



Global Studies

Measuring Climate Change

Levelled Assessment: ____/4

Name:

Section:

Score: ____/20

Directions: Using Google Earth you will be measuring global warming as it happens. Following the framework of investigation, work through the process of asking a question, collecting and analyzing information, and then designing a solution.

Step 1: Ask – How can we actually see the effects of climate change over time?

1. Based on what you know, what type of effect will global warming have on glaciers around the world?
2. Which areas will have the larger impact from global warming? Which areas may not be impacted as much?

Step 2: Acquire – What are glaciers and how are they connected to climate change?




1. Watch the Video *Climate 101: Glaciers* by National Geographic (video.nationalgeographic.com/video/101-videos/climate-101-glaciers) and answer the following questions.
 - a. What are the two different types of glaciers and where do they form?
 - b. What impact do glaciers have on the landscape and why are they important?
 - c. How do glaciers act as an indicator of climate change?

Step 3: Explore – Which areas are being most impacted by global warming?

1. Use the Glacial Melt Time Machine (linked on course website) to examine glaciers around the world. Watch the time lapses for each of the following glaciers and explain the general trends the glacier has been experiencing since 1984.
 - i. Breiðamerkurjökull glacier, Iceland
 - ii. Chacaltaya Glacier, Bolivia
 - iii. Columbia Glacier, Alaska, USA
 - iv. Helheim Glacier, Greenland
 - v. Himalayan Glaciers
 - vi. Larsen Ice Shelf, Antarctica
 - vii. Shirase Glacier, Antarctica

Step 4: Analyze – What actual data is there that shows just how rapidly glaciers are retreating?

Process

1. Open up the desktop version of **Google Earth Pro**
2. In the **Search Bar** in the top left type in **Breiðamerkurjökull** to navigate to the Breiðamerkurjökull glacier in eastern Iceland
3. Take a minute to **navigate** around the map and get a better sense of the glacier’s location as part of the Vatnajökull ice cap and the source of the Jökulsárlón glacial lagoon
4. Along the top bar click the  button to open up the **historical imagery** bar
5. Move the slider all the way to the left so that the imagery from 1984 is displayed (**Note:** Your view must be zoomed out further than 31,473 feet to be able to view imagery from before 2008)
6. Trace the location of the face of the glacier as it was in 1984 by selecting the **Add Path** tool (). Title it 1984, then, once finished tracing the face of the glacier, select ok to close the menu.
7. Move the historical imagery to show the most recent view of the Breiðamerkurjökull glacier (Should be December of 2016)
8. Repeat the process from step 6 to trace the face of the glacier again for the most recent view
9. Open the **Ruler** menu by selecting the  button in the top bar.
10. Take 10 different measurements of the distance between the 1984 line and the 2016 line and record your observations below to help calculate the average distance of retreat for the glacier. Once you have made your 10 observations record the mean.

Breiðamerkurjökull Glacier Average Retreat	
Observation 1	_____ miles
Observation 2	_____ miles
Observation 3	_____ miles
Observation 4	_____ miles
Observation 5	_____ miles
Observation 6	_____ miles
Observation 7	_____ miles
Observation 8	_____ miles
Observation 9	_____ miles
Observation 10	_____ miles
Mean:	_____ miles

Step 5: Act – What can people do about it?

1. What is something that you can do as a consumer to help address the issue?

2. What is something you can do as a citizen to help address the issue?

3. What is something you can do as a part of your role as a student (now or in the future) to address the issue?

4. Choose one of the solutions above and plan out a 4-5 step process to actually implement your solution.