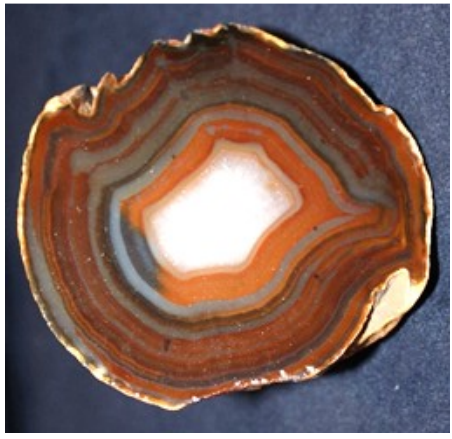
Rock Identification Field Guide



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Metamorphic Rocks

The Greek word for metamorphic (meaning *change form)* is used in the Bible. It occurs in Romans 12:2, "*And do not be conformed to this world, but be transformed (changed) by the renewing of your mind, so that you may prove what the will of God is, that which is good and acceptable and perfect.*" So the idea behind metamorphic rocks is that they have been changed from their original rock through heat and pressure. Metamorphic rocks are divided into two categories: *foliated* and *nonfoliated*.

Foliated refers to repetitive layering or banding in metamorphic rocks. Each layer may be as thin as a sheet of paper, or over a meter in thickness. The word comes from the Latin *folium*, meaning *leaf*, and refers to the sheet-like planar structure. Foliation also would refer to the banding in metamorphic rocks where the original minerals are separated out into alternating layers of light- and dark-colored bands.

Nonfoliated – refers to the crystallization of a rock. When a rock does not show the typical banding or layered appearance that is typical of gneiss and schist, geologists refer to it as nonfoliated.

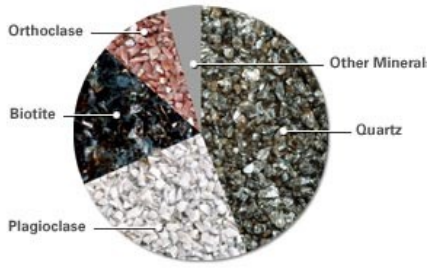
Secular geologists guess that it took millions of years and deep burial of preexisting rocks under a great deal of heat and pressure to form metamorphic rocks. But that is conjecture. Vast amounts of rock grating against other

rocks can create huge amounts of friction and thus heat and pressure. This could have been very easily produced by the Genesis Flood during the tectonic energy associated with the breaking up of the fountains of the great deep in Genesis 7:11. Realize that once the Genesis Flood is rejected as a possible mechanism for all the geology we see in the earth today, then anything is indeed possible. But the Genesis Flood has been revealed to us as a real historical event and that would supersede any possible idea advanced by man.

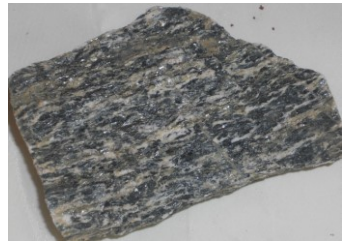
The Foliated Metamorphic Rocks:

Gneiss – upon careful examination of any sample of gneiss, it becomes apparent that it has the same minerals as the plutonic rocks. It is just banded, as opposed to being evenly mixed. It's fair to conclude that most gneiss might have been granite, diorite or gabbro before it was metamorphosed. Examine the following examples of gneiss and try to guess what the original rock was. The minerals are the same as in plutonic rocks, including granite, diorite and gabbro: quartz, the feldspars, and biotite or muscovite mica.

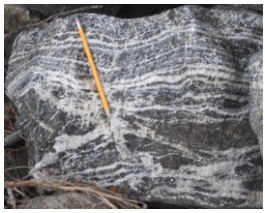
Diagram of minerals in gneiss



Examples of gneiss



(Gneiss, cont.)









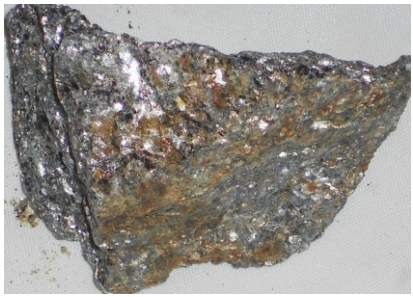

Schist is metamorphosed layering but with the addition of mica. Perhaps schist was formerly shale or sandstone. No one has ever seen a metamorphic rock form, so we don't really know. But the best way to describe schist is that it looks like layers of glitter. Many examples of schist are very fine-grained so that rather than large visible flakes of mica, the texture may appear to be tiny fine crystals cemented together. Schist can also occur in a variety of colors and often can contain large crystals of garnet, staurolite or some other gemstone. Mica is the main ingredient.

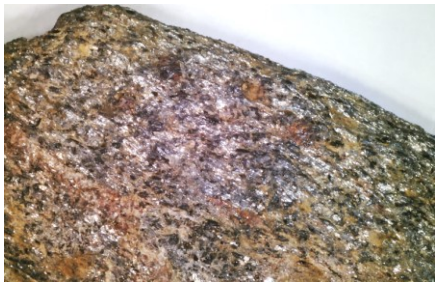
Examples of schist





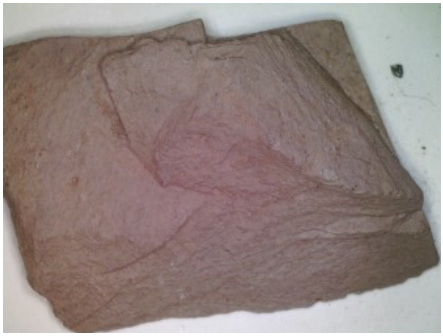

(Schist, cont.)





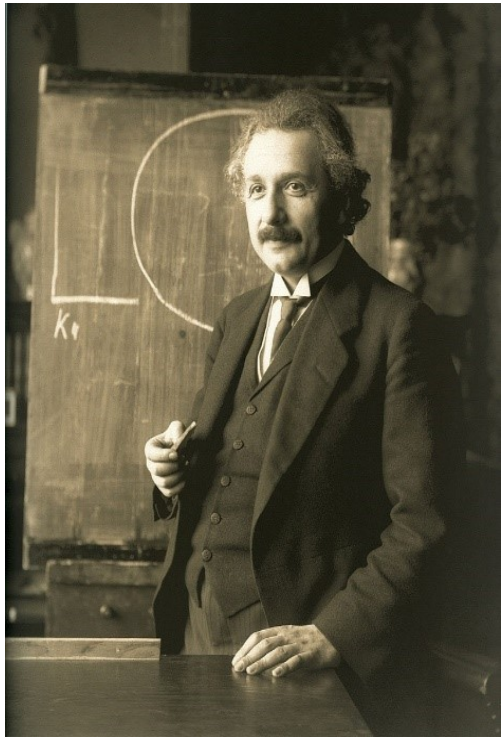
Slate appears to be metamorphosed shale, which is a sedimentary rock. Whereas shale is brittle and fragile, slate is foliated, but hard. Slate can occur in all kinds of colors.

Examples of slate



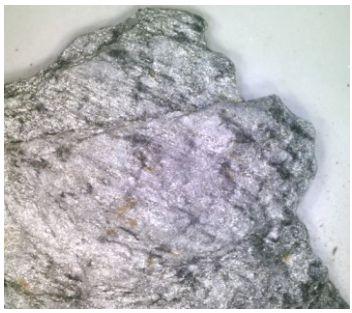
(Slate, cont.)

Blackboards made of slate used to be a common fixture in the classroom. Today they have largely been replaced by white boards.



Phyllite appears to be metamorphosed slate with a very shiny appearance as a result of mica.

Examples of phyllite

The Nonfoliated Metamorphic Rocks:

These rather than being layered or banded, have probably been recrystallized through heat and pressure.

Quartzite, as the name implies, is filled with quartz. It is thought to be metamorphosed sandstone. Its grains can be fine or coarse and there is a tremendous amount of variation in the color. It is quite abundant and because it is so hard, polishes beautifully. It is a fun rock to collect because of its variety. And it is easily recognizable, being kind of like a sugar cube in texture. It often preserves the iron-rich bands common in regular sandstone.