Mineral Identification

Classical Conversations: Cycle 1, Week 21

GOALS
•students would understand what a mineral is
•student would identify and practice four ways to identify minerals

INTRO

- Today we are learning about minerals! What is a mineral?

MINERAL: an inorganic (not living) element or compound that is naturally formed and has a particular chemical composition, crystal structure, and physical properties.
•Is a cow a mineral? (no, because animals are living!)
•Is a tree a mineral? (no, plants are living)
•Is a house a mineral? (no, houses are not naturally formed- they are built by people)
•Are you a mineral????

What do minerals do?
•Minerals are like the legos of nature: put them together and you build all kinds of things!
•Rocks are minerals put together.

Where do we see minerals?
•The steel in our buildings are made with iron, which is a mineral.
•Earth's crust and part of its mantle are made of rock, which is made of minerals.
•The clay and glass used in our pottery and dishes are made of a mixture of rocks and minerals.
•Granite counter tops are made of minerals.
•We even need minerals to stay healthy, and we get them from a variety of different foods.
•Any other ideas of where we might see minerals every day?
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What do we call someone who studies minerals?
•A ***geologist*** is a scientist who studies rocks and land to learn about Earth and its history.

Today, you get to be a geologist as we learn ways that geologists study minerals.

Activity

Minerals have certain properties, which means that there are signs we can use to tell minerals apart.

Suppose you are a geologist out on an expedition and you run into a piece of mineral that you do not know what it is. (Hold up a sample of a mineral) How will you find out? Will you smell it? Taste it? Weigh it on a scale?

Any ideas? (let students brainstorm how they might figure it out?)

What makes it even more difficult, is that sometimes two minerals can look alike. That is why

geologists have special ways to test a mineral to figure out which one it is. Today we are going to try some of those tests.

Test #1: Streak Test

Materials: Mineral samples of graphite, hematite, gypsum, and garnet; 4 white streak plates

Explanation: By pushing a mineral on the streak plate, we are trying to figure out what color the powder of this mineral is. The color of the powder is more reliable in helping identify the mineral than the color we see on the outside of the mineral.

Activity: Sitting in pairs, give each pair a white streak plate and one of the samples.

1. Instruct students to look at the mineral and predict what color the streak will be.

2. Demonstrate how to push the rock against the plate and draw a long line in order to make a streak. Be sure to hold the streak plate with the opposite hand of the mineral.

3. Let students pass around the minerals and try each one on their plate.

NOTE: If the mineral doesn't leave a mark, then encourage students to turn the mineral and try again on a different edge. If a mineral still leaves no mark, this could be due to the fact that the mineral is actually harder than the streak plate.

Results: Graphite- black, Hematite- red, Gypsum-white, Garnet (almandine)- no streak

Test #2: Luster test

Materials: Samples of feldspar, pyrite, and limonite; flashlight

Luster is a word that tells us how light is reflected off of something.

We can divide minerals into categories by their luster:

Glassy- minerals that reflect light similar to a glass window.

Metallic- reflect light similar to a metal surface.

Dull- mineral that does not reflect light or reflects it poorly.

Activity: Let students look at the samples and shine the flashlight on each one. Discuss the luster of each.

Feldspar- glassy, Pyrite- metallic, Limonite- dull.

Test #3: Transparency

Materials: Mineral samples of Biotite mica, magnetite, muscovite mica, and halite; flashlight

Introduce these words to your students:
•Opaque- mineral that allows no light to pass through it (like a wall)
•Transparent- mineral that allows enough light to pass through it so that an object may be seen on the other side (like a window)
•Translucent- mineral allows some light to pass through it, but not enough for an objec to be seen on the other side (like a foggy window)

Using the flashlight, let students take turns sampling the minerals. Group them into either Opaque or Translucent/transparent.

Opaque- Biotite mica and magnetite
Translucent to transparent- muscovite mica and halite

Test #4- Hardness

Materials: minerals samples of talc, fluorite, and quartz; 4 pennies, 4 steel nails, 4 pieces of glass

The "hardness" of a mineral tells us how strong it is against other minerals. We use the MOHS scale to compare minerals to each other (developed in 1812 by scientist Frederick Mohs).

Rub minerals against the glass and see if the mineral makes a scratch.

Rub steel nail on the minerals to see if it make a scratch.

1 MOHS- Talc (least hard)

4 MOHS- fluorite

7 MOHS- quartz (most hard)

CONCLUSION:

Well, geologists, what is a mineral?

If you found a mineral, how would you identify it? (four tests)

Where do we see minerals around us in every day life?