

# MINERALS, ROCKS, AND ORES

A **mineral** must meet each of the requirements below:

- 1) **naturally occurring** - not manmade
- 2) **inorganic** - not formed from plants or animals
- 3) **crystalline** - has a crystal structure or a regular arrangement of atoms
- 4) **characteristic chemical composition** - made up of one or more elements
- 5) **characteristic crystal shape**

Some properties used to identify minerals are listed below:

**Crystal form** is the external geometric appearance of a perfectly formed crystal. The flat external surfaces of the crystal are called crystal faces. Some of the more common terms for crystal forms are cubic, prismatic, and hexagonal.

**Luster** is the manner in which the surface of a substance reflects light. Most commonly used terms are **metallic** (looks like a metal) and **non-metallic**.

**Streak** is the color of a mineral after it has been ground to a fine powder. The easiest way to do this is simply to scratch the mineral across the surface of a porcelain streak plate, then blow away the excess powder. The color remaining on the plate is called the streak.

**Hardness** is a measure of resistance to scratching. Most geologists use *Mohs Scale of Hardness* and the hardness of some common objects to measure this property. Since you probably will not have a complete set of *Mohs Hardness Scale* minerals, you might choose to use the common objects listed in the table on the reverse side.

The **color** of a mineral is its most noticeable property but actually is one of the least accurate properties in mineral and rock identification. Color may vary dramatically for some minerals.

A **rock** is made up of one or more minerals. The three types of rocks are listed below.

**1) Igneous** - rocks that form by the cooling of magma or lava. The size and color of the grains in these rocks are important in identifying them. Notice whether the grains are large (can be seen with the naked eye) or are very small (can only be seen by using a microscope). Next, look at the color of the rock. Note whether it is light, intermediate, or dark in color.

**2) Sedimentary** - rocks that form from sediments, such as loose sand, mud, or pebbles, of preexisting rock, or from precipitation of inorganic material from water. Try to decide whether the rock is made up of clay, silt, sand, or gravel. A lot of sedimentary rocks are made up of shells, or shell fragments (limestone), plant fragments (coal), or crystals of halite (salt), or gypsum.

**3) Metamorphic** - rocks that have been altered physically or chemically by intense heat, pressure, or hot fluids. Metamorphic rocks are divided into two groups, foliated and non-foliated. Foliated rocks contain parallel lines of minerals that have been realigned due to pressure and temperature. If the rock is foliated, it may look wavy or wrinkled, shiny, glittery, or color banded. If the rock is non-foliated, then look at the size of the grains and determine which mineral or minerals make up the rock. Every metamorphic rock has a parent rock, or rock that existed before metamorphism. Marble is formed by the metamorphism of limestone.

**Ore** is the naturally occurring material from which a mineral or minerals of economic value can be extracted at a reasonable profit.