COLOR IN MINERALS

Humans are a visually-oriented species with excellent color vision. When asked to describe a mineral, most people begin with color and then describe luster, crystal shape, or other properties.

Minerals can be placed in three groups based on color. In one group, the minerals always have the same characteristic color. Examples that can be used with a class include:

Azurite – blue
Copper – copper red
Galena – steel gray
Magnetite – black
Malachite – green
Pyrite – brass yellow
Sulfur – yellow

Showing a collection is a good way to convince students that minerals are not drab and boring. Color in some minerals is caused by the presence of metallic or submetallic elements. For example, copper minerals (such as azurite and malachite) are often green to blue. Iron minerals are black or dark green. Sulfur is always yellow. But when sulfur combines with metals, their sulfides reflect light quite differently (such as galena and pyrite.)

Common rock-forming minerals display a variety of color, often due to tiny amounts of pigmenting agents contained within the major elements. You can teach about this property using the common minerals quartz and calcite. Quartz has different names based on color: amethyst (lavender to violet), rose (pink), citrine (yellow), smoky (brown), milky (white), and rock crystal (colorless). Calcite can be colorless, green, blue, white, yellow, or pink, but the color varieties are not separately named.

A large part of the appeal of gemstones comes from their color. Varieties of corundum have different common names: ruby is red, but any corundum not deep red is called a sapphire, and may be blue, pink, or yellow. Beryls may be deep green (emerald), bluish (aquamarine), or other colors. Diamonds come in many hues. Most diamonds used in jewelry are colorless. The famous Hope Diamond (in the Smithsonian Institution in Washington, DC) is deep blue, and other specimens can be yellow, green, pink or red.

A third group of minerals show “false-color” due to how light reflects off the surface. Labradorite shows a multi-colored patterns due to reflections off internal cleavage planes. Opals give off rich flashes of color as a result of the way light interacts with internal silica structures.

Color can be a powerful lure to catching students’ interest in minerals.

Adapted from: “Color in Minerals” by Earl R. Verbeek, Sterling Hill Mining Museum, Ogdensburg, NJ, USA