

10-1C

A Mineralogist's Mystery

Core Lab

Skill Check

- Observing
- Classifying
- Interpreting data
- Evaluating information

Safety

- Be careful when handling materials with sharp points or edges.

Materials

- numbered mineral samples
- streak plate
- copper penny
- iron nail
- glass plate or jar
- steel file
- sandpaper
- emery cloth
- hand lens
- optional: magnet
- Tables 10.1 and 10.2 from pages 318 and 319

Science Skills

For help in making observations, turn to Science Skill 5.

Imagine that you are a mineralogist, a person who studies minerals. You have just received a package of minerals from your company's field team in northern Labrador. The attached note reads: "New mine discovered. Enclosed are samples of minerals found there. Please identify." In this activity, you will investigate how the properties of minerals can help you solve the mystery of the unknown minerals.

Question

How can you identify different minerals?

Procedure

1. Prepare a table of observations like one below. Give your table a title.

Mineral Number	Colour	Lustre	Streak	Hardness	Other Properties	Mineral Name

2.
 - (a) Record the number of the first mineral sample in the first column of the table.
 - (b) Observe the colour of the first mineral sample. Record your observations in the column under "Colour."
 - (c) Observe the lustre of the mineral. Refer to Table 10.1. Record your observations.
 - (d) Scrape the mineral once across the streak plate. Brush off the excess powder. Record the colour of the streak. If the mineral is too hard to leave a streak, write "none" in the column under "Streak."
 - (e) Scratch the sample with your fingernail. If your fingernail does not leave a scratch, use a copper penny to scratch the sample. If the penny does not leave a scratch, use the iron nail, followed by the glass plate, followed by the steel nail, followed by the sand paper, followed by the emery cloth until something leaves a scratch. Refer to Table 10.2. Record the hardness from 1 to 10.
 - (f) Record any other properties you can observe such as cleavage, fracture, crystals, smell, magnetism, heft, feel, and transparency under "Other Properties."
3. Repeat all of step 2 for the remaining mineral samples.

Conduct an INVESTIGATION

Inquiry Focus

- Try to identify each mineral by using the Mineral Identification Guide. Record the name of each sample.
- Wash your hands thoroughly after completing the investigation. Clean up and put away the equipment you have used.

Mineral Identification Guide					
Mineral	Colour	Lustre	Streak	Hardness	Other Properties
Feldspar	orange, pink, or white	glassy	white	6	2 cleavage planes
Hematite	brick red or grey	dull	brick red	5	heft
Magnetite	black	metallic	black	6	magnetic
Pyrite	gold	metallic	green/black	6.5	cubic crystals
Quartz	white	glassy	white	7	transparency
Gypsum	white	dull	white	2	powdery feel
Sphalerite	dark brown	glassy	pale brown	4	rotten egg odour
Fluorite	colourless or blue/green	glassy	white	4	heft
Galena	lead grey	metallic	lead gray	2.5	cubic crystals
Mica	black	glassy	white	2.5	1 cleavage plane
Sulphur	yellow	dull	white	2	rotten egg odour
Calcite	colourless	glassy	white	3	double refraction
Coal	black	dull/glassy	black	1	fracture
Pyrophyllite	yellow	dull	white	2	soapy feel
Talc	brown	dull	white	1	soapy feel

Analyze

- Before testing, which minerals looked the same?
- Which mineral was the softest?
 - Which mineral was the hardest?
- Which minerals were the same colour as their streak or powder?
 - Which minerals had streaks with colours that surprised you?
- What other features or properties helped you identify the samples?

Conclude and Apply

- Were you able to identify all the mineral samples?
 - If not, what other tests could you use to identify them?
- Which property was the most useful for identifying a mineral? Explain.
 - Which properties were not very useful for identifying a mineral? Explain.
- If your mineral was harder than your streak plate you would be unable to observe the colour of its streak. What would be another way to determine the streak of the mineral?