

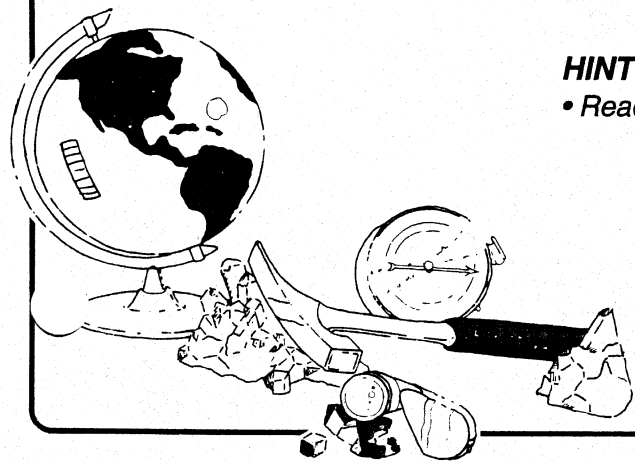
COLOR – A SPECTRUM OF POSSIBILITIES**PROCEDURE:**

1. How many specimens are represented in Set 1?
2. Observe the color of each specimen carefully. How many different colors are represented in Set 1?
3. Based on their colors, how many different minerals do you think there are in Set 1?
4. Actually, the samples in Set 1 are all the same mineral! Can you name it?
5. Although they look different, what do the minerals chert, jasper, flint, amethyst, agate, tiger's eye, rose quartz, milky quartz, and smoky quartz all have in common?
6. Is color a good property to rely on when naming *every* mineral? Explain.

SET 1

HINT:

- Read about color in your text or another reference.



STREAK – POWDER POWER

PROCEDURE:

1. Describe the color of each of the minerals in Set 2 on your answer sheet.
2. Now rub each mineral on the streak plate *one time*. Describe the color of each streak on your answer sheet. Lighter minerals will show up better on the dark streak plate.
3. Compare your answers for #1 and #2 above. Which minerals have a visual color different than their streak?
4. Do you think color or streak is the most reliable indicator of the true color of the mineral? Why do you think that streak sometimes differs from color?
5. What will happen if the mineral tested is harder than the streak plate?

SET 2

a.

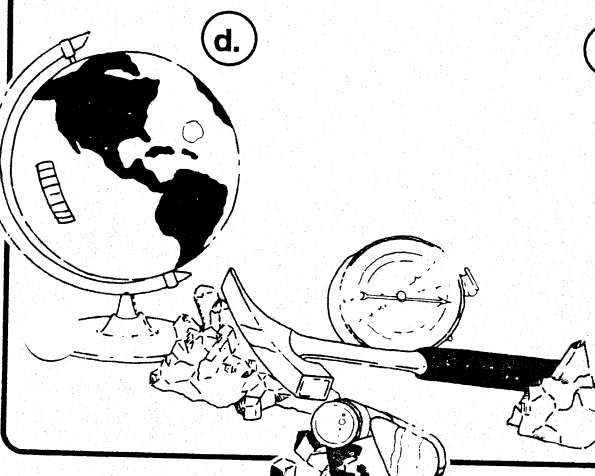
b.

c.

d.

e.

f.



HINTS:

- Read about streak in your text or another reference.
- Some minerals rust or tarnish on weathered surfaces.

LUSTER – *SHINE ON!*

PROCEDURE:

1. Using your own words, describe the specimens in Set 3 on your answer sheet.
2. Decide which of the specimens are metallic. What metals do they look like?
3. Now use some of the terms listed in the *HINTS* to further describe the nonmetallic minerals on your answer sheet.
4. Can a mineral be very shiny and *not* be metallic? Explain!

SET 3

a.

b.

c.

d.

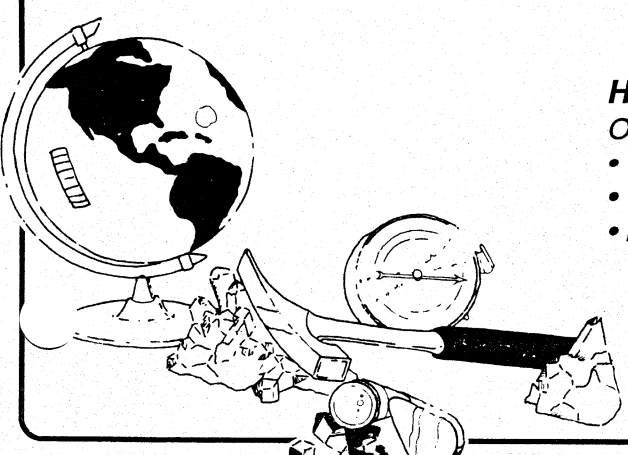
e.

f.

HINTS:

Other terms geologists use to describe nonmetallic luster are:

- Vitreous (glassy)
- Dull (not shiny)
- Waxy
- Resinous
- Pearly
- Silky

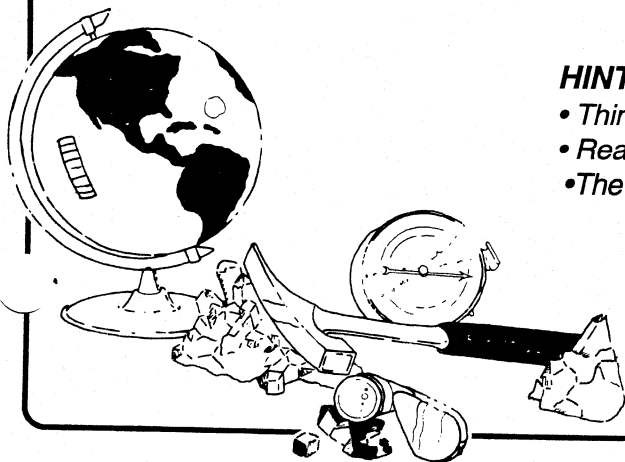


CLEAVAGE – THEM'S THE BREAKS**PROCEDURE:**

1. Select a mineral from each of the bags of specimens provided. Make a sketch of each mineral on your answer sheet.
2. Now break or split the minerals into smaller pieces. If you use the hammer, be sure to use safety goggles and the wood block. What is the common characteristic of the new surfaces you exposed?
3. Using a hand lens, look at the smallest fragments. How do they compare to the original specimens?
4. If you were to continue breaking the fragments, how small could they be and still keep their characteristic shape?
5. Study the fracture specimen. How does it differ from the cleavage specimens you have seen?
6. How do you think Native Americans and other ancient peoples used *conchoidal* fracture?

HINTS:

- Think Safety! Wear safety glasses or goggles.
- Read about cleavage and fracture in your text or reference.
- The cleavage specimens are halite, calcite, and muscovite.



HARDNESS — LET'S BE ABRASIVE

PROCEDURE:

1. Use *scratchibility* to arrange the minerals in order of increasing hardness. If Mineral X scratches Mineral Y, it is harder. Record your findings on your answer sheet.
2. Use the materials provided and the scales in the *HINTS* to assign a hardness from 1-10 to each mineral.
3. Why is talc a good choice for the main ingredient in baby powder?
4. The most effective *sandpaper* is made with garnet and corundum. Can you explain why?
5. Why are tiny diamonds used to coat drilling bits?

SET 5

a.

b.

c.

d.

e.

HINTS:

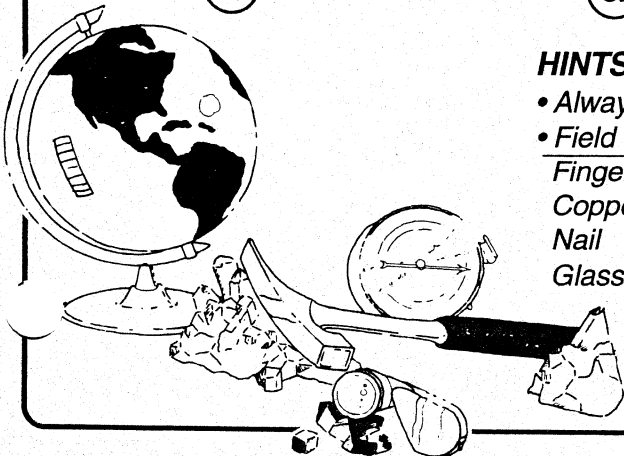
• Always rub the scratch to be certain which mineral is leaving the mark.

Field Hardness Scale

Fingernail	2.5
Copper Coin	3
Nail	5
Glass	5.5

Mohs' Hardness Scale

Talc	1	Orthoclase	6
Gypsum	2	Quartz	7
Calcite	3	Topaz	8
Fluorite	4	Corundum	9
Apatite	5	Diamond	10



CRYSTAL FORM – *SHAPE UP!*

PROCEDURE:

1. Draw a sketch of each mineral specimen on your answer sheet . Be accurate!
2. Match the crystal to one of the models by drawing a line connecting the specimen to the model number.
3. See how many crystal systems from Set 6 you can identify using a reference.
4. Name some crystals that are valuable to people.
5. Can crystals be grown by people? If so, how?

SET 6

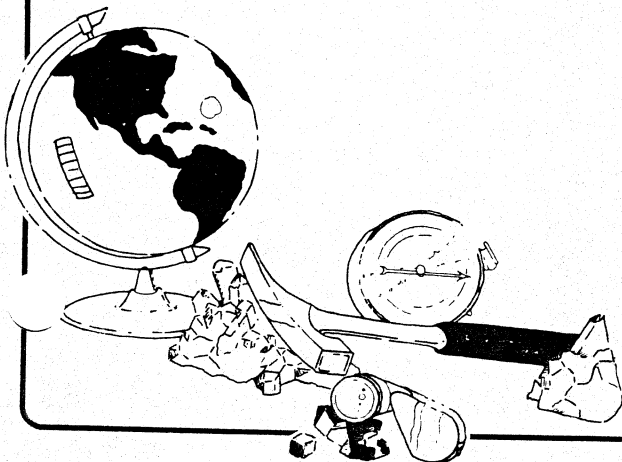
a.

b.

c.

HINTS:

- Read about crystals and crystal form in your textbook or other reference.
- Isometric – All Sides Equal
- Hexagonal – Six Sides Equal
- Tetragonal – Four Sides Equal
- Monoclinic – One Side Equal



DENSITY – A HEFTY TOPIC

PROCEDURE:

1. Pick up each of the mineral specimens one at a time. Rank the specimens from least dense to most dense by *hefting* them.
2. Each of these specimens contains large amounts of one of the following elements: iron, barium, boron, lead, or silicon. If you used a periodic table, do you think you could rank them by density without *hefting* them? Explain.
3. The formula used to calculate density is $D = \text{Mass}/\text{Volume}$. If a mineral sample has a mass of 32 grams and a volume of 11 cm^3 , what is its density?
4. **OPTIONAL:** Use $D = \text{Mass}/\text{Volume}$ to calculate the density of the most dense and least dense mineral in Set 7. The answer should be in grams/cm^3 . You will need a balance and a graduated cylinder or beaker to make the necessary measurements.

SET 7

a.

b.

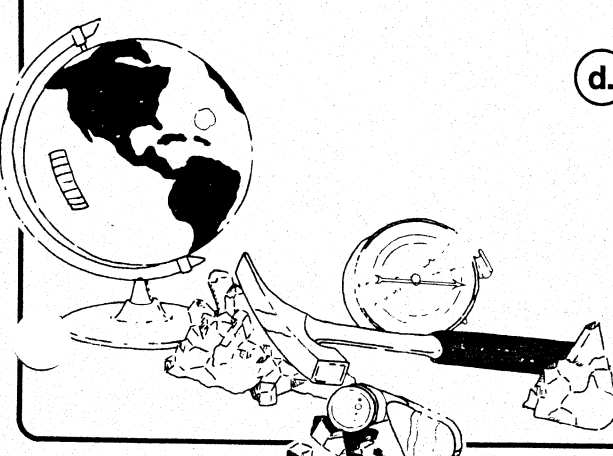
c.

d.

e.

HINTS:

- Read about density or specific gravity in your textbook or other reference.
- Iron – Fe Lead – Pb
- Barium – Ba Silicon – Si
- Boron – B



OPTICAL PROPERTIES — *To SEE OR NOT TO SEE*

PROCEDURE:

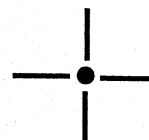
1. Use a reference book to define:
 - Opaque
 - Translucent
 - Transparent
 - Double Refraction
 - Prism
 - Fiber Optic
2. Place one specimen at a time over the Test Pattern on this page and describe exactly what you see as you rotate it 360 degrees.
3. Describe each specimen and attempt to name it using the hints below.

SET 8

Test Pattern

a.

b.

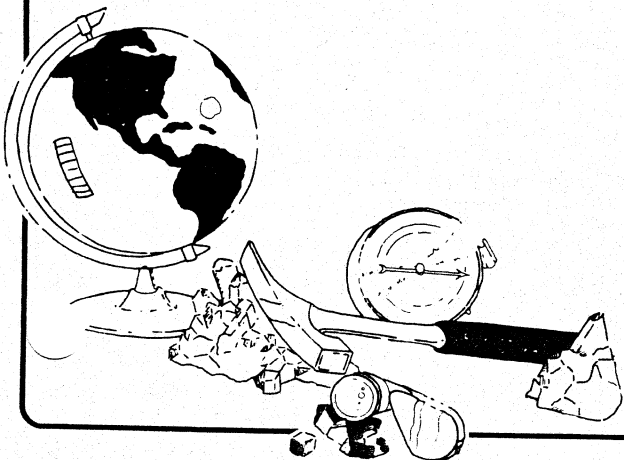


c.

d.

HINTS:

- The specimens are:
 - Ulexite (TV Rock)*
 - Calcite (Iceland Spar)*
 - Quartz (Optical)*
 - Halite (Salt)*



CALCITE TEST – THE ACID TEST

PROCEDURE:

1. Place one small drop of dilute hydrochloric acid (HCl) on each specimen and record the results.
2. Study the following equation to see what happens when hydrochloric acid (HCl) is added to calcite (CaCO₃) and answer the questions below.



In the equation above,

- a. List the five elements present in the reaction.
 - b. What is the formula for hydrochloric acid? For calcite?
 - c. On the right side, which three chemicals are produced?
 - d. Why does the calcite fizz in acid?
3. Caves often form in limestone, which is made of calcite. Could natural solutions be responsible for cave formation?

SET 9

a.

b.

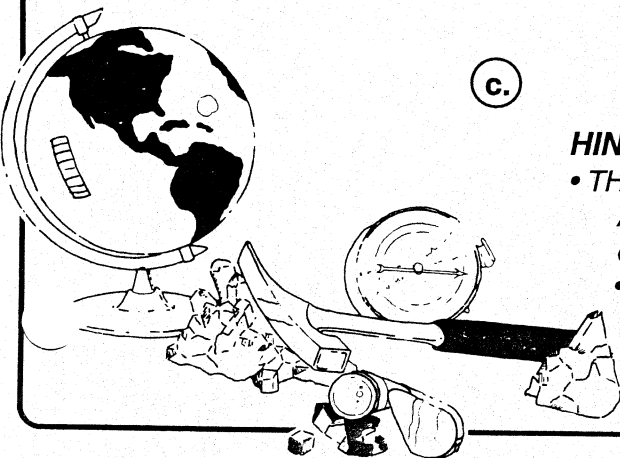
c.

d.

HINTS:

- THE ACID IS DILUTE HYDROCHLORIC ACID! THINK SAFETY!!
Always wash skin and clothing if accidental contact with acid occurs.
- It may be helpful to scratch or rough up the surface of the specimens before testing.

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DEFINITION – PLAY BY THE RULES

PROCEDURE:

A mineral is defined as a solid, naturally occurring, inorganic substance composed of an element or compound, and having a fixed chemical composition.

1. Record on your answer sheet whether each sample is a mineral or not based on the definition above. Give the reasons for your answers!
2. You may want to have some exceptions to the *rules*. List the names of the samples that you think should be called minerals despite the definition.
3. Based on this definition, would a snowflake be a mineral? An ice cube? Explain!

SET 10

a.

b.

c.

d.

e.

f.

HINT:

- *Inorganic means that something doesn't contain material generated by a living organism.*

