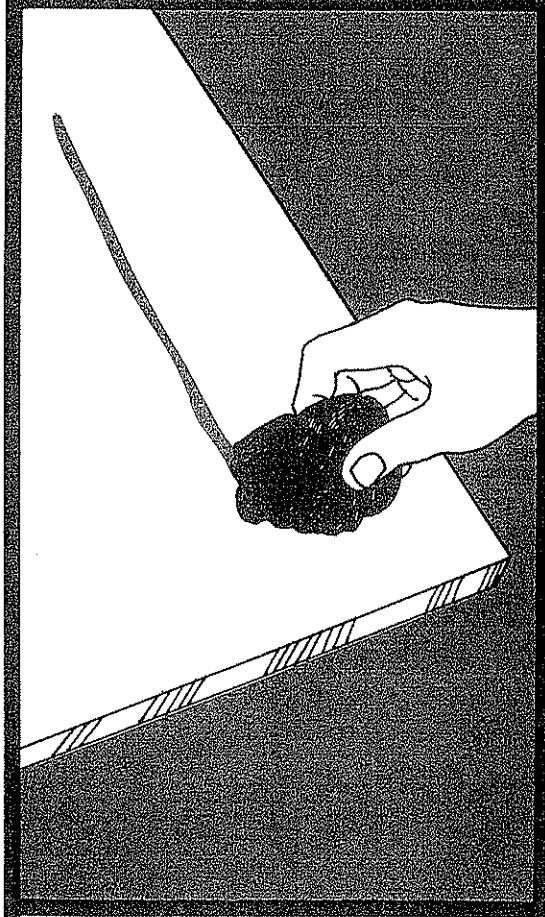
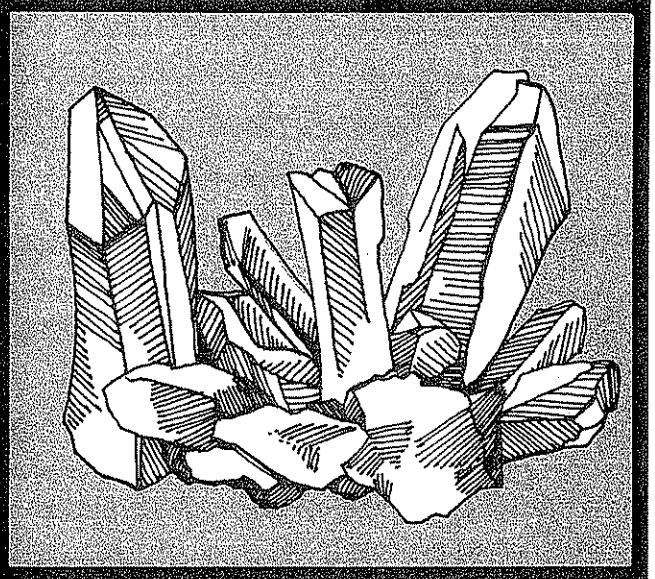
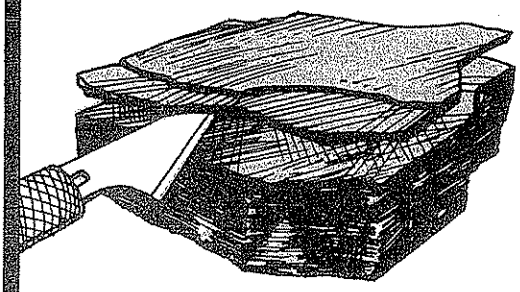
HOW CAN WE IDENTIFY MINERALS?

5







density: the weight of a substance compared to the weight of another of the same size

luster: shine

cleavage: the pattern in which a mineral splits

streak: the color of a mineral's powder

AIM 5 | How can we identify minerals?

Have you ever heard of "fool's gold"? It looks like gold, but it is another mineral. It is worth far less than gold. Many people have been fooled by it.

Many minerals have "look-alikes." That is why scientists have come up with tests to identify minerals. Sometimes, only one test is needed. More often several are needed.

These are the most important tests:

HARDNESS Minerals have different hardnesses. To find out how hard a mineral is, we test it against other minerals. Ten minerals whose hardnesses are known are used for this test. Diamond and talc are two of these minerals. Diamond is the hardest mineral. Talc is the softest.

DENSITY Density is the weight of a substance compared to its volume. Different minerals have different densities.

COLOR Some minerals are colorless. Others come in just about any color you can imagine.

LUSTER The kind of shiny quality a mineral has is its luster.

CRYSTAL FORM Crystal form is the natural form of some—but not all—minerals. Crystal form helps identify some minerals.

CLEAVAGE The way a mineral splits is called cleavage. Some minerals split in definite patterns. Others do not.

STREAK When you rub a mineral on a hard, rough, white surface, it may leave a streak of powder. The color of its streak is important. Some minerals leave no streak.

ACID TEST The mineral calcite is tested with dilute hydrochloric acid. Bubbles are given off if calcite is present. Dilute hydrochloric acid is used to test for the mineral calcite.

TESTING MINERALS

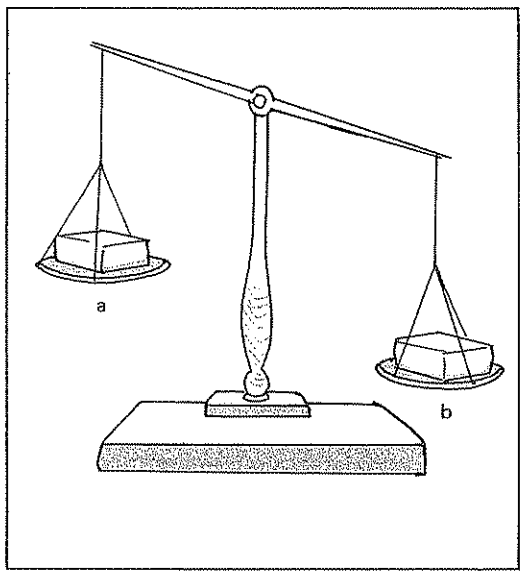
MINERAL HARDNESS SCALE

Hardness		Mineral
Softest	1	talc
	2	gypsum
	3	calcite
	4	fluorite
	5	apatite
	6	feldspar
	7	quartz
	8	topaz
	9	corundum
Hardest	10	diamond

The *Mineral Hardness Scale* shows the ten minerals that we test other materials against. When a material is tested for hardness, it is given a number to show how hard it is. A material with a hardness of 2.5 would be harder than gypsum, but softer than calcite. A mineral can scratch something softer, but not something harder.

1. Which mineral cannot scratch any mineral but itself? _____

2. Which is harder, calcite or topaz? _____



A.

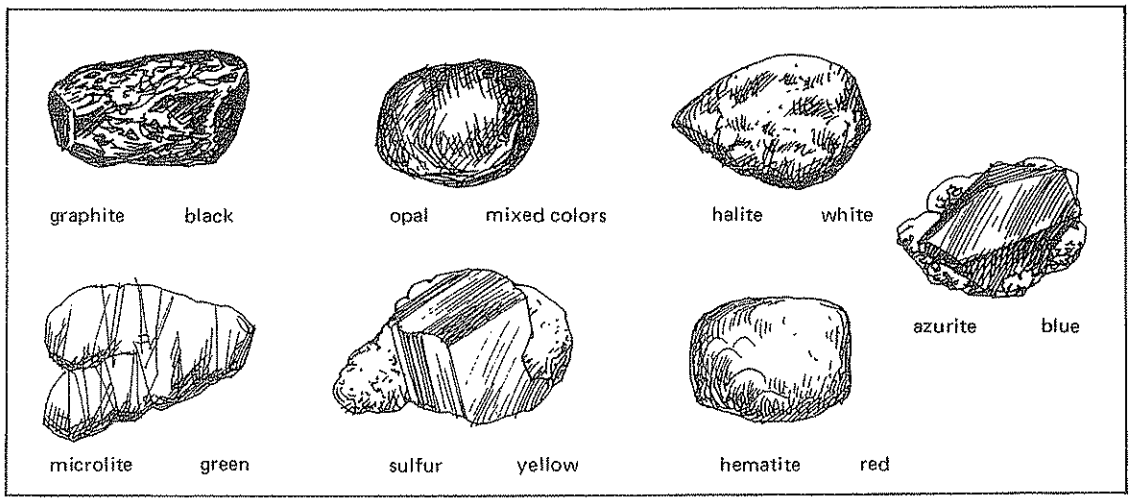
Study diagram A and answer these questions.

3. Which weighs more, mineral a or b? _____

4. The chunks of minerals a and b are of _____ sizes.
(the same, different)

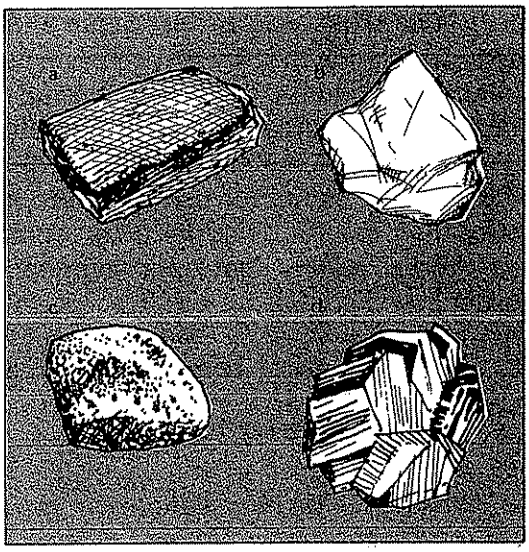
5. Mineral b is _____ than mineral a.
(denser, less dense)

Minerals come in many colors.



B.

C.



Luster is divided into two classes —*metallic*, and *nonmetallic*.

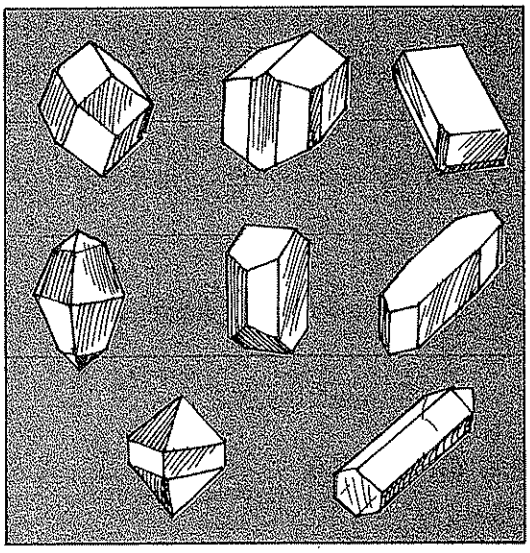
Minerals that shine like metal *have metallic* luster.

Minerals that do *not* shine like metal have *nonmetallic* luster. (There are several kinds of nonmetallic lusters)

Can you identify these lusters? Write the correct letters next to each luster.

6. metallic _____

D.



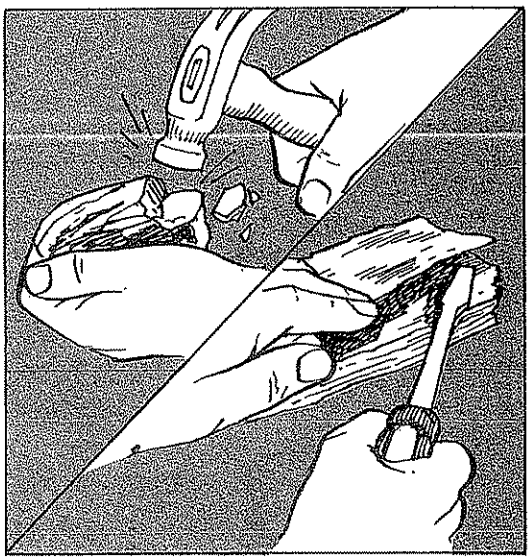
7. nonmetallic _____

There are many crystal forms. Which one is quartz? Circle it.

8. Do all minerals form crystals?

_____

E.

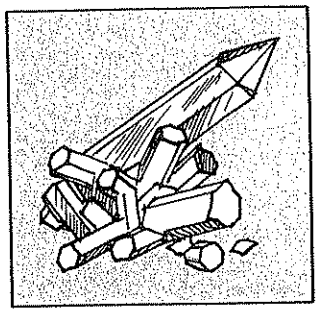


9. What instruments can be used to show the cleavage of minerals?

_____

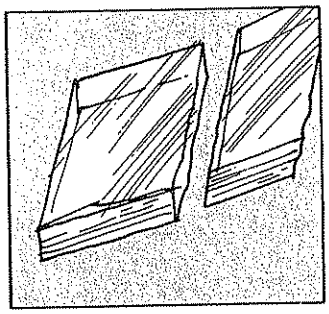
_____

There are many kinds of cleavage. Here are three examples:



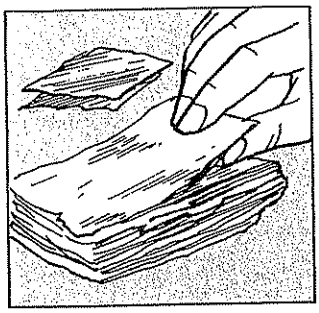
F.

Quartz shows no definite cleavage pattern.



G.

Calcite cleaves in a very definite pattern.

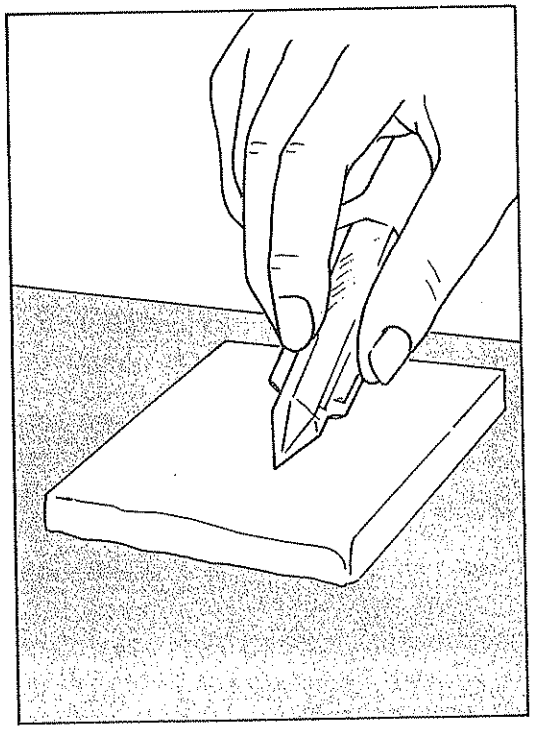


H.

Mica cleaves easily in thin flat sheets.

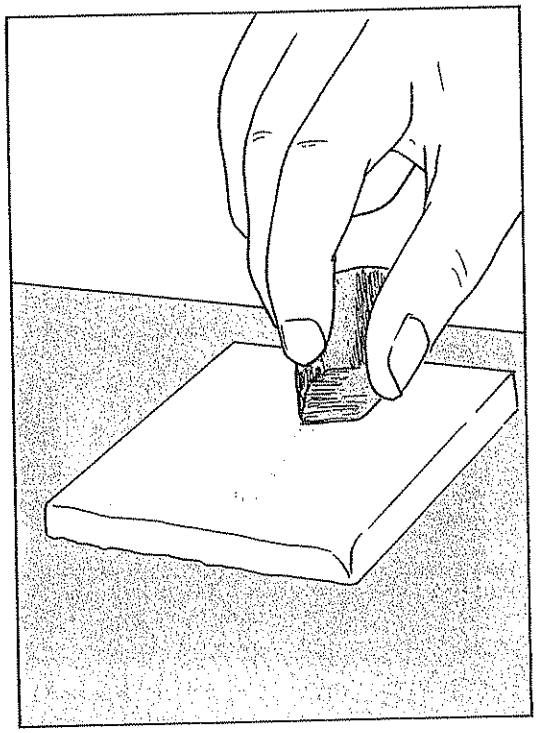
Streaking is done by rubbing a mineral on a hard, rough white surface. The streak is the color of the mineral's powder.

- Some minerals leave *no* streak.
- Some minerals streak the *same* color as the mineral. Some streak a *different* color than the mineral.



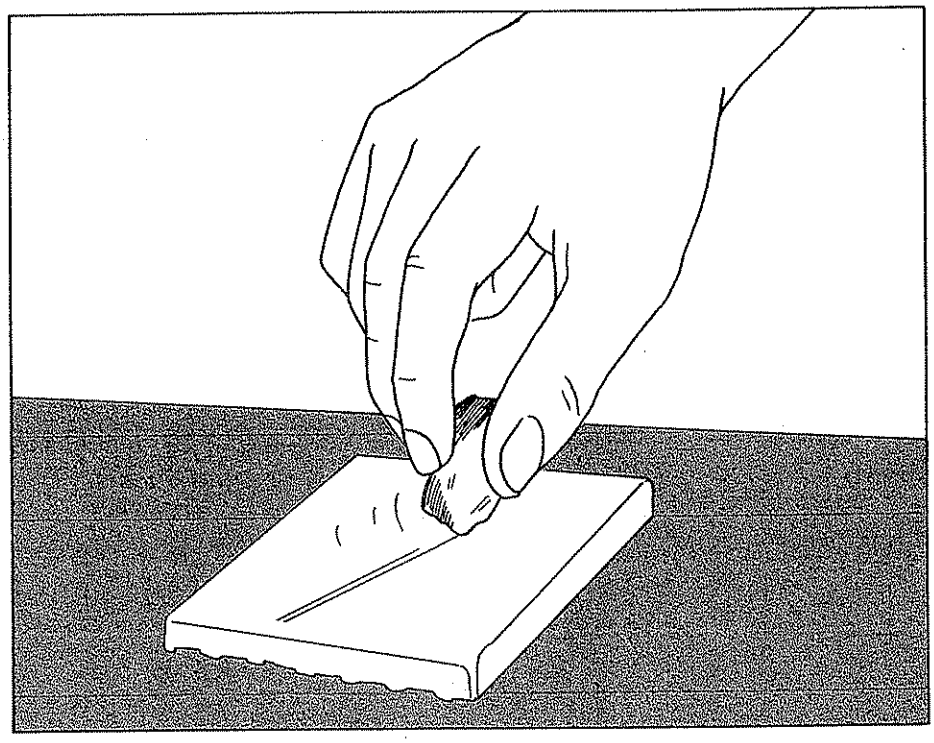
I.

The mineral quartz leaves no streak.



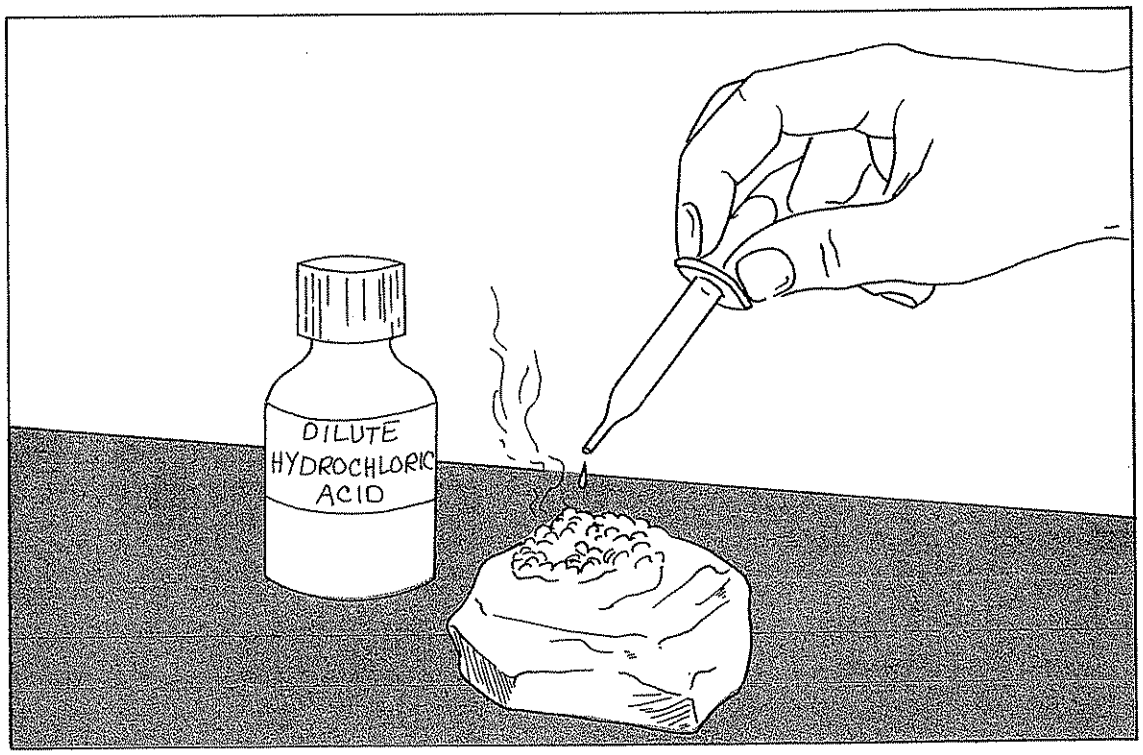
J.

The mineral iron pyrite is yellow. But it streaks greenish-black.



K.

Gold streaks its own color.



L.

Bubbles are given off if calcite is present.

COMPLETING SENTENCES

Complete the sentences with the choices below.

ten	breaks	share
shine	density	calcite
powder	crystal form	talc
diamond		

1. There are _____ minerals on the hardness scale.
2. The hardest mineral is _____.
3. The softest mineral is _____.
4. Metallic and nonmetallic are kinds of _____.
5. The natural shape of mineral is called its _____.
6. Cleavage is shown when a mineral _____.
7. Streak is the color of a mineral's _____.
8. The weight of a mineral compared to its volume is called its_____.
9. Dilute hydrochloric acid tests for the mineral _____.
10. Often, several minerals _____ some properties.

MATCHING

Match the two lists. Write the correct letter on the line next to each number.

1. _____	streak	a)	wet test for calcite
2. _____	cleavage	b)	pattern of split mineral
3. _____	crystal form	c)	the two classes of luster
4. _____	hydrochloric acid	d)	color of a mineral's powder
5. _____	metallic and nonmetallic	e)	a mineral's natural shape

TRUE OR FALSE

Write T on the line next to the number if the sentence is true. Write F if the sentence is false.

1. _____ All minerals have the same hardness.
2. _____ Minerals come in many different colors.
3. _____ Every mineral has a color.
4. _____ Every mineral has a crystal form.
5. _____ A mineral may have a crystal form but no cleavage.
6. _____ Some minerals leave no streak.
7. _____ A mineral's streak is always the same color as the mineral.
8. _____ Hydrochloric acid makes calcite bubble.

REACHING OUT

Iron pyrite is sometimes known as "fool's gold." If you had a yellow mineral, what would be one test you could use to see if it were real gold or iron pyrite?