

Rocks



http://en.wikipedia.org/wiki/File:USDA_Mineral_Sandstone_93c3955.jpg

Dr. Michael J. Passow



<http://www.beg.utexas.edu/mainweb/publications/graphics/granite.htm>



<http://www.gccaz.edu/earthsci/imagearchive/gneiss.htm>

This slide show is intended to help you understand important types of rocks.

The diagram in the next slide represents the ROCK CYCLE—a scheme that represents the processes of continuous changes that connect the three major groups of rocks:

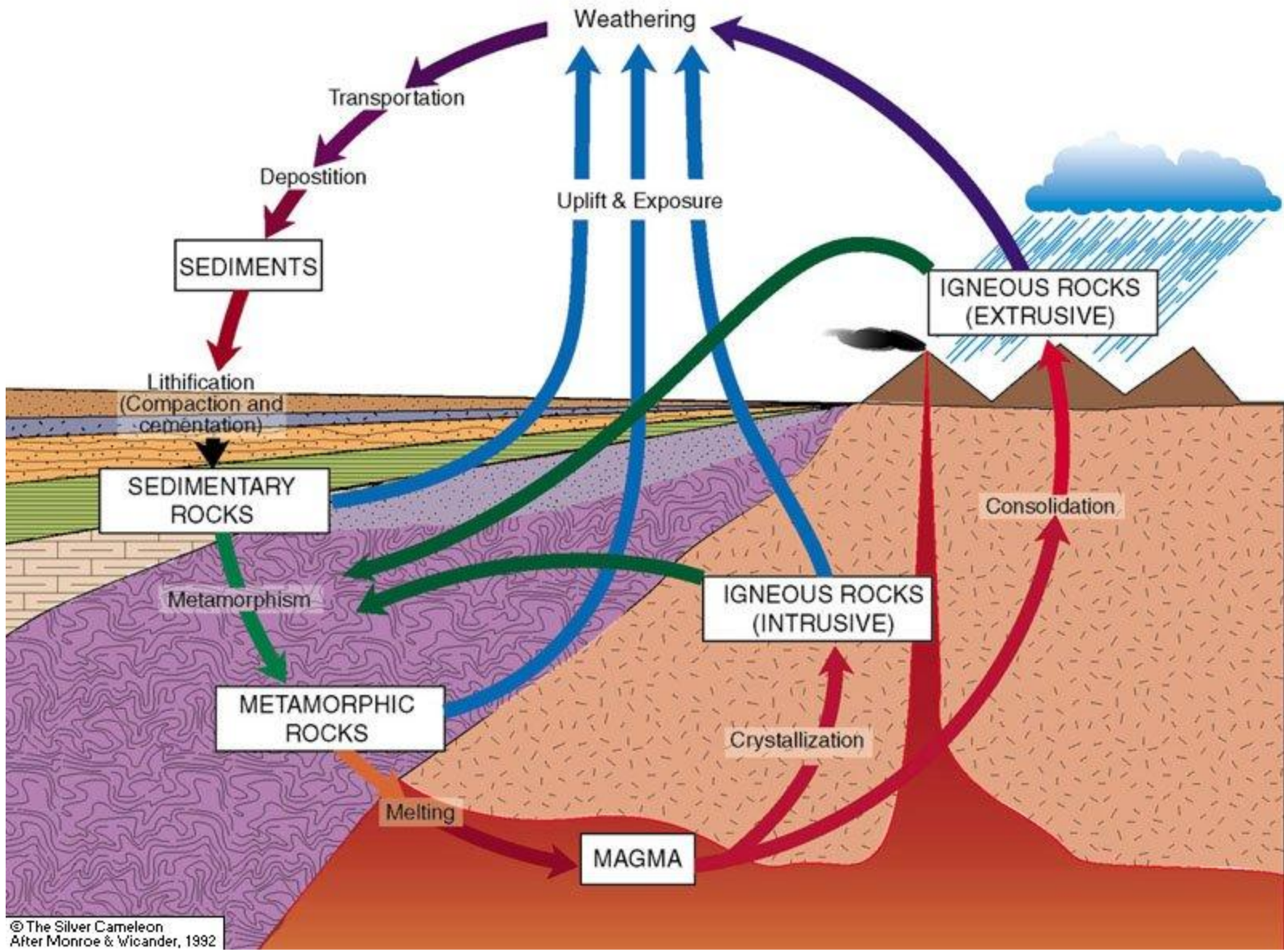
SEDIMENTARY

IGNEOUS

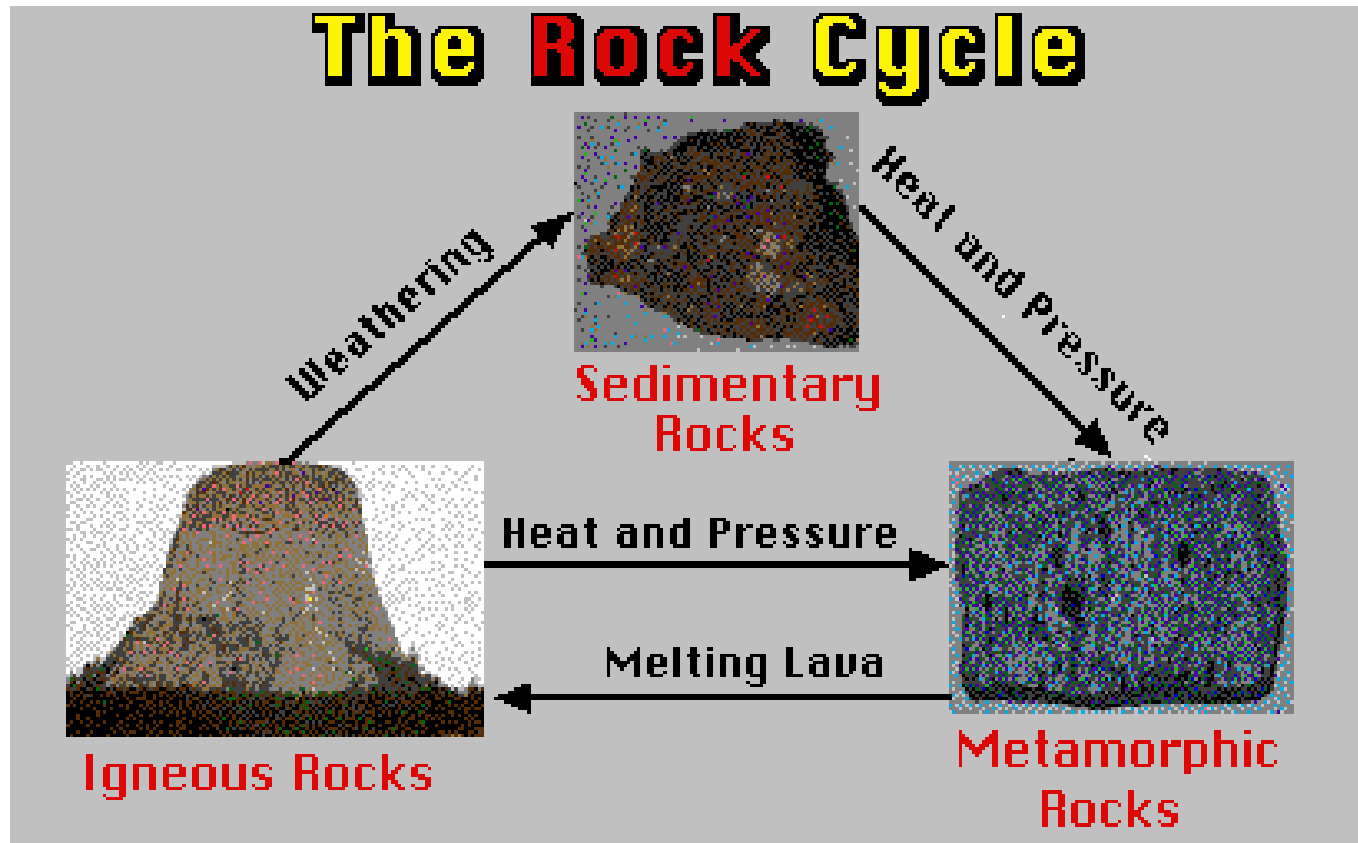
METAMORPHIC

It also shows two other important parts of the “Rock Cycle” – SEDIMENTS and molten LAVA and MAGMA

Note about image sources: Many images come from a website (Volcano World) that no longer is supported, so no credit is given. The last slide provides possible sources.



Here is another version of the Rock Cycle



CLASSIFICATION OF ROCKS

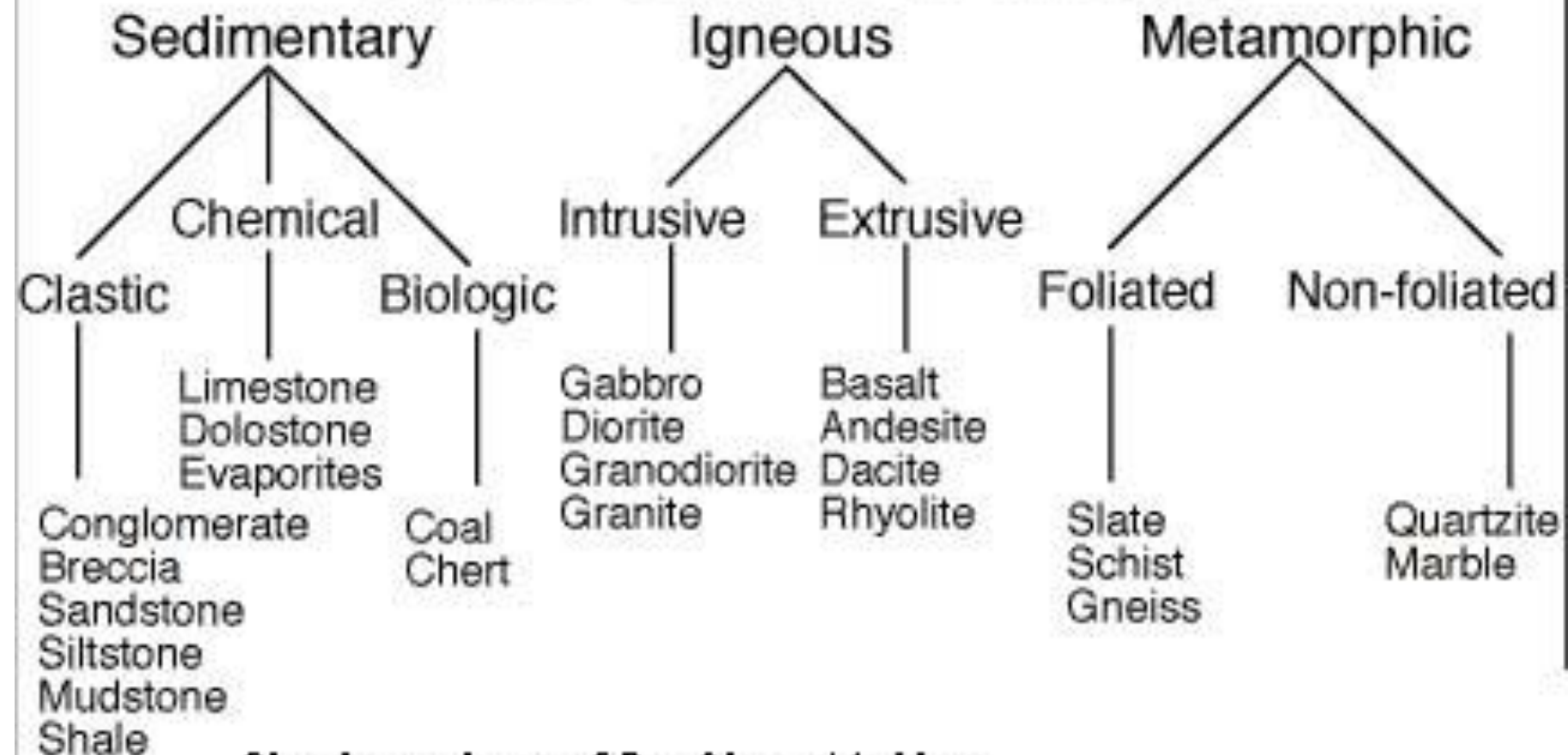


Chart courtesy of Dr. Steve Mattox

IGNEOUS ROCKS

- Form by solidification (crystallization) of melted minerals
- At the surface, LAVA hardens to form EXTRUSIVE rocks with tiny (FINE-GRAINED) crystals or GLASSY (no crystal) TEXTURES
- Beneath the surface, MAGMA hardens to form INTRUSIVE rocks with easily visible (COARSE-GRAINED) crystal texture.

Granite

- Light-colored, coarse-grained, no pattern
- Mostly quartz, feldspar, mica, and hornblende
- Often used for buildings and monuments



Basalt

- Dark-colored, fine-grained, extrusive
- Formed where lava erupted onto surface
- Most widespread igneous rocks
- Found locally in the Palisades along west shore of Hudson River, Connecticut River valley



Gabbro

- Dark-colored, coarse-grained intrusive
- Similar composition to basalt—plagioclase feldspar with some pyroxene and olivine



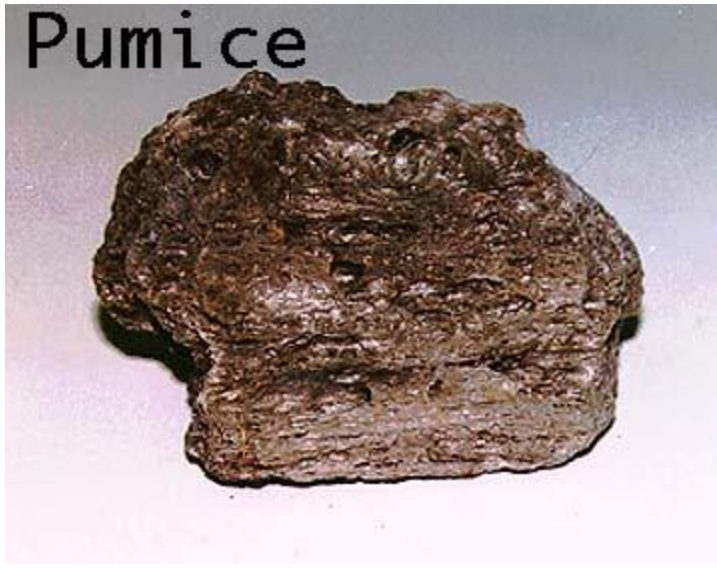
Obsidian

- Natural volcanic glass
- Forms when lava cools very quickly
- Usually dark, but small pieces may be clear
- Fractures along curved (conchoidal) surface
- Used as spear and arrow points, knives



Pumice and other igneous rocks

- Light colored, frothy (many air spaces)
- Same minerals as in granite, but finer in grain size

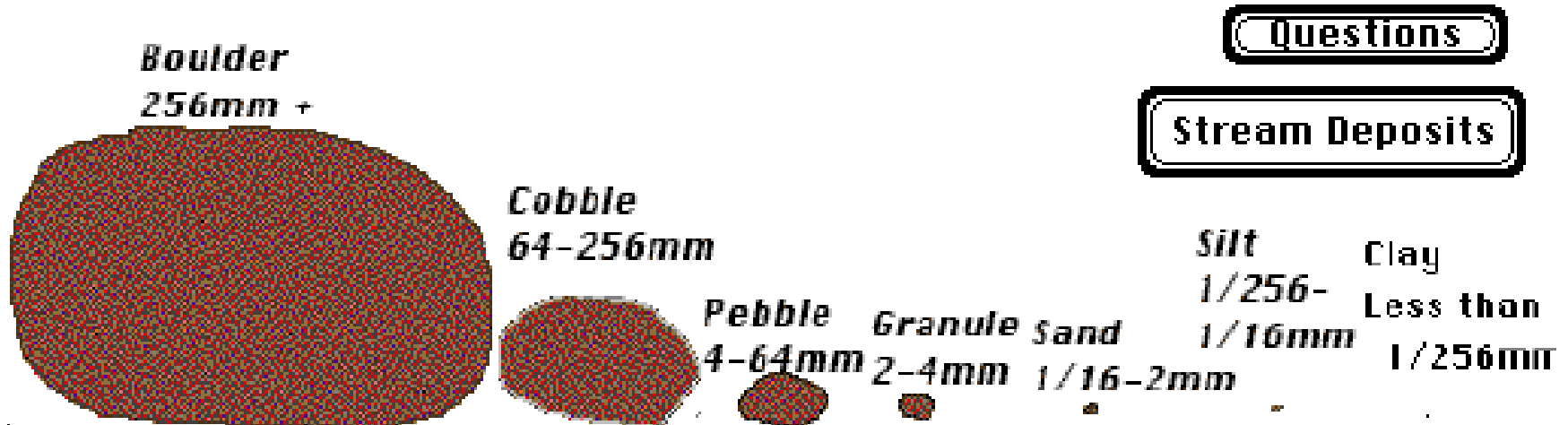


Sedimentary Rocks

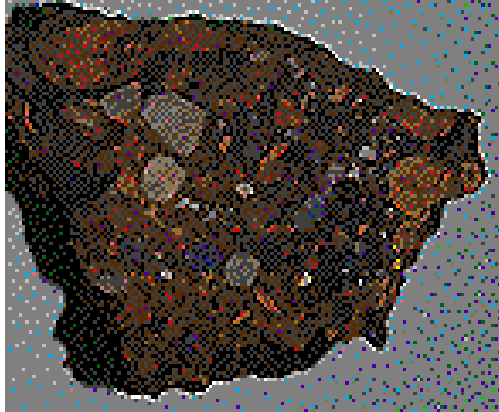
Sedimentary rocks may be made of rock fragments—sediments—or by chemical reactions. The classification of sediments is shown below.

Sediment Size Chart

Diagram not drawn to scale

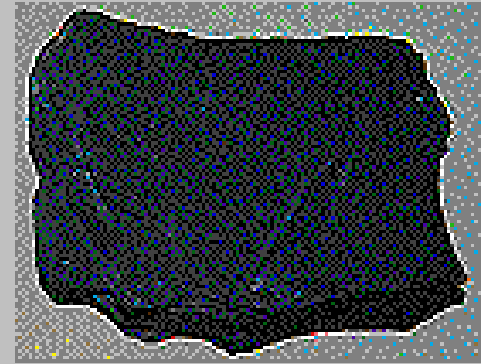


Clastic rocks—made of cemented sediments—are classified by their grain sizes.

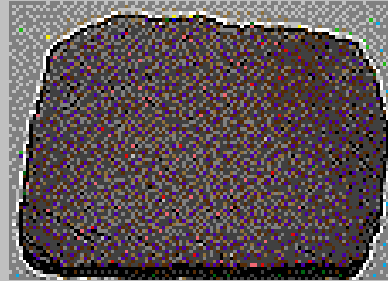


Conglomerate

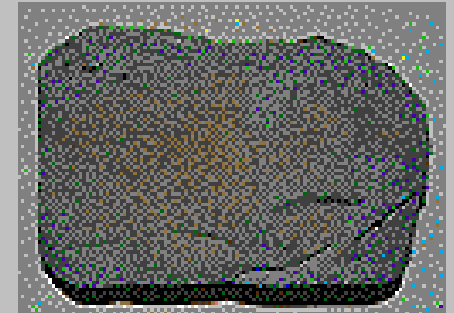
Clastic Rocks



Shale



Red Sandstone



Gray Sandstone



Breccia

Non-clastic rocks form by chemical precipitation (settling out from a solution.) Limestone is made from calcite, chert from quartz, and halite is rock salt.

Limestone

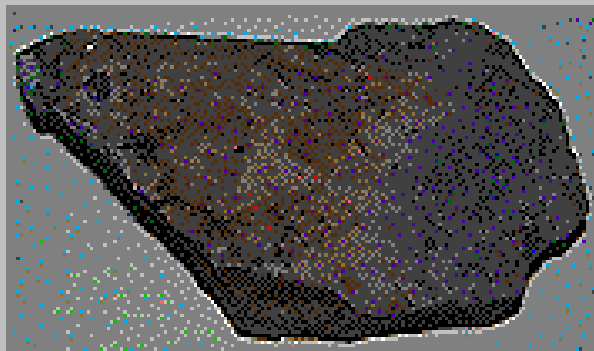


Non-Clastic Rocks

Halite



Chert



Biologic sedimentary rocks come from the remains of organic matter.

- The most important of these is coal. Anthracite coal results from the greatest pressure and releases the most energy when burned. Other varieties are bituminous and lignite. “Petrified” (permineralized) wood is another organic rock.



More about sedimentary rocks

- Shale is the most common sedimentary rock
- Sedimentary rocks cover about three-quarters of the land surface
- For more about sedimentary rocks:



Metamorphic Rocks

- Formed by heat and pressure changing existing rocks
- REGIONAL METAMORPHIC affects a large area and results from plate tectonics
- CONTACT METAMORPHISM affects rocks on a local scale, such as “baking” sedimentary rocks next to magma or lava

“Foliated” rocks contain much mica and other rocks that produce layering or banding

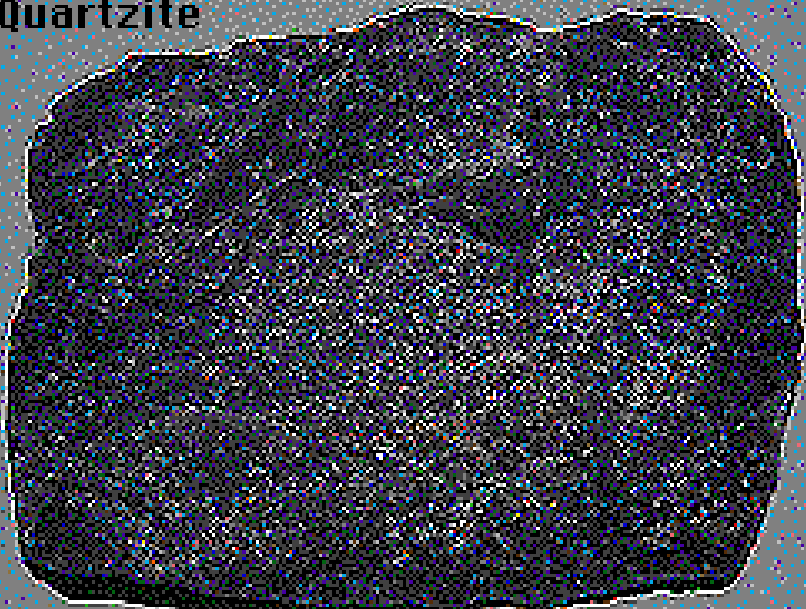


Gneisses and schists are common in New York City and Westchester.

Non-foliated metamorphic rocks include marble, which comes from limestone, and quartzite, which comes from sandstone

Non-Foliated

Quartzite

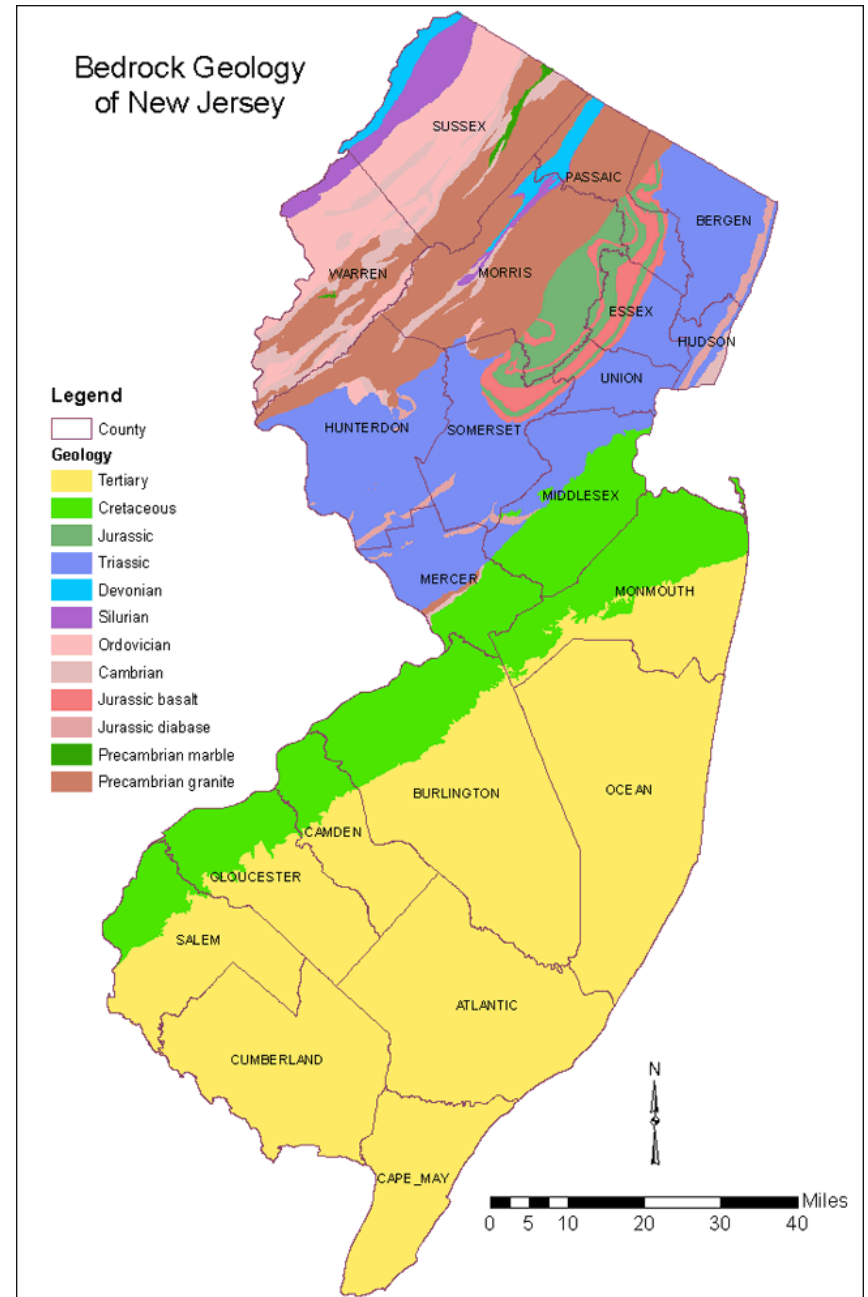


White Marble

Photos by Dr. Steve Mattox

Locations, types, and ages of the **bedrocks** are represented in a **geologic map**

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



Additional Resources

There are many web sites that can provide you with more information about rocks and images. Here are a few:

<http://www.gccaz.edu/earthsci/imagearchive/gneiss.htm>

<http://geology.about.com/library/bl/images/blrockindex.htm>

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