

ROCKS OF NEW JERSEY

Introduction

The minerals that you studied previously usually combine to form "mixtures" called **rocks**. The kinds of rocks found in any location depend on many factors that form the "geologic history" of the region. These factors can include the kinds of chemical elements present when the molecules in the minerals formed, ways in which the minerals were created, events that changed them later, whether the area was covered by glaciers during the Ice Ages, and other processes.

The solid **bedrock** of Earth's crust may lie beneath loose **soil** or be exposed as **outcrops**. Rocks found at a location may have broken off as the bedrock was **weathered** or they may have been **transported** into the region by glaciers, streams, or human activities (such as landscaping.)

The two main purposes of this investigation are:

- to learn how to identify major rock types through their characteristic properties, especially through the Earth Science Reference Table identification charts
- to understand how to find out what types of rocks can be found in New Jersey using **geologic maps**

Procedure

Begin your study of rocks with the samples provided of **IGNEOUS, SEDIMENTARY** and **METAMORPHIC** rocks to learn how to identify the major types. In the spaces provided for each type of rock, write key characteristics that would help you identify each of these.

Also answer the questions for each rock type and the additional question set.

Note: As you are using actual specimens, be sure that you are learning to identify samples based on the general characteristics of any sample of that rock and not just through the specific characteristics of a particular sample.

To help you know what characteristics are important, use:

- pages provided from the Earth Science Reference Tables
- "Rocks" slideshow available from your Class Page or Earth2Class http://www.earth2class.org/er/students/sel_ppt.php
- your textbook and other sources

IGNEOUS ROCKS

BASALT	
GRANITE	
GABBRO	
OBSIDIAN	
PUMICE	

1. What major features help you identify a sample as an igneous rock?
2. Where can you find igneous rocks in Englewood? What formed them?
3. What igneous rocks are often used for buildings and monuments? Why?

SEDIMENTARY ROCKS

CONGLOMERATE/BRECCIA	
LIMESTONE	
SANDSTONE	
SHALE	
ROCK SALT/HALITE	

4. What major features help you identify a sample as a sedimentary rock?

5. Where can you find sedimentary rocks in Englewood? What formed them?

6. What sedimentary rocks are used on this campus? Where?

METAMORPHIC ROCKS

GNEISS	
MARBLE	
SCHIST	
COAL	
QUARTZITE	

7. What major features help you identify a sample as a metamorphic rock?

8. What metamorphic rocks are found in New York City?

9. What metamorphic rock are often used in buildings and statues?

10. On another piece of paper, make and attach a relatively simple drawing of the "Rock Cycle" and explain it.

New Jersey's Rocks and Geology

The New Jersey Geological and Water Survey, a division of the NJ Department of Environmental Protection (NJDEP), provides a lot of information about our state's geology at <http://www.state.nj.us/dep/njgs/>.

The bedrock geology map provided on the next page is one version. Information about the geologic age is also given.

You should now view the online version to see the colors better and read the description of the rocks and their geologic history available at <http://www.state.nj.us/dep/njgs/enviroed/freedwn/psnjmap.pdf>

Also on the next page is a map of the **physiographic provinces**. This term refers to the landscapes and bedrocks of a region. You can view the online version at <http://www.state.nj.us/dep/njgs/geodata/dgs02-7.htm#Image>

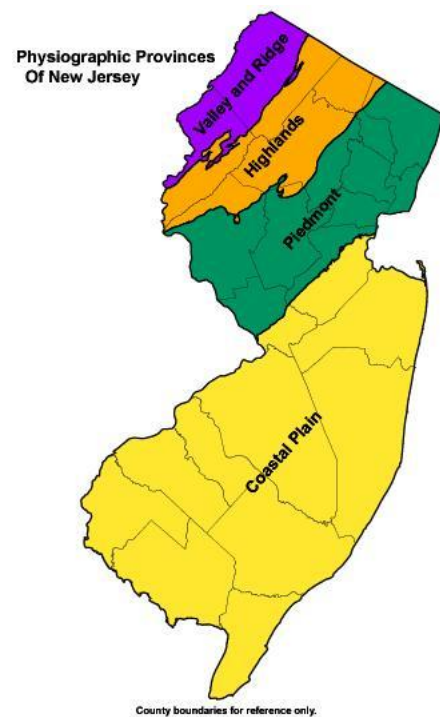
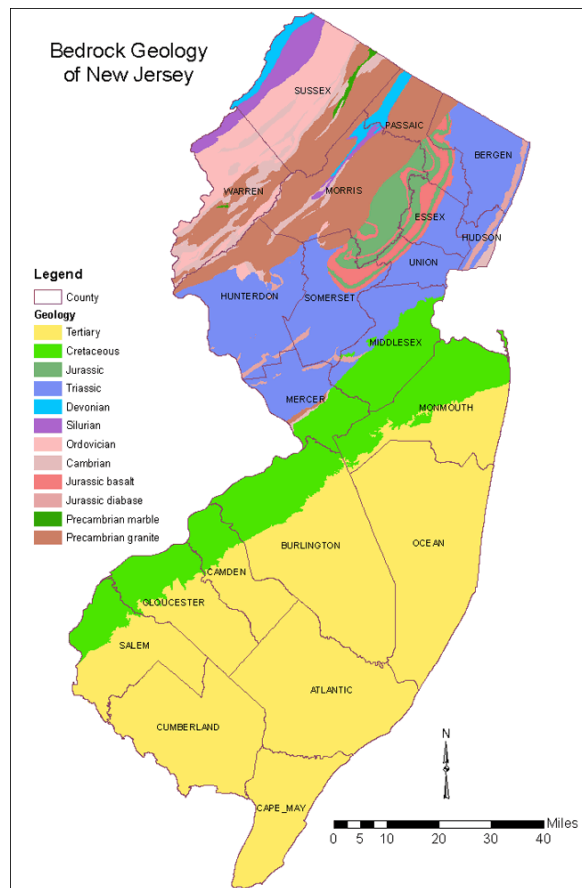
Use both of these to answer the next set of questions.

11. In which physiographic region do we live? What are the rocks found in this province-age and types?

12. What are the types of rocks and ages found in the Atlantic Coastal Plain province?

13. What are the types of rocks and ages found in the NJ Highlands province?

14. What are the types of rocks and ages found in the Ridge and Valley province?



Additional questions:

15. Explain how to distinguish rocks that formed by "extrusive" processes from those that formed from "intrusive" processes.

16. Contrast "felsic" and "mafic" igneous rocks, using specific examples.

17. Garrett Mountain in Paterson contains "pillow lavas." How did these form?

18. In what kinds of rocks do caves and caverns often form? Why?

19. In what kinds of rocks are fossils often found? In which kinds of rocks are fossils rarely found? Explain.

20. Describe briefly the three "agents of metamorphism."

21. Where has "contact metamorphism" occurred in the Englewood area?

22. In what kinds of rock did the Franklin area iron and zinc ores form?

23. For centuries, especially before food could be refrigerated, salt was an essential resource. Near which city in New York State have rock salts been mined?

24. Coal is an valuable non-renewable energy source.

A) Explain why coal is considered a rock, but not a mineral.

B) In what state near NJ has coal been extensively mined?

c) What were built in the 19th century to transport coal across NJ?

25. Bricks and concrete are “artificial” rocks. What “natural” rocks are these most similar to?

Selected Internet sites to learn more about rocks:

NJ Geological Survey <http://www.state.nj.us/dep/njgs/>

United States Geologic Survey (USGS) <http://geomaps.wr.usgs.gov/parks/rxmin/rock.html>

Franklin Mining Museum <http://franklinmineralmuseum.com/>

Sterling Hill Mining Museum <http://sterlinghill.org>

Mineral Information Institute <http://mii.org>

Glendale Community College (AZ) image gallery
<http://www.gccaz.edu/earthsci/imagearchive/interest.htm>