

MYSTERY MINERALS

OBJECT OR PURPOSE:

- Students will develop listening and observational skills.
- Students will learn that minerals have specific characteristics that can be used to identify the minerals.
- Students will learn the uses of a few common minerals.

MATERIALS REQUIRED:

- Paper bags containing samples of quartz, halite, and gypsum plus other minerals such as calcite, pyrite, hematite, and mica for each group of students. This activity can be extended by including more minerals. Ask a local gem and mineral club, university geology department, or museum if they have samples available for classroom use.
- Glass jar (baby food jars work well) for hardness test for each group of students.
- Streak plates for streak test for each group of students. These are unglazed porcelain tiles, and are used to test for pyrite (grey to black streak) and hematite (rusty streak), among other minerals. They can be cleaned easily with sink cleanser.
- Piece of sheetrock
- Table salt
- Time Required: 30 minutes

PROCEDURE OR INSTRUCTIONS:

1. First talk to students about minerals and rocks. Ask the students questions about what they think minerals and rocks are. Depending on the age group, ask some of the following questions. What is a mineral? What is a rock? What are rocks made of? What are the three groups of rocks? Do you have a favorite mineral/rock? During the question period the students should learn that minerals are the ingredients that make up rocks. Use a chocolate chip cookie (or other delectable delight) as an example of something made of ingredients that have specific qualities. Tell students they are going to investigate minerals, the ingredients of rocks. Discuss the fact that minerals have specific characteristics that help us identify them.
2. Investigate the concept of specific or key characteristics with the class by asking for a volunteer. Tell the other students they have to describe the volunteer so that five years from now (what grade will you be in five years?) Someone else



could pick the volunteer out of a group of people. You will receive a variety of answers such as clothes-will they wear these clothes tomorrow? Five years from now?

Hair length-can't that change too? Hair color-is it possible to change that? Weight- what happens if they eat a dozen Twinkies? Eventually someone mentions eye color, dimples, shape of ears and nose, fingerprints, and rarely gender. The process takes a while but it is always interesting and fun way for the students to understand the concept of key characteristics.

3. Ask for volunteers to pass out glass jars, streak plates, and a paper bag of mineral samples to each group.
4. Tell students that in each bag there are three clear minerals and that their first task is to pick out the three clear minerals. These minerals all have very different key characteristics. One is very soft, so soft they can scratch it easily with their fingernails, another has a funny taste (lick your finger, rub the mineral to it, and touch your finger to your tongue; the mineral can be rinsed off under a faucet), another is so hard that you can use it to scratch the glass jar. After giving the class these descriptions, the students are told to open their bags, find the clear minerals and pick out the hard mineral, the soft mineral, and the one with the funny taste.
5. Go around to each group several times to see how they are doing and answer questions. When it seems most have completed the task, have one student from each group hold up the soft mineral. Tell them the soft mineral is gypsum (write mineral names on the blackboard). Tell the students that everyone has this mineral in their home- can they guess what it is used for? (Usually no one knows, but they come up with a variety of answers). Hold up a piece of wall board and also knock on a wall-tell students that gypsum is used to make sheetrock. Next, have a student from each group hold up the funny tasting mineral-ask the class what it is (most know this one). Show them the salt shaker and tell them that salt is the mineral halite. Who likes salt on their watermelon? Finally, have one student from each group hold up the hard mineral. Ask the class to name this mineral-quartz. Quartz is used to make something that everyone has in their home and that is in this very room. Ask the group if anyone knows what that something is. Then point to a window or the glass jars.
6. If metallic minerals such as hematite and pyrite are used, begin by asking the students to pick out the two heavy minerals. Tell them that each has a characteristic color when rubbed on a streak plate, one streaks grey-black, while the other has a rusty brown streak. Have them streak the samples and hold up the black-streaking mineral. This is pyrite, also known as fool's gold. The rusty-streaking mineral is hematite, an ore of iron.
7. Follow a similar procedure with other minerals. Some minerals have specific characteristics. Mica splits easily into thin sheets, calcite will fizz when diluted



hydrochloric acid is dropped onto it (do this only as a teacher demonstration), talc is extremely soft and has a soapy feel to its surface, and galena is very heavy and has a dark grey-black streak.

Additional Activity:

This activity can be extended by following a similar procedure for rocks. You can begin by telling the students they have some minerals and rocks in their paper bags. The following are suggested rock samples from the three groups of rocks; igneous-granite (the minerals can be seen), obsidian (volcanic glass), and pumice; sedimentary-sandstone and limestone; metamorphic-gneiss.

EVALUTION:

Background:

Minerals are the ingredients that make up rocks. It is easy to understand that some of the characteristics of the different types of rocks are a result of their mineral composition. Many minerals are valued by people because of the specific qualities or characteristics they display.

Minerals are usually formed by inorganic processes, are crystalline solids (have an internal orderly arrangement of atoms), have specific chemical compositions (chemical formula), and have specific physical and chemical characteristics. Minerals are commonly identified by the physical properties they possess. These physical properties include hardness, color, crystal shape, specific gravity (a measure of heaviness), and streak (the color of the mineral in the powdered form). Some other useful properties are reactions with hydrochloric acid and a characteristic taste.

In this activity students will discover that many minerals have a specific characteristic that helps to identify them. Most minerals have a characteristic hardness; heaviness, and / or streak. However, color is not always useful for identifying minerals.

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