

## Activity 10: Bedrock Geologic Map of Maine

### Maine Geological Survey



#### **Objectives:**

To have students develop basic skills in reading, and some familiarity with, the Bedrock Geologic Map of Maine.

#### **Time:**

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

#### **Background:**

A map of bedrock geology describes the types of rocks that exist in a given area. A bedrock geology map shows these rock units as well as their known and inferred contacts. Consideration is also given to folding, faulting, unconformities, and similar rock relationships. These features are often included in bedrock geology maps.

The revised Bedrock Geologic Map of Maine displays the current knowledge of these topics in a colorful fashion that can be used in a variety of ways. In addition to noting the types of bedrock that exist in your local area, teachers can also point out trends such as the general northeast-southwest direction of some of the bands of rock. An interesting activity is to spot the Sebago Lake and Bottle Lake plutons which were once proposed locations for nuclear waste disposal facilities. Students should note other plutons on the map as well.

Students need to be familiar with the definitions of igneous, sedimentary, and metamorphic rocks before doing this activity. A general knowledge of the rock cycle is also useful.

### **Materials:**

Each group of four students should have:

- A copy of the bedrock geology map of the state of Maine. Visit the MGS [website](#) for more information on purchasing or downloading maps.
- Copies of the question sheets
- String and a pin or a compass
- Rulers
- Pens and notebooks
- Optional: Radon levels map based on test well data for the state of Maine.

### **Procedure:**

Students should be reminded to read the legend and scale, and to be aware of the other information that is included on the map such as the stratigraphic column, list of formations, inset map of metamorphic grade, and so on.

Once they are familiar with this, they should locate their city or town and place a pin in the exact center. Using a piece of string or a compass, swing a 2.5 inch arc (40 miles diameter) around the pin. Draw a circle lightly in pencil on the map. Students should then identify all the symbols inside the circle, and the age of the various rocks

Students will then locate their town on the tectonic and metamorphic zone maps and record specific information; using this information they will answer questions about the area.

There are no special safety precautions for this activity.

## **Follow-Up:**

If travel is available, and the list of rock types is not too large, it is an excellent idea to take the students, AFTER the exercise, and collect representative samples of the major bedrock types. These can be the basis of a permanent display or collection. You may want to take a photo of the outcrop and then make a poster including the photo, location data, a description of the rock type and the sample itself (nicely cleaned up) at the bottom of the poster. When neatly done, these make excellent displays for glassed-in bulletin boards, parent's night and so on. They are also an excellent classroom resource.

From Biblical times when man was advised to "build his house on a rock" to modern times when bedrock type and structure can affect all of our lives, the vast majority of people have ignored the rock(s) beneath them. With Maine having one of the highest levels of radon gas emissions in private and public buildings in the nation, (Maine is second only to Finland in radon gas emissions worldwide) it might be well for all students to take a good look at the bedrock geology of the area in which they plan to build or purchase an existing house, or where they are currently living.

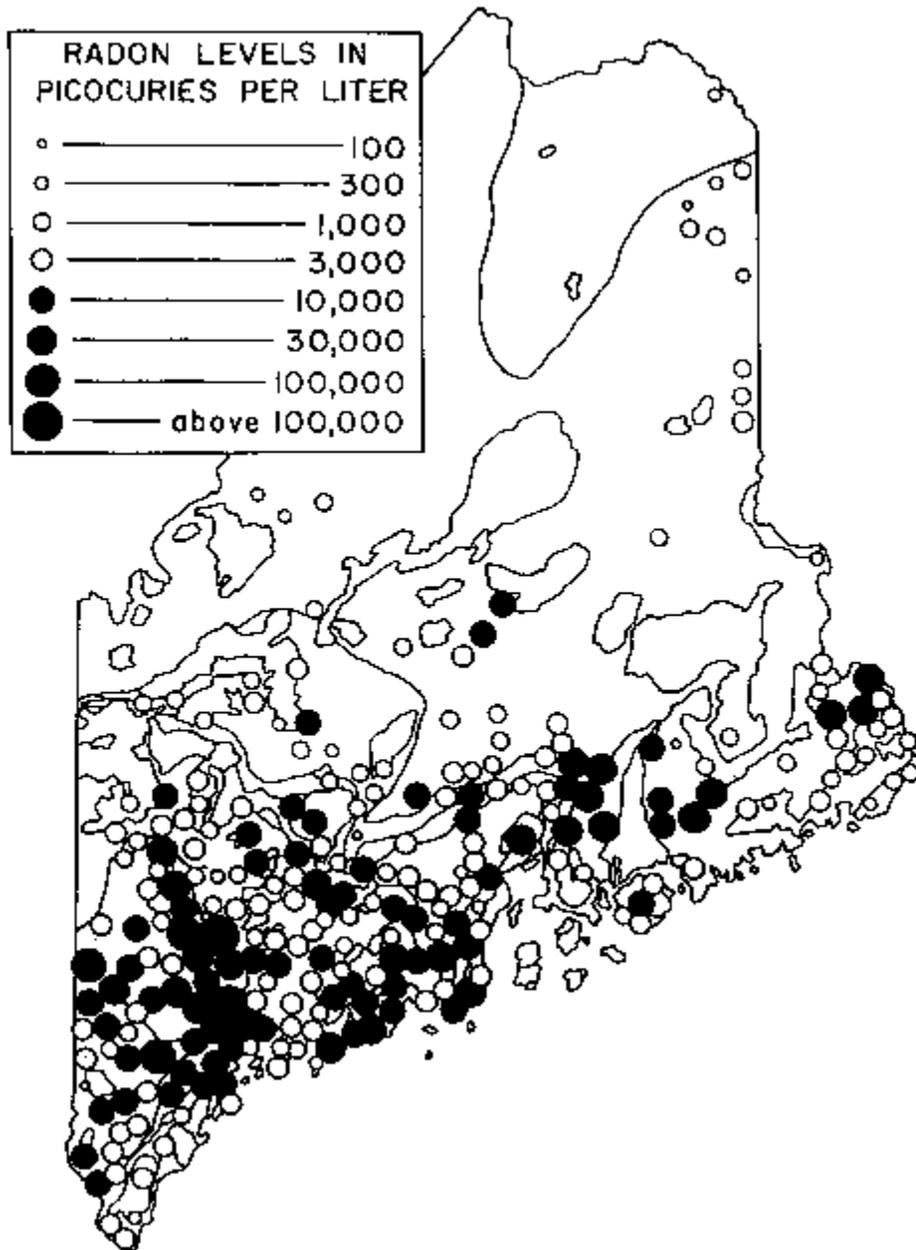
## **References:**

There is a list of 248 references located on the right hand portion of the map. Some of these references are available for inspection at the Maine Geological Survey Library. Teachers may wish to obtain photocopies of references that pertain to their area.

The book entitled Radon-222 in Potable Water Supplies in Maine: The Geology, Hydrology, Physics and Health Effects by C.T. Hess and others (Project Report A-045-ME, Land and Water Resources Center, University of Maine at Orono, 1979), is an excellent reference covering most aspects of radon gas here in Maine.

## Optional Radon Map of Maine:

GENERALIZED MAP OF MAINE SHOWING RADON LEVELS



(from C. T. Hess and others, 1979, *Radon-222 in Potable Water Supplies in Maine: The Geology, Hydrology, Physics and Health Effects: Land and Water Resources Center, University of Maine, Orono, p. 78.*)

Name \_\_\_\_\_



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#### Student Sheet

#### **Purpose:**

To develop familiarity with the Bedrock Geologic Map of Maine; to use this map to infer some basic geologic history.

#### **Materials:**

Each group of four students will need the following: a copy of the Bedrock Geologic Map of Maine, a pin, string or a compass, pens, and notebooks. OPTIONAL: Radon levels map.

#### **Part I:**

1. Make certain that you are familiar with the map. Be certain to check the scale and read the legend.
2. Locate your town \_\_\_\_\_, on the map, and place a pin through the center of your town.
3. Using the pin as an axis of rotation, draw a circle with a 2.5 inch radius around the pin. This will give you a circle on the map that is approximately 40 miles across.
4. Once you have done this, examine the rock types inside the circle and record the following. The sample rock type provided may or may not be in your circle.

| ROCK SYMBOL | ROCK NAME | AGE OF ROCK | AMOUNT IN CIRCLE |
|-------------|-----------|-------------|------------------|
|             |           |             |                  |
|             |           |             |                  |
|             |           |             |                  |
|             |           |             |                  |
|             |           |             |                  |
|             |           |             |                  |
|             |           |             |                  |

Once you have filled in the chart, write a short paragraph describing the major rock types and relationships inside your circle.



## Questions:

1. Look up the symbol for fault on the map and record it; what is a fault?
2. Find the Norumbega fault and list some of the towns that it goes through or near. *PLEASE NOTE: Unlike the situation on the United States West Coast, historic and recent earthquakes have never been directly linked to known faults in Maine, or all of New England.*
3. It is possible to establish relative ages of some faults in Maine. Look for faults near Devonian plutons (such as Sebago Lake pluton), of which there are several good examples. How would you determine if the fault is younger or older than the pluton?
4. If your teacher gives you a locator map of radon gas emissions for Maine, locate your town on the map and record the degree of radon gas emissions from test wells. Next note the overall bedrock type for your map. Write a statement relating these two pieces data.
5. What major differences in rock types can you find between northern and southern Maine?