TREASURES IN THE EARTH

Earth's crust is loaded with minerals—some of them common, some of them very rare. Even those that don't cost hundreds or thousands of dollars in the gem variety are valuable and useful. All minerals are natural, inorganic solids which have interesting crystalline structures. Each mineral is a specific combination of elements. Minerals are usually identified by certain physical properties such as hardness, streak, luster, mass, form, cleavage, feel, smell, and taste.

Erik and Erika, two young mineral fanatics, have discovered some treasures. Answer the questions on these two pages (44 and 45) about what they have found. To do this you will need to pay attention to the hardness scale below. You will also need the chart of "Physical Properties of Some Common Minerals" from page 56.

1. Erika has found a mineral that scratches quartz. Could it be gypsum? _____
2. The searchers are thrilled to find a handful of pale yellow, shiny nuggets. They are sure they have found gold! The mineral leaves a greenish-black streak, and cannot be scratched by fluorite. Have they struck it rich? _____
3. Erik has a handful of whitish-gray stones with a nonmetallic luster that leave a colorless streak. They can be scratched by a steel file but not by a knife. What does he have? _____
4. Both kids have found samples of a red mineral which leaves a gray streak. It can be scratched with a fingernail and with a penny, and it can be easily cut with a knife. What is it? _____
5. Erika is holding a very soft mineral that leaves black "grease" on her fingers. It makes a black streak and has a shiny luster. What is it? _____
6. Erik has found a metallic, gray mineral that leaves a gray streak. The crystals appear cubic. When it breaks, it breaks with clear, clean cleavage. It scratches gypsum. Is it graphite? _____
7. Erika has a pile of white, nonmetallic stones that leave a white streak. They can be scratched with a fingernail. What are they? _____
8. Erik has some yellow stones that leave a yellow streak. They can be scratched with a fingernail. He wonders if they could be gold, but they do not have a metallic luster. What might they be? _____
9. A pale white stone is found at Erik's feet. It has hexagonal crystals, leaves a white streak, and can be scratched by a knife, but not by a fingernail. Could it be dolomite? _____

HARDNESS SCALE

Hardness	Characteristics and Example
1	soft, greasy, flakes on fingers (talc)
2	can be scratched by fingernail (gypsum)
3	can be cut easily with a knife or nail, or scratched by a penny (calcite)
4	can be scratched easily by a knife (fluorite)
5	can be scratched by a knife with difficulty (apatite)
6	can be scratched by a steel file (orthoclase)
7	scratches a steel file (quartz)
8	scratches quartz (topaz)
9	scratches anything lower on scale (corundum)
10	scratches anything lower on scale (diamond)

Use with page 45.

Name _____

Use with page 44.

10. Erik has picked up a mineral which feels soapy and leaves a white, powdery residue on his hands. It is very soft and flakes off. What has he probably found? _____

11. Meanwhile, Erika has a colorless chunk that breaks apart into cubes. It has no luster and is soft enough to be scratched by fluorite. When she gets it wet, it starts to dissolve. What has she found? _____

12. Right away, Erika finds another colorless chunk of mineral. It cannot be scratched by calcite. It has no shine to it, and seems to break apart in 3 directions. What has she probably found? _____

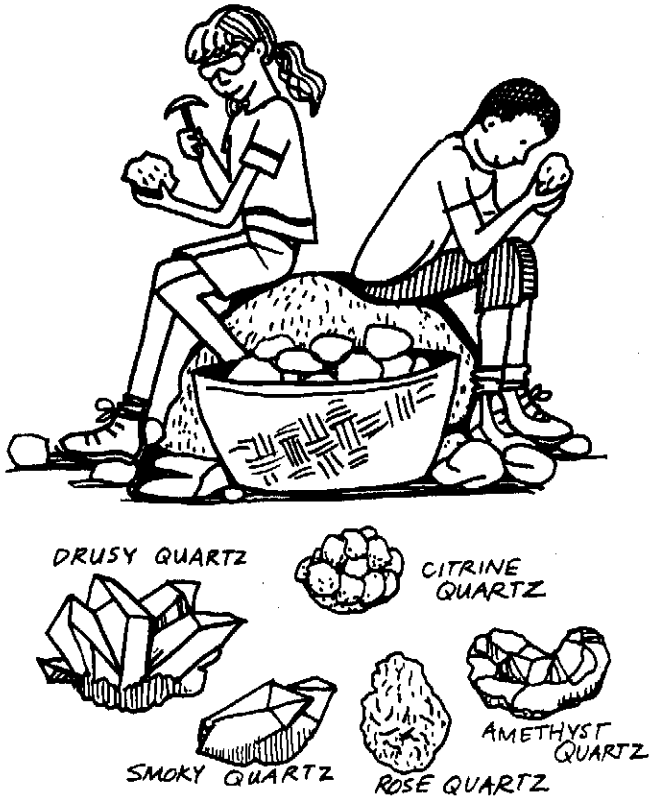
13. The two have stumbled upon a large amount of a mineral that has various colors. Some of it is almost clear. It appears to have hexagonal crystals and is hard enough to scratch a steel file. What could it be? _____

14. Erik has found a red mineral that looks like a gem. It leaves a colorless streak and is harder than quartz. Could it be a garnet? ___

15. A brown mineral that leaves a brown streak is in Erika's basket. It fractures irregularly, and can be scratched by a steel file but not by a knife. It has a metallic luster. What might it be? _____

16. Erika is especially excited about a find of whitish mineral that glows when she puts it under ultraviolet light. It leaves a colorless streak and cannot be scratched with a penny, but can be scratched with a knife. What might it be? _____

17. Erik's mother has let him examine a gem she has. It is blue, leaves a colorless streak, and cannot be scratched with anything they find. It does scratch quartz. What might it be? _____



18. Erica thinks she's found some copper. The mineral looks coppery-red, and can be scratched by fluorite. It has a metallic luster. Is this probably copper? _____

19. Another black mineral is in Erik's basket. It leaves a black streak and has a metallic luster. It cannot be scratched by a fingernail, knife, or penny. Is it galena? _____

20. A yellow gem that Erika has seems to be a topaz. If it is, will it scratch a steel file? _____

21. The pair has happened upon a small amount of a shiny, silvery-white mineral that leaves a light gray streak. It is hard enough to scratch calcite. Could it be silver? _____

22. Erika has a green, nonmetallic mineral that leaves a colorless streak. It can be scratched by a penny, but not easily by a fingernail. Could it be muscovite? _____

Name _____

PHYSICAL PROPERTIES OF SOME COMMON MINERALS

Metallic Luster

MINERAL	COLOR	STREAK	HARDNESS	CRYSTALS	BREAKAGE
GRAPHITE	black to gray	black to gray	1–2	hexagonal	scales
SILVER	silvery, white	light gray to silver	2.5	cubic	hackly
GALENA	gray	gray to black	2.5	cubic	perfect, cubic
GOLD	pale-golden yellow	yellow	2.5–3	cubic	hackly
COPPER	copper red	copper red	3	cubic	hackly
CHROMITE	black or brown	brown to black	5.5	cubic	irregular
MAGNETITE	black	black	6	cubic	conchoidal
PYRITE	light brassy yellow	greenish black	6.5	cubic	uneven

Nonmetallic Luster

MINERAL	COLOR	STREAK	HARDNESS	CRYSTALS	BREAKAGE
TALC	white, greenish	white	1	monoclinic	in 1 direction
BAUXITE	gray, red, brown, white	gray	1–3	—	—
GYPSUM	colorless, gray, white	white	2	monoclinic	basal cleavage
SULFUR	yellow	yellow to white	2	orthorhombic	conchoidal
MUSCOVITE	white, gray, yellow, rose, green	colorless	2.5	monoclinic	basal cleavage
HALITE	colorless, red, white, blue	colorless	2.5	cubic	cubic
CALCITE	colorless, white	colorless, white	3	hexagonal	in 3 directions
DOLOMITE	colorless, white, pink, green, gray	white	3.5–4	hexagonal	in 3 directions
FLUORITE	colorless, white, blue, green, red, yellow, purple	colorless	4	cubic	cleavage
HORNBLENDE	green to black	gray to white	5–6	monoclinic	in 2 directions
FELDSPAR	gray, green, white	colorless	6	monoclinic	2 planes
QUARTZ	colorless, colors	colorless	7	hexagonal	conchoidal
GARNET	yellow-red, green, black	colorless	7.5	cubic	conchoidal
TOPAZ *(gemstone)*	white, pink, yellow, blue, colorless	colorless	8	orthorhombic	basal
CORUNDUM	colorless, blue, brown,	colorless	9	hexagonal	fracture