Mineral Mystery (Grades 2 - 4)
Pre-Visit Activities

Vocabulary List and Student Definitions (elementary level):

- **Mineral:** a natural, non-living, solid material found in rocks.
- **Rock:** natural, non-living, solid material made of more than one mineral.
- **Earth:** the third planet from the sun that is the home of humans and other living things.
- **Crust:** the solid, outermost layer of the Earth
- **Physical Properties:** characteristics that can be observed using the senses
- **Natural:** produced by nature, not made by humans
- **Inorganic:** not alive; non-living
- **Sand:** loose grains of rock or minerals found on beaches, in deserts and in soil.
- **Pebble:** a small round stone that has been worn smooth by wind or water.
- **Soil:** the top layer or the Earth's land surface.
- **Layer:** flat covering over or between others.

Key Point

1. Minerals are made of one type of element or "ingredient".
2. Rocks are usually made of more than one mineral, the building blocks or "ingredients" for rocks.

Teacher Background and Supporting Information

1. What are Minerals and Rocks?
    a. **Minerals** make up the earth's **crust**, the solid, outermost layer of the Earth.
    b. Minerals are natural, inorganic, solid material with definite chemical compositions, crystal structures, and physical properties. That is quite a definition! Let's discuss each part:
        i. **Natural:** Produced by nature; not made by humans.
        ii. **Inorganic:** not alive.
        iii. **Solid:** state of matter that has definite shape, mass and volume.
        iv. **Chemical composition:** is made of a specific element (one type of atom) or compounds (more than one type of atom).
        v. **Crystal structures:** specific geometric pattern. Since atoms make up a mineral, they are arranged in a pattern specifically for that mineral. The pattern repeats over and over to develop the solid structure.
        vi. **Physical Properties:** characteristics we can observe to allow us to distinguish one sample from another.
    b. **Rocks** are also natural, inorganic, solid material with definite chemical compositions, crystal structures, and physical properties.
2. What is a Geologist?
    a. **Geologists** are scientists that study the structure of Earth, the planet we live on. They study rocks and minerals, soil, and Earth's history.
    b. Geologists visit sites, such as mountains, volcanoes, and canyons to collect rock samples to take back to their lab for testing.
        i. Geologists identify types of rocks, soil, and minerals by studying

their physical properties.

ii. Physical Properties are the characteristics, or attributes, of a rock or mineral that can be observed.

iii. The physical properties of minerals and rocks include:

1. **Color:** Visual appearance of a mineral or rock.
2. **Hardness:** The state or quality of being firm, solid, and compact.
3. **Tenacity:** Can be used to describe how breakable the mineral is. Words such as brittle, flexible, elastic are used to describe the mineral.
4. **Streak:** The color of the finely powdered rock or mineral.
5. **Luster:** The appearance of a mineral or rock in the presence of light.
6. **Magnetism:** The ability of the mineral or rock to attract other minerals or rocks.
7. **Acid Test:** The appearance of bubbles or fizz when acid is placed on the rock or mineral's surface. This indicates a presence of calcium carbonate.

Student Activities

1. Read: Let's Go Rock Collecting by Roma Gans and have a class discussion.
2. Refer to: Rocks and Minerals (Eyewitness Books) by DK Publishing or The Best Book of Rocks and Minerals by Chris Parrault
3. Chocolate Chip Cookie analogy
    a. Chocolate chip cookies are made of many different ingredients, such as flour, milk, eggs, butter, sugar, chocolate chips and so on. Rocks are also made of different "ingredients" called minerals. Display each ingredient separately.
    b. Explain that each ingredient is a separate mineral. However, the minerals combine to form a new substance, our rock (cookie). Pass out a chocolate chip cookie to each student (optional).
    c. We need minerals to make rocks, but we do not need rocks to make minerals. We cannot use cookies to make sugar, flour, milk or eggs (the "minerals" in our cookie).
4. Take students on a rock hunt in the schoolyard, or throughout the school building, identifying what is made from rock and spotting rocks in nature. Have students write down their observations.
5. Generate a list by discussing how rocks can be used. What do we use rocks and minerals for?
6. Recommended for 4th and 5th only: Do an internet search to learn where different mineral mines are located throughout the world. Are there any in the United States? Florida?
    - www.infomine.com
    - http://www.dep.state.fl.us/geology/geologictopics/minerals.htm