Activity 9: Surficial Geologic Map of Maine

Maine Geological Survey

Objectives:

To have the students become familiar with the nature and use of the Surficial Geologic Map of Maine. To have them gain practice in using maps other than topographic ones.

Time:

This activity is designed to fill at least one class period.

Background:

Surficial geology deals primarily with the geologically youthful, unconsolidated sedimentary materials that exist at, or close to the surface, of a specific area. Surficial geology is important because the surface deposits filter and control the access of water to the water table. They are also important for siting of waste disposal facilities and for resources such as sand, gravel, and clay.

Mapping and correlating these deposits may also reveal a number of facts about the history of an area. A great many human activities take place on, or affect these surface deposits.

Make certain that the inland boundary of the marine limit is noted accurately. This boundary is very significant since it marks the maximum extent of ocean level rise after the last glaciation.

Materials:

Each group of four students should have:

- A copy of the surficial geology map of the state of Maine. Visit the MGS website for more information on purchasing or downloading maps.
- Copies of the question sheets
- Pens and notebooks
- Rulers and string may be helpful

Procedure:

After a brief discussion/review of the nature of maps in which the scale, legend, and reading techniques are emphasized, students should break up into groups and, using their maps, answer the enclosed questions.

There are no special safety precautions for this activity.

Follow-Up:

The marine limit is a significant, determining factor in delineating the boundaries of wetlands. See Activity #36 (Wetlands).

References:

Activity developed by Grant Connors, in conjunction with the 1991 CREST intern program.

Answer Key for Part I: A and B on Student Sheet

PART I. A) Identify the structures represented by the following symbols on the map:

 Glacially streamlined landforms

 Glacial striation locality

 Meltwater channel

 Cirque

 Contact

PART I. B) Identify the geologic units represented by the following.

a = Stream alluvium
s = Swamp, marsh, or bog
b = Beach deposits
eb = Emerged beach deposits
e = Eolian (wind) deposits
L = Lake bottom deposits
m = Glaciomarine deposits
ge = Eskers
em = End moraines
rk = Bedrock

Name_____

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Student Sheet

Purpose:

To develop familiarity with the Surficial Geologic Map of Maine.

Materials:

Each group of four students will need a copy of the Surficial Geologic Map of Maine, the enclosed data sheets, and notebooks and pens.

Procedure:

The Surficial Geologic Map of Maine shows the geographic extent and shape of various sedimentary deposits. It has many uses, from helping to determine the location of wetlands, to selecting a location for a well, to locating sources of sand and gravel for construction purposes.

These earth materials, such as sand, gravel, and clay, are much younger and easier to excavate than the solid bedrock that underlies them. Many of them were formed by glaciers that once covered Maine. Others were deposited more recently by wind, water, and accumulation of organic material.

After reviewing the general nature of maps and the rules for reading them (be certain to look at the legend), use the surficial map to find the following information and answer the following questions.

PART I:

A) Identify the structures represented by the following symbols:

_____

_____

_____

_____

_____

B) Identify the geologic units represented by the following symbols:

a = _____

s = _____

b = _____

eb = _____

e = _____

L = _____

m = _____

ge = _____

em = _____

rk = _____

C) Define in your own words the following:

delta = _____

moraine = _____

glacier = _____

esker = _____

bedrock = _____

peat = _____

kettle = _____

drumlin = _____

Part II:

I live in _____, Maine. Find the location of your town or city on the surficial map and note the spot. Using the scale of 1 inch = 8 miles, locate the NEAREST example of each of the following features. Indicate the distance to these features "as the crow flies" from your town.

FEATURE	MAP SYMBOL	INCHES	MILES	DIRECTION FROM TOWN
Swamp				
Lake bottom deposit				
Glacial outwash				
Glaciofluvial deposit				
Esker				
Moraine				
Bedrock				

Questions:

1. How far away from the inland marine limit are you? Answer in inches and miles.

2. Would you have been on dry land or under water when the ocean extended inland to the "marine limit" line? Explain how you know this.

3. About how many thousand years ago would YOUR town have emerged from the melting glacial ice sheet?

4. What is the name of the sand and gravel ridges formed in tunnels that were carved by water running through or under the glacier?

5. What glacial features occur right around Mt. Katahdin in Baxter State Park?

6. Millinocket has a lot of "rm" and small pockets of "t". Were these materials formed in contact with the glacier or by streams flowing away from the ice?

7. What are the yellow areas found in the Penobscot River valley?

8. What areas of Maine might provide large clay deposits for making bricks and pottery? How can you tell this from the map?

9. List five features found on the map around Presque Isle.

10. Describe Mt. Desert Island in terms of what is shown on the map.

11. What is the purpose of the small index map of Maine shown in the lower-right corner of the map sheet?

12. What sites of special interest are within 100 miles (remember, 1in=8mi) of your town? List them.

13. What is the oldest radiocarbon dated site in Maine?

14. Which map units might supply sand and gravel needed for road construction?