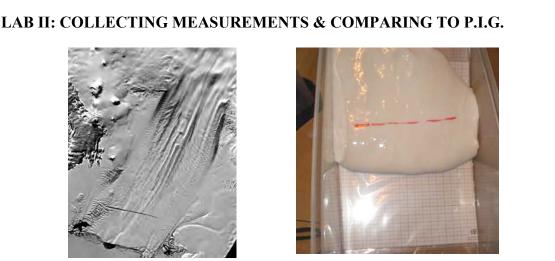
Name\_

### Date



P.I.G. GLACIER GOO How does your glacier match up to P.I.G.? You will collect measurements on the elevation and velocity of your glacier, and see how your glacier compares to P.I.G.!

#### **Elevation Change:**

1. Let's collect some measurements to see how your glacier elevation matches up to the P.I.G. glacier. You will use your stopwatch to measure how long it takes the glacier to lose 1 cm of elevation. Return to baseline, and mark a line on the outside of the container both at surface level and 1 cm below the surface (*Images 12 and 13*). Release the goo and start your stopwatch! Stop the watch when the glacier has dropped to the 1 cm line marked on the container. (Report in seconds)

(Note – glacier goo can stick to the container wall if it spreads to the edge – use your knife to carefully clear this so you get an accurate time for your 1 cm elevation change. Be careful not to push down on the surface and change the elevation!)





1

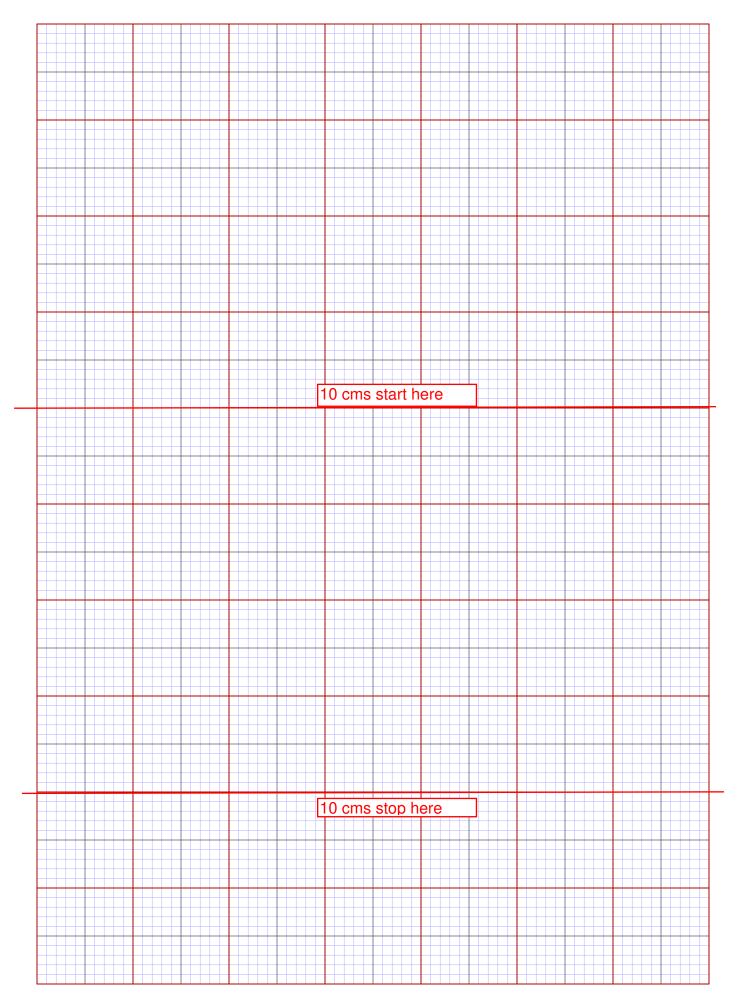
Image 12) Mark up surface and 1 cm dropImage 13) Time goo as it drops 1 cmRepeat 2 other times, or pool class results for an average.

Гime 1	Time 2	Time 3	Average
The average	elevation change you	calculated is:	
l cm/se	CS		
Pound this to	the nearest minute be	fore comparing to F	DIG
,	ins.		.1.0.
· · · · · · · · · · · · · · · · · · ·	swer in the Glacier G	oo results box belov	V.
•			
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More	e Activities: http:/www	/.ldeo.columbia.edu/j	polareducation

Name	Date				
2.	<b>Compare your glacier elevation changes to P.I.G.</b> How long did it take P.I.G. to lose 1 cm in elevation? Use the timeframe of 2003-2007 rounding to 4 years. Use two ' <b>DELTA</b> ( $\Delta$ )' columns on the chart on <b>page 7</b> for elevation change. Find the row that shows the largest drop in meters and write it in the blank below (you don't need the negative sign).				
	P.I.G. dropped meters/ 4 years				
	Divide for meters/1 year				
	To better compare the two sets of measures convert the meters to cm				
	meters X 100 cm = cm/ 1 year				
	$365$ days in a year = cm/_365 days				
	To determine how long it takes P.I.G. to drop 1 cm divide 365 days by the number of cms. Place you answer in the results box.				
	RESULTS				
	P.I.G. 1 cms/days Glacier Goo 1 cm/mins.				
	Think Scale - P.I.G. is dropping by cms/day while your glacier is dropping by cms/mins.   How does your changing elevation compare to that of P.I.G.?   ?				
	What if P.I.G. was made out of glacier goo, how would that affect its elevation loss?				
3.	Now examine the velocity (rate of flow). Using a stopwatch you are going to measure the velocity of your glacier & then compare it to the velocity of P.I.G. In its fastest flowing sections P.I.G. has been measured at ~3.5 km/yr or 9.6 m/day (this is ~31ft/day!) Let's see what your glacier goo can do!				
	What is your Velocity? Velocity = Distance/Time				
	Your graph paper is marked to show 10 cms of distance. This will be your distance (D). Return to baseline. Use your stopwatch to time the glacier flow on the 10 cm section on your grid. Start the stopwatch as soon as the toe of the glacier touches the top of the marked square and stop timing as soon as it touches the bottom of the marked square. Record the time below. Repeat twice more, or pool class results to get an average ( <b>round</b> <b>to the nearest minute</b> ).				
	Time #1Time #2Time #3Average Time				
	Velocity (V = D/T) $V = 10 \text{ cm}/$ min				
	Lamont-Doherty Earth Observatory2COLUMBIA UNIVERSITY   EARTH INSTITUTEMore Activities: http://www.ldeo.columbia.edu/polareducation				

Name_	Date				
4.	<b>How does that compare to P.I.G.'s velocity</b> ? We know how many meters P.I.G. can travel in a day so convert your glacier velocity into meters. This is easy to do since you measured 10cms so multiplying both sides of your equation by 10.				
	V = 1meter/(#mins. X 10) ORminutes* (* insert this number wherever you see this symbol below)				
	Your glacier needs *minutes to travel 1m				
	So how far will it go in a day? There are <u>1440 minutes</u> in a <b>day</b> . Divide by your minutes 1440mins/*(your minutes starred above) to getm/day				
	RESULTS				
	Glacier Goo V =m/days P.I.G. V = $9.6 \text{ m/day}$				
	How does the velocity of your glacier goo compare to P.I.G.?				

5. Glacier goo is not the same as a real glacier but it can help us learn about real glaciers. What are three things you have learned about P.I.G. working with your own glacier model, be sure at least one mentions a connection to climate.



Free Multi-color Graph Paper from http://incompetech.com/graphpaper/multicolor/

# POLAR I.C.E. (Interactive Climate Education)

## **GLACIER GOO**

### For Use in Modeling Glaciers

#### Mix#1:

One 20 oz cup 1 stirring stick 3/4 cup warm water 1 cup Elmers white glue

#### Mix#2:

one 8 oz cup 1/2 cup warm water one stirring stick (for the 8 oz cup) 2 tsp. Borax powder 1 qt plastic zip lock bag

Mix # 1:

In the large cup, add 3/4 cup warm water and 1 cup glue. Stir until well mixed. Mix # 2:

In the smaller cup, measure 1/2 cup warm water. Add 2 tsp. of Borax powder. Stir

until the powder is dissolved.

Pour Mix 2 (the powder mix) into the glue mix. Stir until a glob forms and most of the water is mixed in. This happens quickly! Knead and work the mix for 2 - 3 minutes. Most, if not all, of the water will be incorporated into the mixture. Place the glacier goo in the zip lock bag.

The mixture will store for a few months.

## Lamont-Doherty Earth Observatory

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