go

Students observe different variables that influence glacier movement.

Related Web Pages for Students
- http://www.windows.ucar.edu
- http://www.eo.ucar.edu/kids/wwe/ice1
- http://nsidc.org/glaciers/

Directions
1. Have students conduct a control run by placing their flubber at the top of their PVC pipe and at a “normal” slope. (Teacher will need to define what the “normal” slope is. A 30-degree angle is recommended.)
2. Students need to record the distance that their flubber moves during a predetermined length of time (10 minutes). More advanced students can determine the velocity at which it moves.
3. Next, students run several tests with different values for valley slope, glacier mass, flubber temperature and basal conditions. (Basal conditions refer to what lies beneath a glacier: rocks, debris, water, smooth or rough surface ...).
4. Continue to record and calculate your data (slope, distance moved over time, temperature, glacier mass, basal condition, velocity ...).

Ask yourself the following questions:
1. How do various slopes, flubber temperatures, glacier mass, and basal conditions impact glacier flow?
2. How might climate change impact glacier flow? What evidence can you find that glaciers might be experiencing such impacts already?

Background Information
Flubber behaves in mechanically similar ways to glacier ice, flowing extremely slowly at low stresses and becoming brittle and creating crevasses under high stresses. Glaciers exist all over the world, but most of them are found near the Poles in regions of high snowfall in winter and cool temperatures in summer so that the snow that accumulates in winter isn’t lost by melting, evaporation or calving. Under the pressure of its own weight and the forces of gravity, a glacier will begin to move, or flow, outwards (deformation) and downwards. As glaciers warm or melt due to the pressure of overlying ice, a water layer can form beneath them and cause them to flow or slide. When glaciers move rapidly, internal stresses build up in the ice which cannot be relieved by deformation alone, and cracks called crevasses form at the surface of the glacier. As long as snow accumulation equals or is greater than melt and ablation, glacier health is maintained, but over the past 60 to 100 years, glaciers worldwide have tended toward retreat.

Ablation: Combined processes (such as sublimation, fusion or melting, evaporation) which remove snow or ice from the surface of a glacier. Deformation: The ability of a material to change its shape or size under the influence of external or internal stress, temperature, or pressure.

This activity is adapted from the following sources:
L. Stearns and Erich Osterberg, “Modeling the Malaspina”, Department of Geological Sciences, University of Maine, Orono.