

Background Information for Parents – Rocks and Minerals

Minerals naturally occur in nature and are the raw materials of rocks. Minerals have definite chemical compositions and physical properties. Some common minerals are feldspar, quartz, calcite, mica, and hornblende. Some minerals are valuable enough to be mined. Some of these are the metal ores from which we obtain iron, lead, copper, aluminum, zinc, gold, and silver.

Mineral properties include

- *Shape*
 - Usually found in layers or crystals
- *Color and Streak*
 - The streak (or mark) of a mineral may not be the same color as it's presenting color.
- *Hardness*
 - Minerals vary a great deal in hardness, but scientists are able to determine ranges of hardness by way of a list called Moh's Scale.
 - The scale ranges from the softest mineral (talc) to the very hardest (diamond).
- *Luster*
 - How shiny or dull a mineral is
- *Cleavage and Fracture*
 - How the mineral breaks
 - If a mineral can be split or broken on a flat plane then it has cleavage.
 - If a mineral doesn't split on flat planes or shatters easily than it is said to have fracture.

The materials of which the Earth's crust is composed are rocks. Rocks are naturally occurring materials, themselves composed of combinations of minerals. Few rocks are composed of a single mineral. Rocks are classified by where and how they are formed.

All rock types can be physically and chemically broken down by a variety of surface processes collectively known as **weathering**. The sediment that is created by weathering is often moved through the landscape by erosional forces such as streams, glaciers, wind, and gravity. When this debris is deposited as permanent sediment, the processes of burial, compression, and chemical alteration can modify these materials over long periods of time to produce **sedimentary rocks**. These rocks have been exposed to weathering on the Earth's surface. Most sedimentary rock has formed on the sea bed; as layer upon layer of sediment is deposited one upon another, the weight of the continuous deposits squeezes out water and causes chemical changes in the minerals present. These changes can cause the grains to become cemented together and new sedimentary rock is formed. Distinct layers, depicting different periods of deposition can usually be found in sedimentary rock. (Examples: *Sandstone, Shale, Conglomerate, Limestone, Chert, Coal, Gypsum*)

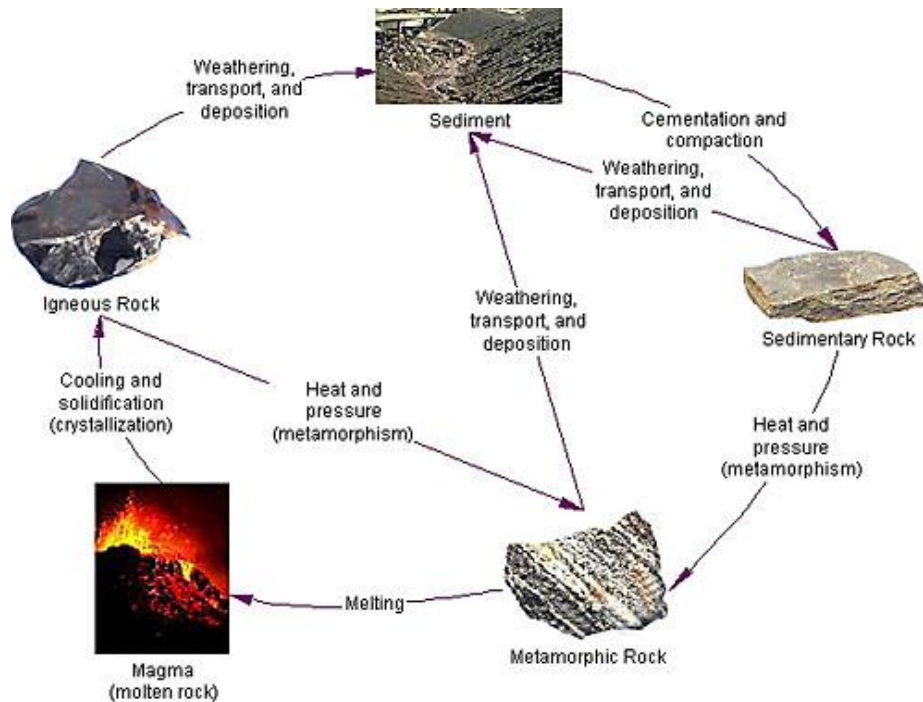
Igneous rocks have been formed by cooling and crystallization of molten rock (magma). The magma could have been formed in the crust or upper mantle of the Earth. It consists of molten silicates, water, and gases. Magma tends to rise into and through the crust since it is less dense than solid rock. Igneous rock can be identified by its crystals which are often large enough to be seen with the naked eye. The size of the crystals depends upon the rate at which the magma cools: rapid cooling such as magma that rose quickly to Earth's surface, results in very small crystals. Large crystals form when the magma cools

slowly and solidifies before reaching the surface. (Examples: *Granite, Obsidian, Basalt, Pumice, Andesite, Diorite, Rhyolite*)

Rocks modified by heat and/or pressure are termed **metamorphic rocks**. Metamorphic rock has undergone physical and/or chemical changes when existing rock (sedimentary, igneous or metamorphic) becomes buried because of Earth movements. The rock will undergo extreme pressure and if buried deeply enough, will become heated and a new rock will form. Baked rock does not melt, but it does change. It forms crystals. If it has crystals already, it may form larger crystals. Metamorphosis can occur in rock when they are heated to 300 to 700 degrees Celsius. (Examples: *Marble and Quartzite*)

The rock cycle never stops. Given enough time every type of rock can become every other type of rock. Mountains made of metamorphic rocks can be broken up and washed away by streams. New sediments from these mountains can make new sedimentary rock.

The diagram below illustrates a basic rock cycle. Notice the forces that act upon each rock in order to change it to a different type of rock.



Courtesy of <http://www.personal.psu.edu/users/c/l/cll161/insys%20441/main.html>

Sources: <http://www.ei.lehigh.edu/envirosci/geology/rocks/minerals3.html>
<http://www.uen.org/Lessonplan/preview.cgi?LPid=2492>
thetrc.org/trc/download/geoscience/GRADE_6.doc