

Mineral Detectives

Mineral Hall Gallery Interpretation Activity

Objectives: *what do you want the visitor to learn, know, or do?*

- To learn how to use all senses to explore and discover the properties of different minerals.
- Properties can give us clues and tell us what's in the rock.
- The properties that can be explored are hardness/softness, color, density, magnetism, smell, chemical reaction and fluorescence.

Program Preparation:

Materials/Props:

- Hand samples of minerals to include if possible: quartz, gypsum, pyrite, hematite, galena or iron ore, basalt, magnetite, sulfur, calcite & Fluorite.
- Bucket for mineral specimens.
- Mining helmet with light & apron with pockets for interpreter
- Lamp
- Hand Lens to look closer at specimens
- Black and white streak plates
- Magnet
- Acid & paper towel
- Penny, nail and glass plate
- Laminated labels with properties

Setup Instructions:

Bucket is in the mine with mineral specimens. Specimens to include : sulfur, Quartz pyrite gypsum magnetite, hematite, halite, iron ore or galena, basalt, calcite & Fluorite. Cart is outside of the mine. Interpreter will stand outside the mine with apron and helmet on. In the pockets of the apron will be some or all of the following depending on which tests the streak plates, magnet, acid, fluorescent light, penny, nail & glass plate. Invite visitors into the mine to discover some minerals. The bucket of minerals or minerals can be brought out on to the cart for the observation or testing to begin.

Program Delivery

Hook or intro: Hi there, we've been mining today. Would you like to see what I have found? Can you help me sort things out?

Suggested key questions:

1. Which is your favorite mineral? Would you like to pick out one?
2. What do you think this is? If you do not know what it is, how do you think we can find out?
3. What do you notice that is different about these? Don't forget to use all your senses. (color, weight, magnet test, hardness test, smell) We are going to use all of our senses to help identify these minerals.

4. Depending on what minerals the visitor pulls out, the interpreter can pull out the comparative minerals for testing, or specific ones depending on what direction you would like the activity to go.
5. Discuss color, weight, smell, hardness or other properties by exploring using a magnet, UV light, streak plate etc.

One or all of the following tests can be done on the minerals selected depending on what the visitor has chosen, what they noticed or what direction you guide the activity.

Color

What color is your mineral? Color isn't always a reliable way to identify a mineral because some minerals can be different colors (ie the quartz samples) but geologists always make a note of this anyway.

Streak Test

Streak is a scientific way of saying chalk mark. Some minerals have the characteristic of leaving a chalk mark or streak mark on a tile. If your mineral is white or clear do this test with the black streak plate. If the mineral is colored or dark do the test with the white streak plate. Hold the plate down on the table and run the mineral across the plate once. What color is the powder that it leaves behind?

Specimens and their color.

Pyrite - black

Hematite – red

Calcite – white to grayish

Gypsum – white

Halite – white

Galena – silver gray streak

Sulfur – yellow

Quartz – doesn't streak, but will scratch the tile

Density or Weight

Visitors can compare the density or weight of each of the minerals by lifting them and comparing the weight and then sorting.

Galena – heavy

Basalt – light

Luster

Luster is the way a mineral shines or reflects light. Is it metallic (like a metal) or is it non-metallic? If it is non-metallic is it waxy, glassy, pearly, or dull? *This part of mineral testing can be omitted and just discussed with a few examples from the specimens on the cart or table.*

Specimens and their luster?

Galena – Metallic luster

Pyrite--

Hardness

How easily can the mineral be scratched? Can you scratch it with your fingernail? Can you scratch it with a nail? Can you use the mineral to scratch your glass scratch plate? *This activity can be shortened by having them do the fingernail scratch and record "soft" if the fingernail scratches the mineral. If the mineral wasn't scratched then have them try to scratch the glass plate. If the mineral scratches the glass then have them record hard.*

Quartz, pyrite, sometimes hematite, – Hard, can scratch glass

Gypsum, Talc – soft, can be scratched by a fingernail

Halite, Galena – can be scratched by a penny

Calcite, Hematite – can be scratched by steel

Acid Test

Remind students that they will be using real acid and that they need to be very careful with this. What happens when you put **one** drop of acid on the mineral? Does it fizz? Is it absorbed into the mineral or soak in? Does it dissolve, stain the paper towel red?

Hematite. Does it just sit there and nothing happens? When you are done with this test, be sure to use a paper towel to blot the acid from the surface of the mineral.

Calcite – fizzing

Hematite – dissolves

Sometimes the kids think the acid soaks into the iron pyrite. I don't think it really does, it just goes between the minerals.

Magnetism

Using the magnet, test the minerals to see if any of them have magnetic properties.

Magnetite – moves with magnet

Smell

Using your noses, see which specimens smell.

Sulfur – smells

Taste

Don't actually let them taste this specimen, but talk about it.

Halite - salt

Background Information needed:

Rock vs. Mineral

Info on Each Mineral in Bucket

Magnetism