

Name: _____

Date: _____ Period: _____

Surface Processes

The Physical Setting: Earth Science

Lab Activity: Glaciers

INTRODUCTION:

The two major types of glaciers are valley glaciers and continental glaciers. Valley glaciers form at high elevations and move due to the slope of the mountain valley and under their own weight. Continental glaciers are sheets of ice that cover large surface areas and move radially from the zone of accumulation due to their own weight.

Glaciers carry large amounts of sediment under, within, or on top of the ice. As a glacier melts, sediments are deposited forming a variety of glacial features. Unsorted deposits are formed from sediments dropped directly by the ice, whereas meltwaters flowing from the base form sorted deposits.

OBJECTIVE:

You will gain understanding of glaciers, glacial movement, and their depositional features.

VOCABULARY:

Continental Glacier -

Valley Glacier -

Glacial Grooves -

Terminal Moraine -

Eskers -

Outwash Plain -

Kettle Lake -

Drumlin -

Lab Activity: Glaciers

PROCEDURE A:

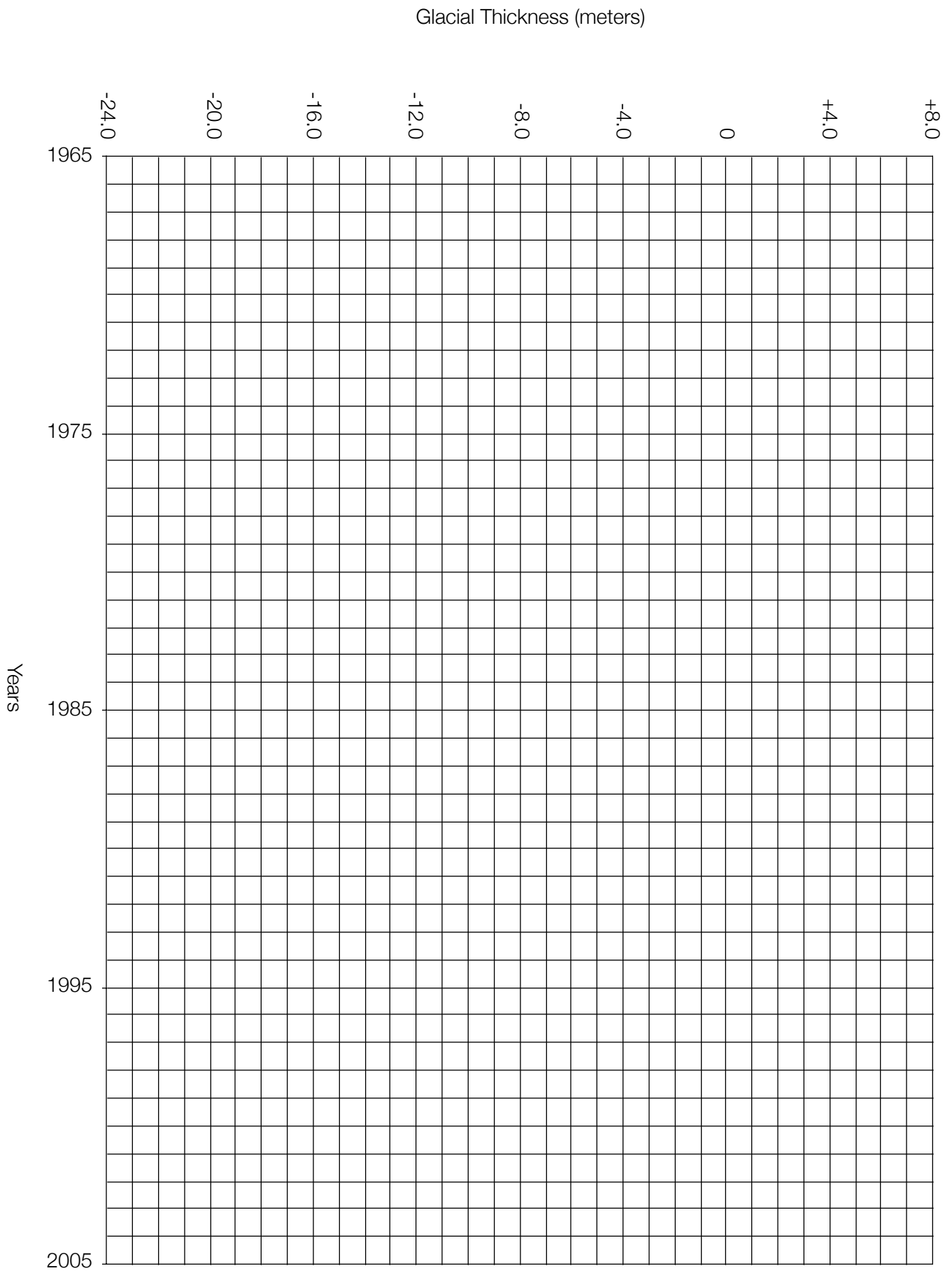
The U.S. Geological Survey (USGS) operates a long-term "benchmark" glacier program to monitor climate, glacier geometry, glacier thickness, glacier motion, and stream runoff. The data collected is used to understand the consequences of climate change. One piece of data that the monitor records is the thickness of ice which is in a balance between accumulation and melting.

Using the data table below which shows changes in glacial thickness in meters, make a double line graph that will show the changes in glacier thickness for both glaciers over the 40 year record from 1965 to 2005. Be sure to make a key for the graph using a different color line for each glacier.

Year	Gulkana Glacier	Wolverine Glacier
1965	0	0
1966	0	-1
1967	+0.5	-3
1968	0	-3.5
1969	-1	-4.5
1970	-0.5	-3
1971	0	-3
1972	-0.5	-4
1973	+1.0	-4
1974	-1	-6
1975	-1.5	-6.5
1976	-2	-7
1977	-2.5	-6
1978	-3	-5.5
1979	-3.5	-6.5
1980	-3.5	-4.5
1981	-3.5	-2.5
1982	-3.5	-3
1983	-3.5	-2.5
1984	-3	-3
1985	-3	-3

Year	Gulkana Glacier	Wolverine Glacier
1986	-3	-3
1987	-3.5	-1.5
1988	-4	0
1989	-4	-1.5
1990	-4.5	-4.5
1991	-4.5	-5
1992	-4.5	-6
1993	-6.5	-6.5
1994	-7.5	-6.5
1995	-8	-7
1996	-8.5	-7.5
1997	-10	-10
1998	-11	-10
1999	-12.5	-11
2000	-12.5	-11.5
2001	-13	-12
2002	-13	-11.5
2003	-13	-12
2004	-16	-12
2005	-17	-14.5

United States Geological Survey Data on Glacial Thickness

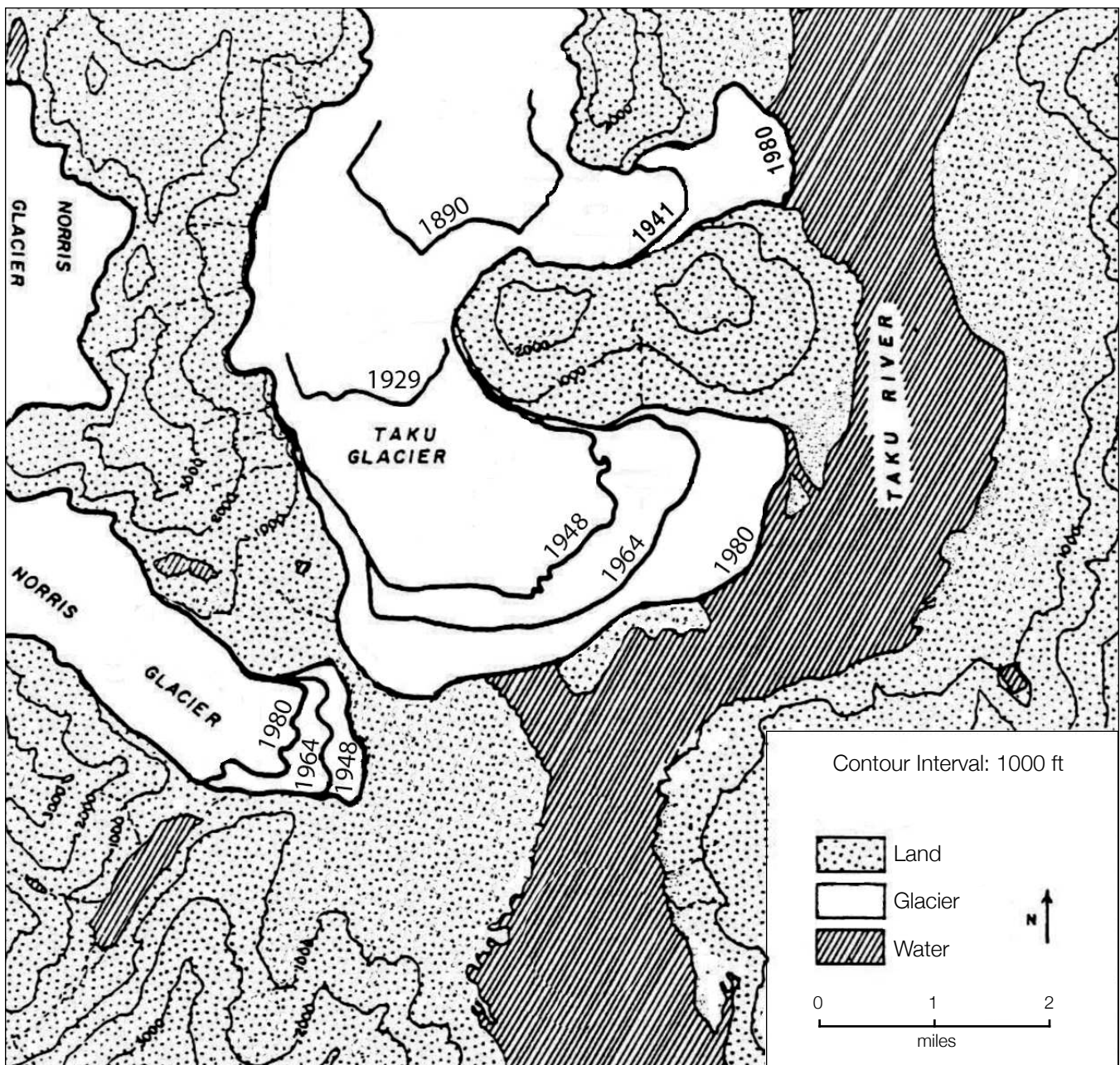


Lab Activity: Glaciers

PROCEDURE B:

The map below is of the Juneau Icefields in Alaska. It is showing the Taku and Norris Glaciers as well as land contours and the positions of the edge of each glacier at different times since 1890. Glaciers gain and lose snow and ice each year. As the amount of snow and ice increases it causes the glacier to advance. When the snow and ice melt, the glacier retreats and moves up the hill.

1. On the map lightly shade in the areas of land and water using the key below:
 - Lands = Green
 - Glacier = Light Blue
 - Water = Blue
2. Answer the following questions on the next page.



Lab Activity: Glaciers

PROCEDURE B QUESTIONS:

1. What is the distance from east to west across the entire map?
2. What is the distance from north to south across the entire map?
3. What is the contour interval of the map?
4. What is the width of the Taku Glacier at the terminus (end)?
5. What is the width of the Taku Glacier at the 1000 ft contour line?
6. What has happened to the Taku glacier from 1890 to 1980?
7. State one possible reason for the Taku Glacier movement that has occurred from 1890 to 1980?
8. What has happened to the Norris glacier from 1916 to 1980?
9. State one possible reason for the Norris Glacier movement that has occurred from 1916 to 1980?

Lab Activity: Glaciers

DISCUSSION QUESTIONS:

1. Based on procedures A and B, what has happened to the glaciers in recent years?
2. What long term consequences may occur if glaciers continue to melt?
3. What is the difference between a continental glacier and a valley glacier?
4. Where can continental glacier be found today?
5. Describe the shape of a glacial valley?
6. How can glacial grooves determine the direction a glacier has moved?

CONCLUSION: What are some of the depositional features that are associated with glaciers?