

NAME: _____ PERIOD: _____ DATE: _____

LAB PARTNERS: _____ LAB #15

Glacial Erosion

Introduction:

A glacier is a naturally formed mass of ice and snow that gradually moves downhill under the influence of gravity. Glaciers advance when more snow and ice builds up than melts away. A glacier will retreat if more snow and ice melt, than accumulate. There are two types of glaciers: alpine (mountain) and continental glaciers. Mountain glaciers exist only in high mountain valleys, such as the northern Rocky Mountains and the Alps in Europe. Continental glaciers cover huge areas of land, such as the glacier that carved out the landscape of New York State during the last 2 million years. Evidence of this movement is seen in the Finger Lakes and other surface glacial features. The Finger Lakes look like fingers on a hand, they occupy former V shaped valleys that were once occupied by streams. The valleys were altered in shape when the glaciers moved through, to a “u” shape. Once the glaciers retreated they deposited a terminal moraine that stopped that water from the streams from flowing any further. The streams were dammed and the lakes were formed. Other common features around the state include, drumlins, kettle lakes, moraines, erratics and striations.

Standards:

HS. ESS2-4.

Use a model to describe how variations in the flow of energy into and out of Earth’s systems result in changes in climate.



Materials:

Phone with a camera

Procedure:

1. Complete the definition of each of the vocabulary words
2. Using the camera on a phone, scan over the QR codes. Using the vocabulary words, identify the glacial feature see in each picture from the QR code.
3. Read each passage about the glacial formation of New York. Answer the questions based on these readings.

Vocabulary:

Use your notes to fill in the definitions of the following words:

Drumlin:

Kettle Lake:

Moraine:

Striations:

U-shaped valley:

Erratic:

Procedure A:

Use the words and definitions from the first page to identify the glacial features found on the following sites. Use your phone to scan the QR codes below. Write the feature on the line next to the QR code.













Procedure B

Our little place in the universe is known as Long Island, and it has an amazing history. It hasn't always been there; in fact it took glaciers thousands of years to form the land you live on. If you don't know exactly where you are, well here's a little hint — Long Island is located in the Southeastern part of New York State, it is separated by the rest of the state by water, more specifically the East River, and from Connecticut by the Long Island Sound.

Long Island was formed by glaciation — process, condition or result of being covered by glaciers or ice sheets, roughly around 22,000 years ago. Long Island is part of the Outer Lands Region; it is primarily formed by four spines of glacial moraine — a mass of rocks and sediment carried down and deposited by a glacier, typically as ridges at its edges or extremity. The moraines consist of gravel and loose rock left behind by the Wisconsin glaciation some 21,000 years ago (19,000 BC). The northern moraine, which directly abuts the North Shore of Long Island at points, is known as the Harbor Hill moraine. The more southerly moraine, known as the Ronkonkoma moraine, forms the "backbone" of Long Island; it runs primarily through the very center of Long Island, roughly coinciding with the length of the Long Island Expressway.

The land to the south of this moraine to the South Shore is the outwash plain — a landform feature created by outwash, of the last glacier. Part of this, known as the Hempstead Plains, supported one of the few natural prairies to exist east of the Appalachian Mountains.

The glaciers melted and receded to the north, resulting in the difference between the North Shore beaches and the South Shore beaches. The North Shore beaches are rocky from the remaining glacial debris, while the South Shore's are crisp, clear, outwash sand. Running along the center of the island like a spine is the moraine left by the glaciers. (Bald Hill, Farmingville, is the highest point along the moraine.) The glaciers also formed Lake Ronkonkoma.

Physical Features of Long Island

- Created by glaciers.
- Surrounded by salt water.
- Bedrock deeply buried.
- Porous unconsolidated material (sand, silt, clay and gravel) form layers that holds water underground.
- There are 3 aquifers — a body of permeable rock which can contain or transmit groundwater: The aquifers are: The Upper Glacial, The Magothy and The Lloyd.



Reading Questions:

1. Why are the north shore and south shore of Long Island different?
2. How did Lake Ronkonma form on Long Island?
3. Where is the highest elevation of the termination moraine on Long Island?
4. What is a moraine?

A moraine is formed as a glacier pushes mounds of till (unsorted glacial sediments) like a bulldozer. If the glacier is melting at the same rate as it is flowing forward, the glacier appears to be staying in place. However the sediments flowing with the ice continue to move (like a conveyor belt), the moving ice carries the sediments with it and they pile up at the end where the ice is melting. A terminal moraine is a ridge that marks where a glacier stops advancing. Long Island was created in this way by a glacier. There are two terminal moraines that form the “backbone” of Long Island giving it a “Y” shape. The northern shore is composed of mounds of till that have a wide range of particle sizes from clay up to boulder sized, all mixed together (unconsolidated). This is why the northern shore has many rocky beaches with steep cliffs and the southern shore is mostly flat with fine sand deposited from the glacier meltwater.

Glaciers also created the Finger Lakes in central & western New York. When the glaciers moved south, the ice followed the north-south oriented stream valleys. These valleys were made deeper and altered their V-shape to a U-shape. Later, the southward flowing streams were blocked by till & terminal moraines. The dammed north-south valleys then filled with water forming the Finger Lakes. Some of these valleys remained dry, but still show the glacially formed U-shaped valley.

No matter where you live in New York State, it is likely that you can observe glacial landforms in your local area.

Perhaps you have seen large erratics left high above a stream valley, such as Shelter Rock in Long Island. Maybe you have seen polished, scratched bedrock that has been exposed. Or even gravel pits and road cuts that reveal the unsorted till and layered meltwater deposits left behind by the glaciers. Even the patterns we see in the landscape, such as the alignment of ridges, valleys & drumlins are most likely the result of glacial erosion.



1. Explain how a moraine is created.
2. Why are there no bedrock exposures on Long Island?
3. Describe how the Finger Lakes were formed.
4. Give 2 examples of glacial evidence present in New York State.
5. Make a sketch below of a valley created by stream erosion and another of a valley created by glacial erosion. Label each.