

MINI MINERS MONTHLY

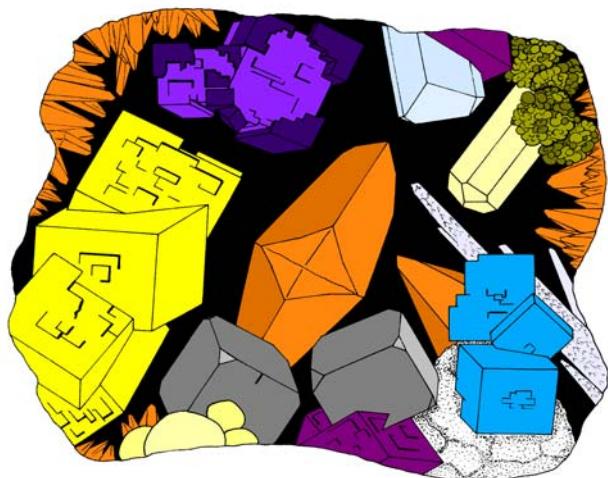
Welcome to the “Back to School” issue of *Mini Miners Monthly*. This issue starts off with an awesome interview by contributing editor, Emma Fajcz, with Dr. George Robinson, one of the leading mineralogists of our day. Then, we have an 11-page fun “mineral challenge.” This is for all those mineral enthusiasts who will be studying minerals in school this year. It’s also for all the rest of you who just love minerals!!

We close out the issue with a bunch of mining scenes for you to color with family and friends.

That’s it for now. Have a load of fun and learn a lot. Remember . . . a successful collector is a smart collector.



Vol. 7 No. 8
August 2013



George Robinson: Former Mineral Museum Curator

by Emma Fajcz

Please explain the many jobs you performed as a curator.

A curator wears many hats. First and foremost, a curator is the caretaker of the museum's collections. This means taking care of not only the specimens themselves, which in my case were rocks and minerals, but also all of the information that goes with them. This includes information on the locality the mineral came from, any scientific data obtained from the mineral, how the museum got the mineral (whether it was purchased, donated, collected, or traded for), and other important records. Most curators are also expected to create educational exhibits, give tours of the museum, identify specimens for the public, teach, do research and publish the results, collect specimens in the field, and help with fundraising. Other things that curators might have to do are attend meetings, supervise assistants and/or student workers, docents and volunteers, train those individuals where necessary, as well as carryout various other duties that may arise. Being a curator is an interesting job!



Figure 1 - George Robinson using a scanning electron microscope to identify minerals, 2004

What was the best donation to the A. E. Seaman Mineral Museum during your time there?



Figure 2 - Five foot tall amethyst geode from Brazil

This is a difficult question, not only because there were lots of important donations, but each had its own different strengths in specific areas. For example, one donation may be a fantastic single specimen of some highly popular mineral with tremendous display potential (like a 5-foot-tall amethyst geode from Brazil), while another might consist of a whole suite of rare, but unattractive specimens from a unique locality important to research. Another may be a one-of-a-kind or finest known specimen from a region of special interest to the museum (for example, the finest known datolite from Michigan). Overall, however, if I had to select a single donation, it would probably be a collection of about 1200 specimens donated by Lance Hampel, a Wisconsin mineral collector, since they were generally all large, attractive specimens, from many of the world's most famous localities.

In your 31 years as a mineral museum curator, what was the most interesting specimen that a collector brought in to be identified?

It would probably be a toss-up between a nickel-iron meteorite a local mineral collector found while searching for copper specimens with a metal detector, and a suite of micro phosphate minerals from the Tip Top mine in Custer, South Dakota. Not only were these minerals beautiful under the microscope, but they also proved to be important to science, because a number of them were found to be new minerals.

Over the years, what kind of themes has the A. E. Seaman Mineral Museum had for their galleries and exhibits, and which were your favorites?

For many of its early years, the museum's exhibits were displayed two different ways. The first way grouped minerals with similar chemical compositions together. For example, pyrite, sphalerite, and stibnite might be shown together, since they are all sulfide minerals, whereas hematite, magnetite, and corundum might be displayed together, since they are all oxide minerals. This way of organizing minerals is called the "Dana" system, named for a famous 19th century mineralogist, James D. Dana, and the resulting arrangement of minerals is often called the "systematic collection." As time went by various exhibits were made to honor donors who had given their collections to the museum. The best minerals from each collection were put on display in individual cases devoted to each of the donors. One exhibit case might show the collec-



Figure 3 - Whiteite Lazulite from Rapid Creek, Yukon Territory, Canada

tion of a particular mineral collector, while another displayed specimens donated by a famous geologist.

Today, the museum's exhibits are more educational and some display cases show minerals from a famous collecting area, such as quartz crystals from Arkansas, or rare minerals from the Yukon Territory in Canada. Nearly one whole side of the Seaman Museum is organized into three mineral-producing areas in Michigan. Other displays show how different minerals form by different geological processes. These include crystals that are created from rocks being metamorphosed; crystals from rocks that are melted; and those formed from water in which different minerals may be dissolved. Some of my personal favorite displays are the fluorescent minerals, crystals that have been faked, and the systematic collection of worldwide minerals, though many people prefer the gems, especially the display on birthstones, which is very popular with most visitors.

Please share an interesting story about collecting minerals in the field.



Figure 4 - Rapid Creek, Yukon Territory, Canada

Having been a mineral collector for over 50 years, I have had many interesting experiences while collecting minerals in the field, but few as memorable as collecting in the Canadian Arctic. Usually when one thinks of the Arctic, visions of glaciers and sub-zero temperatures come to mind, not acres of alpine meadows with wildflowers and majestic mountain ranges, but that is how I found Rapid Creek, Yukon, in July 1984. This locality is famous for its high-quality, rare phosphate minerals like lazulite, wardite and whiteite. These minerals occur in veins of quartz, and are found by walking the creek beds looking for bits of quartz in the banks, then following them up to their source, which can be several hundred feet above the creek. Because it is north of the Arctic Circle, there is 24 hours of day-

light in the summer months. This results in your body having to re-adjust its normal times of sleep and meals. It also means you have to be on the lookout for grizzly bears and cope with thousands of mosquitoes 24 hours a day!

One day, my collecting partner, Jerry, and I had been dropped off by helicopter in an unexplored area with the promise we would be picked up 2 hours later. With about 15 minutes left before we had to leave, Jerry uncovered a vein containing the best collinsite crystals we had ever seen. As he motioned for me to join him and I turned to pick up my tools, I noticed a large, brown furry object about 200 yards upstream and heading our way. "Grizzly!" I told Jerry, who by this time had nearly filled his sack with specimens, I would stand guard with the rifle so he could continue collecting, since the best specimen was still in the vein, attached to the wall. I never knew Jerry could dig so fast. A few minutes later we could hear the helicopter in the distance, but more worrisome, all of a sudden the grizzly disappeared from view! With one last tap from his hammer, Jerry freed the specimen. We both crawled up the ledge looking for the bear while we waved to the helicopter pilot. When he landed his first words to us were "Did you know there was a bear coming your way? Good thing he took the other fork in the stream!"

In other places in the Arctic, collecting can be quite different. One such place was the Nanisivik mine, located on the far western end of Baffin Island in Nunavut. Now closed, the mine was formerly worked for zinc, but it was the unusual crystals of pyrite for which the mine was famous. I was told to come in March, when the collecting should be good in most of the mine. "But won't it be too cold there in March?" I asked. "No different in July" was the reply. That is because the mine is located in permafrost to a depth of nearly a quarter mile, which keeps the temperature in the mine at about -25°C year-round. In the summer months when it is warm outside, the humidity in the air pumped into the mine for ventilation causes the walls to accumulate frost several feet thick so you can't see anything other than frost. So we went in March when the outside temperatures were closer to -50°C than -25°C. We also soon learned that all the crystal pockets in the mine were filled with ice, and an ice pick became a very important tool to have.



Figure 5 - Collinsite from Rapid Creek, Yukon Territory, Canada



Figure 6 - Wulfenite from Arizona

The procedure was as follows: find an unexcavated pocket, chop out all the ice in its center, leaving a protective layer of ice about 1-2 inches on everything else. Next, you have to chisel the specimens off the walls of the pocket and bring all the pieces into a heated building so the ice can melt off them overnight, revealing sparkling crystals of pyrite, quartz, calcite and other minerals.

Explain how you designed memorable educational exhibits for the new mineral museum built in 2011.

The approach I followed in designing the new exhibits was similar to those used by most larger museums, and is somewhat like writing an essay or doing a term paper as a homework project. First you need a topic to write about, and then you have to make an outline organizing the different parts of the topic into a logical sequence to tell the larger “whole story.”

The topics chosen to be covered in the new museum were gotten by asking visitors questions such as what they liked and disliked about the old museum’s exhibits, and what they wanted to see in a new mineral museum. This also gave me an idea of their basic levels of understanding about geology and minerals. Using this information, the educational content for each exhibit area was selected and developed with individual cases arranged in a logical sequence. Similar displays were grouped together to best-present the geological story or other theme being presented. Finally, specific specimens from the collection that best-illustrated the specific topics being covered for each exhibit case were selected. Case colors, text, labels and physical layouts of the specimens for each were determined last. Not being very artistically inclined myself, I was fortunate to have had help from my wife, Susan, who happens to be an artist with a strong background in geology.



Figure 7 - Silver from Cobalt, Ontario, Canada

Since you are a prolific writer, what article or book of yours meant the most to you when it was published?



Figure 8 - Gold from Colorado

That's an easy one: the first major book I did in 1994 while at the Canadian Museum of Nature in Ottawa, titled *Minerals*, published by Simon and Schuster.

Who were your mentors in the field of mineralogy and collecting?

Many people have helped me learn about minerals and where to find them, but my primary mentors were probably Elmer Rowley, a well-known collector, amateur mineralogist, and teacher in the Glens Falls, NY area from the 1930s – 1960s, and Brad Van Diver, one of my professors at the State University of New York, Potsdam.

How did being a mineral museum curator shape your skills as an accomplished mineral photographer?

Two things here: 1) having a great collection at my fingertips certainly made it easy to find naturally photogenic specimens, and 2) publishing the various books and articles I have written gave me access to people like Jeff Scovil, Wendell Wilson and others who are far better photographers than I will ever be. For example,

in doing the two books *Minerals* (published in 1994) and *Mineralogy of Michigan* (published in 2004) gave me nearly 6 – 8 weeks of working with Jeff Scovil, who generously shared his knowledge and allowed me to watch over his shoulder as he photographed the specimens that were used in these two books.

Most mineralogists would probably want to have a mineral named after them, like you had in June of this year. Please explain how this or other special honors you may have received have impacted you personally and professionally.



Figure 9 - Copper from the Keweenaw Peninsula, Michigan

I have been fortunate to have received many honors during my career as a curator, but two stand out as especially important: having a mineral named after me (Georgerobinsonite), and winning the Carnegie Mineralogical Award. When I was first informed of each of these honors, my first reaction was one of disbelief. Was I dreaming or was this really happening? The Carnegie Award honors “outstanding contributions in mineralogical preservation, conservation, and education,” and is given to both individuals and institutions. When I compare my achievements to those of past Carnegie Award winners such as Paul Desautels and Fred Pough or institutions like the Mineralogical Record or Rochester Mineral Symposium, it makes me think I still must be dreaming!

Traditionally, most professionals who have had minerals named for them are eminent mineralogists, i.e. scientists, who have made significant contributions to the science of mineralogy, rather than curators who, by the nature of their job, are not expected to do as much research or as many publications as an academic or research scientist. To know what others recognized the importance of curatorial work, and thought mine was worthy of such an honor, is extremely gratifying. And with the gratification comes inspiration to continue to do as good, or hopefully better, work than before. It's rewarding to know that there really are people out there who care and appreciate the importance of curatorial work.

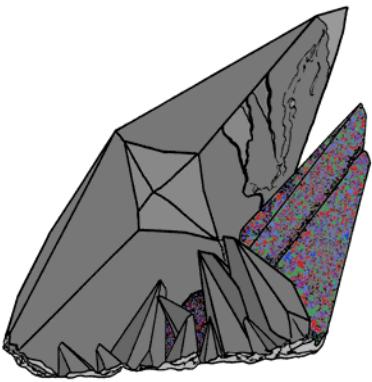
Photo Credits: George Robinson

Note: If you would like to view photos of georgerobinsonite, please visit the following website with an adult's help: <http://www.mindat.org/gallery.php?min=39765>

Editor's Note: This interview is an outstanding effort by our contributing editor, Emma Fajcz. Thank you, Emma, for what is obviously a product on which you spent considerable time and effort. We also express our deep gratitude to Dr. George Robinson who took significant time to answer Emma's questions with thoughtfulness and meaningful detail. Together, you fine people have blessed us with a wonderful article to read. Thank you both, very much.

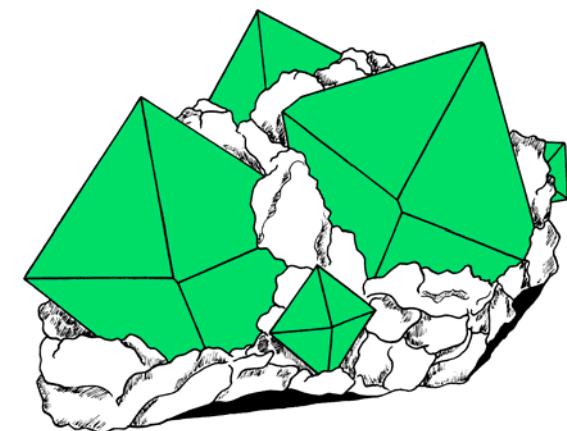
DIAMOND DAN'S
HEY, WHAT DO YA KNOW ABOUT
MINERALS?
CHALLENGE





Circle the mineral that does not belong in this list: talc, gypsum, calcite, barite, fluorite, apatite, quartz.

Extra Credit: Why doesn't it belong in the list?



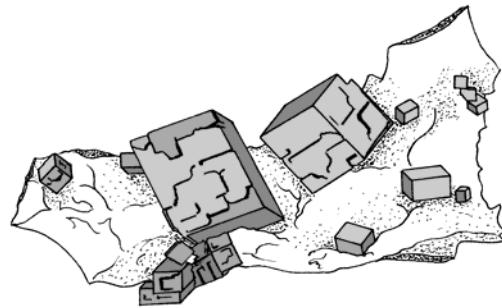
What element is removed from fluorite to make a special chemical that is added to toothpaste?

CLEAVAGE

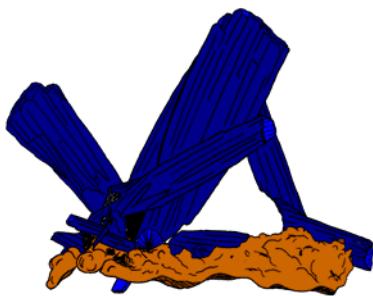
What is the name of the type of cleavage found in the mineral fluorite?

CLEAVAGE
Mica cleaves in one direction.
Fluorite cleaves in 8 directions.

What kind of cleavage does galena have?



Hematite can be identified by one very revealing physical test. What is the test and why does it reveal hematite's identity so easily?



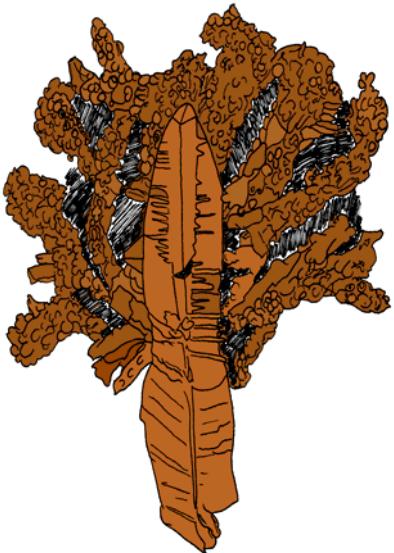
Name two copper-bearing minerals, each of which has a distinctive color.

_____ is always a shade of blue.

_____ is always a shade of green.



Give the proper mineral name for the mineral that you probably use every day on your food. It is soft, soluble in water, and has a salty taste.

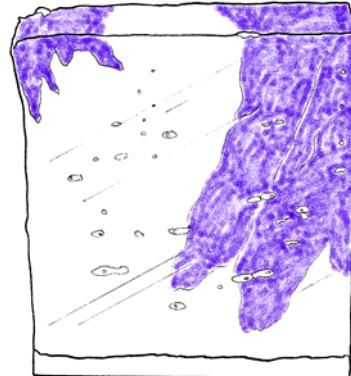


LUSTER

Circle the minerals in the following list that do not have metallic luster in GREEN.

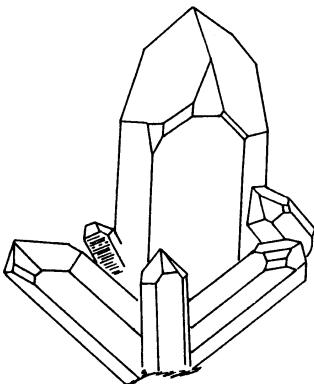
Circle the minerals in the following list that do have metallic luster in RED.

Galena, Gold, Quartz, Silver, Diamond, Platinum, Calcite, Talc, Copper, Feldspar, Pyrite, Sulfur, Graphite.



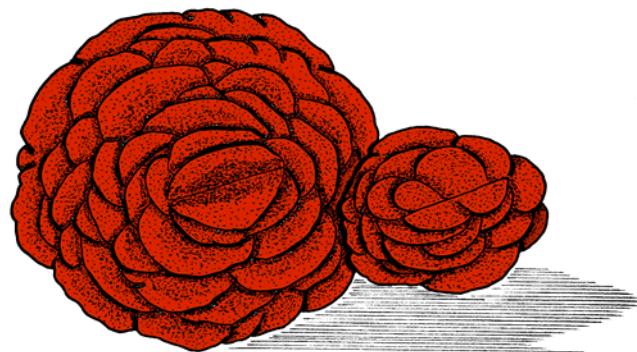
LUSTER

Many minerals, like quartz, tourmaline, calcite and fluorite have a luster that is described as glassy. The word mineralogists use for glassy is _____.



SPECIFIC GRAVITY

Name the NON-METAL mineral that has the highest specific gravity in the mineral kingdom.



HARDNESS

Name the mineral that is too hard to leave a streak. It is number 9 on the hardness scale.



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What is the physical property of minerals that describes the way a mineral breaks into smooth, flat planes? This property is determined by the atomic structure of the molecules of which it is made.

STREAK

What is the “streak test”?

What is the streak of the following minerals?

Galena: _____

Calcite: _____

Fluorite: _____

Graphite: _____

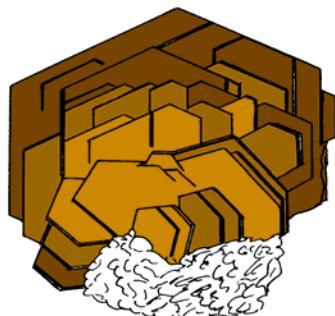
Hematite: _____

Gypsum: _____

Pyrite: _____

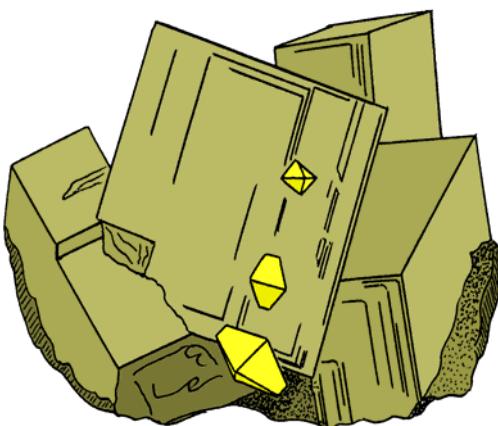
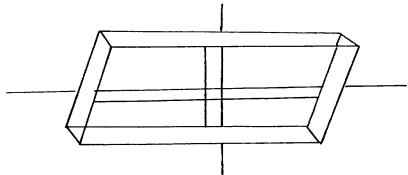
Malachite: _____

Azurite: _____



SPECIAL PROPERTIES

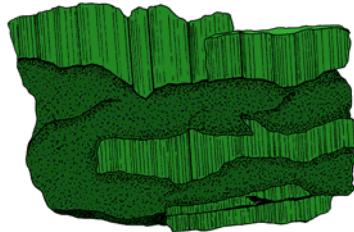
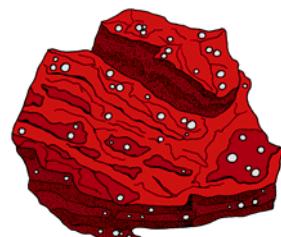
Which mineral has the special optical property called “double refraction”?



SPECIAL PROPERTIES

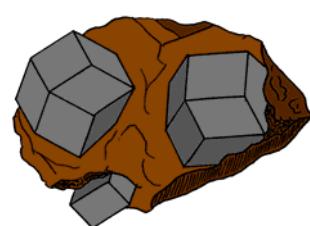
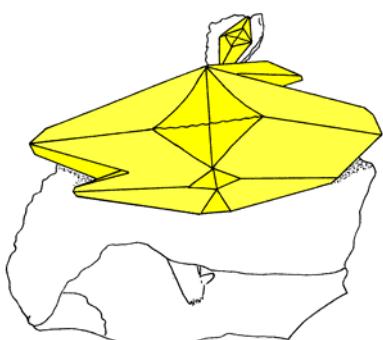
Why is the mineral mercury unique in the mineral world?

Why is the mineral asbestos unique in the mineral world?



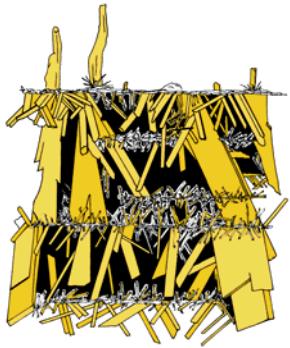
SPECIAL PROPERTIES

What special experiment can you do to determine if an unknown mineral is calcite?

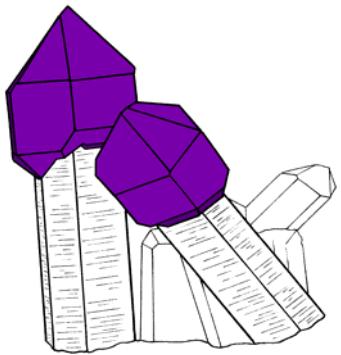


SPECIAL PROPERTIES

Magnetite is a unique mineral because it is naturally _____.

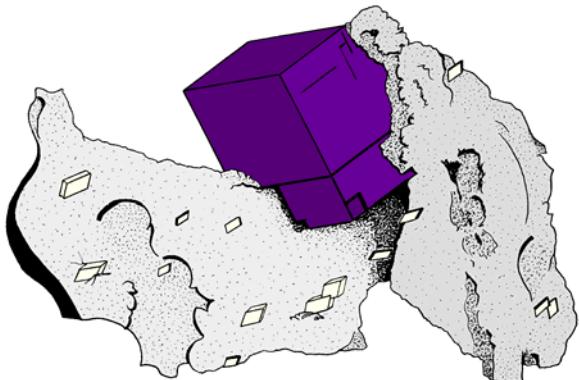
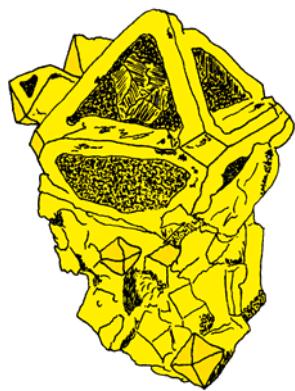
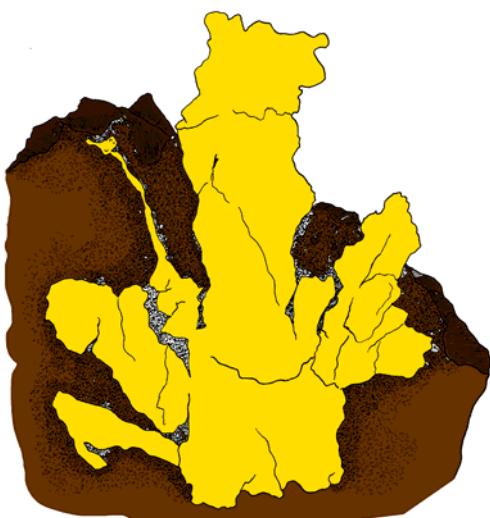
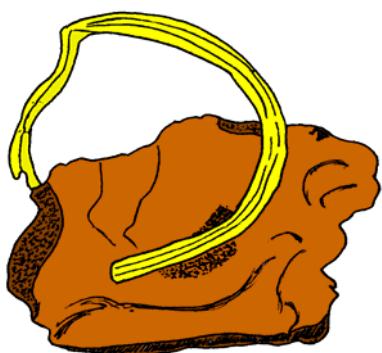


Name two uses of the mineral gypsum.



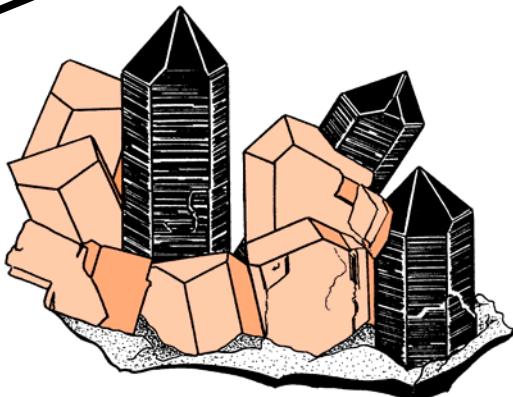
Name two uses of the mineral quartz.

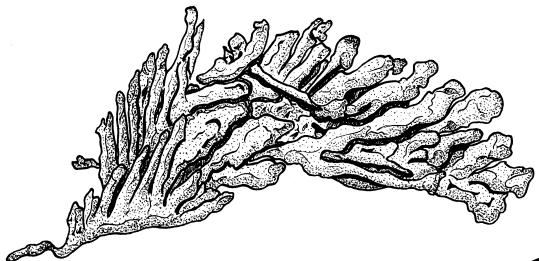
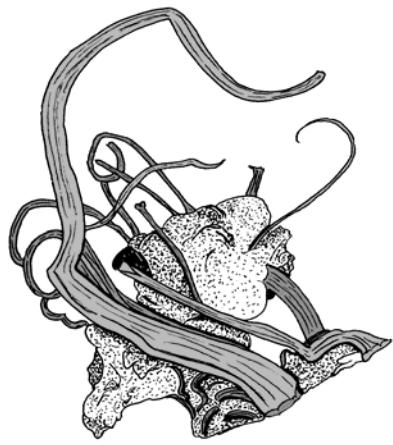
Name three uses for the mineral gold.
(And you can't say "rings, watches and necklaces.")



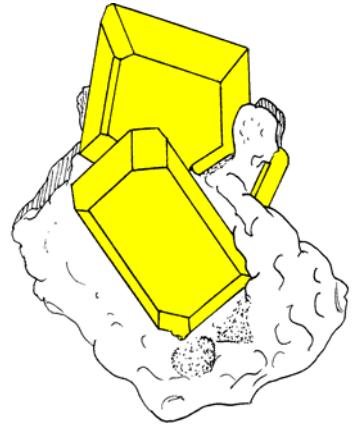
Name two uses for the mineral fluorite.

Name two uses for the mineral feldspar.

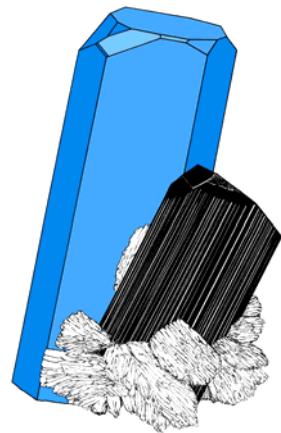
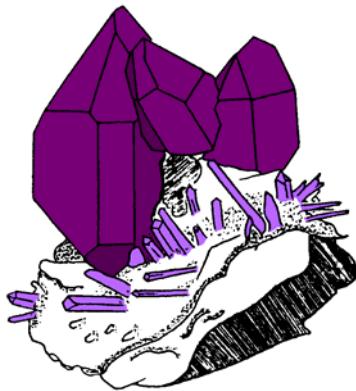
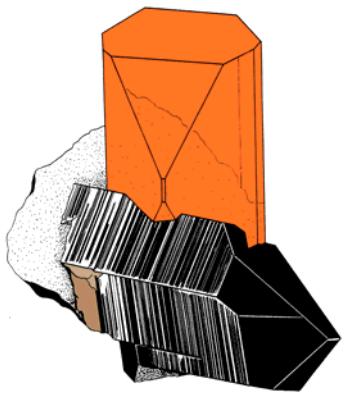




Name two uses for the mineral silver.

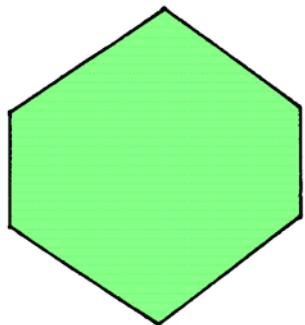


Name four uses for the mineral sulfur.

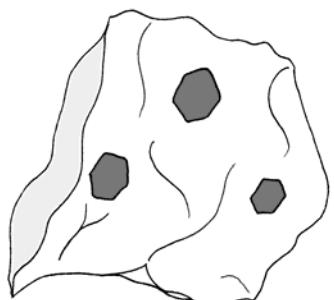


Name two uses for the mineral talc.

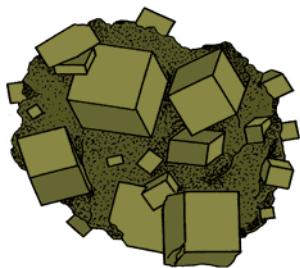
Topaz, tourmaline, garnet, amethyst, opal, diamond, sapphire, ruby and aquamarine are all colorful, hard, and can be cut and polished. What do you call a mineral that can be cut and polished and made into jewelry?



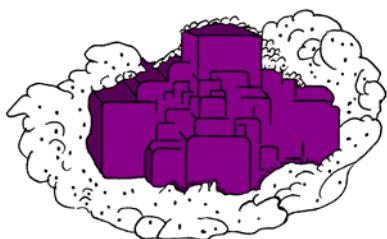
Name two uses for the mineral graphite.



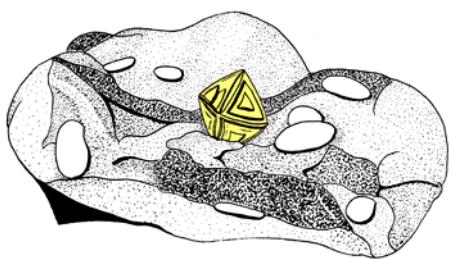
The name for this mineral is from the Greek word for *fire*.



The name for this mineral means *to flow*.

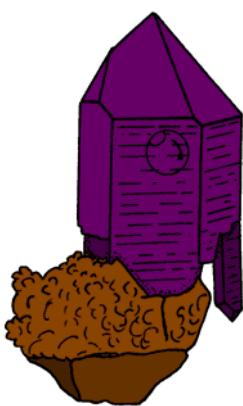


The name for this mineral means *invincible*.

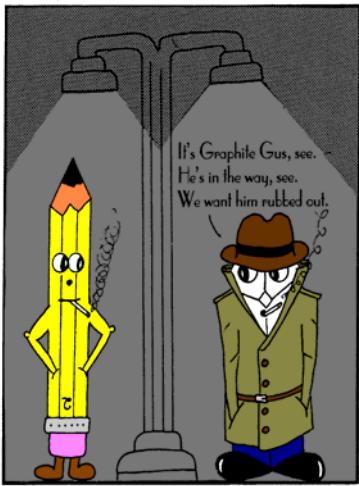
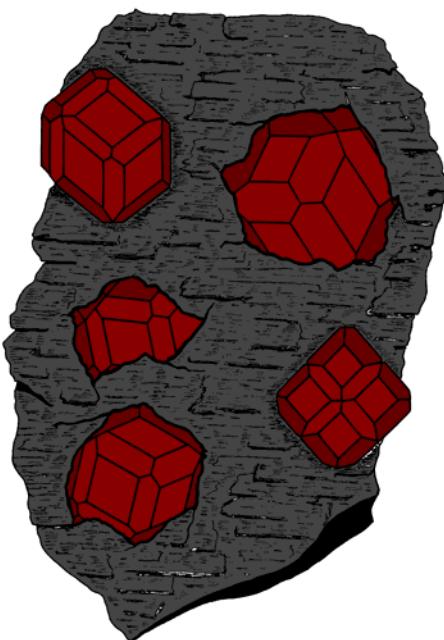


It is thought that this mineral name comes from an old German word, although no one is really certain. This mineral is number 7 on the hardness scale. What is this mineral?

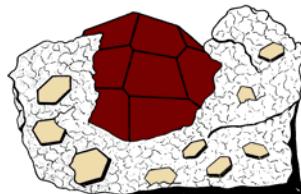
The purple variety of this mineral is named after a Greek word that mean “not drunken.”



This mineral was named after a Latin word for a pomegranate because small, red, round crystals of this mineral can look a little like pomegranate seeds. What is the name of this mineral?

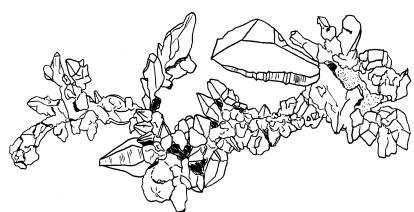
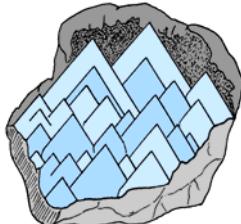


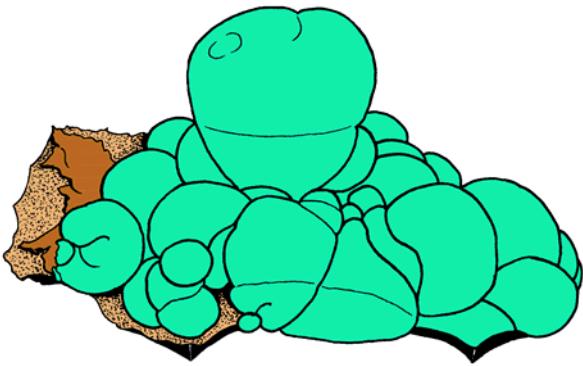
This mineral is named after the Greek word which means “to write” because it is soft, dark and used to write on paper. It is often called “lead” but it is not lead at all. What is this mineral?



This mineral is named after the island called Cyprus where large amounts of this mineral were once found. What is the name of this mineral?

This mineral is named after its sky-blue color.



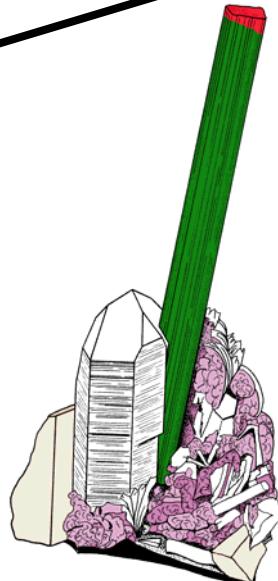


This mineral was named in honor of the British chemist and mineralogist, James Smithson. What famous museum is named after him and where is it found? What is the mineral name?

This mineral was named in honor of a famous German poet, Johann Wolfgang von Goethe.

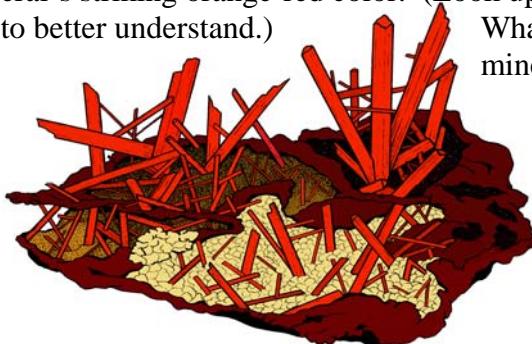


What is the special name given to colorful tourmaline crystals. The name comes from an island off the coast of Italy. You may need to do some research to figure this one out!



This mineral is named from the Greek word that means “saffron.” This is a reference to this mineral’s striking orange-red color. (Look up saffron to better understand.)

What is this mineral’s name?

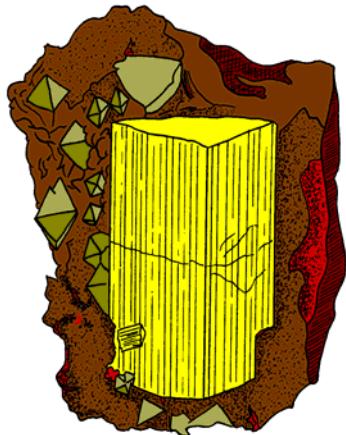
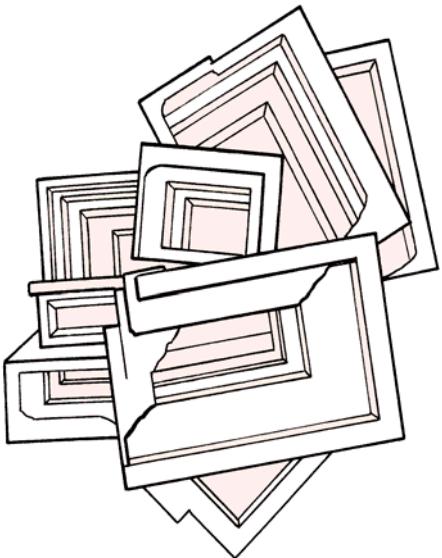


The following are the 10 minerals in the mineral hardness scale. But, they are not in the proper order. Put them in order, from softest to hardest on the lines provided.

Corundum, Quartz, Gypsum, Orthoclase
Feldspar, Topaz, Diamond, Talc, Fluorite,
Calcite, Apatite.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Which body part has the same chemical composition as the mineral apatite?

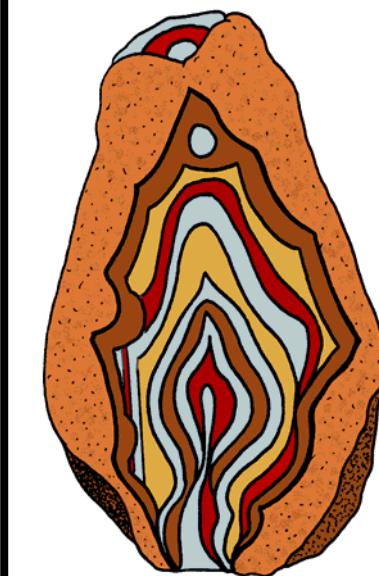
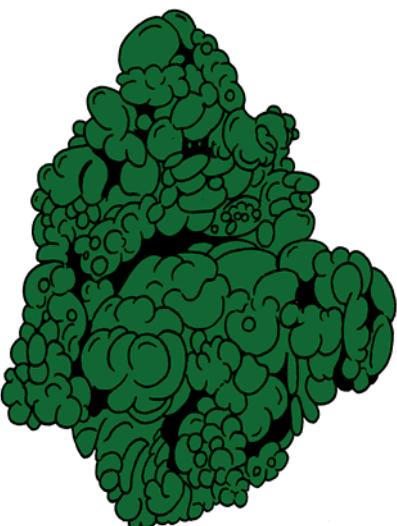


This mineral is the source of two important elements: sodium (Na) and chlorine gas (Cl).

What is the *scientific* name of this mineral? (In other words, what is its proper mineral name - not its common name.)

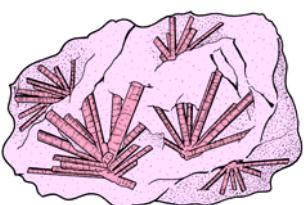
Two minerals are known by this name. The variety pictured here is called nephrite _____.

It is valuable and carved into art objects.

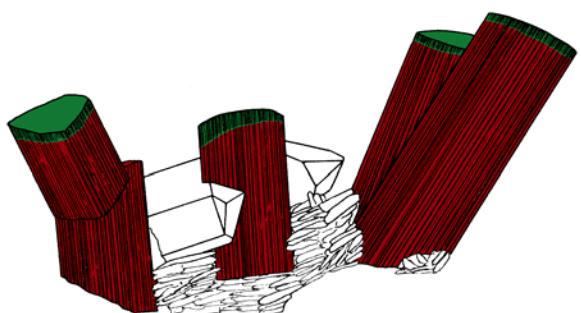


The cryptocrystalline form of quartz is called *chalcedony*. ("Cryptocrystalline" means its crystals are so small, they can only be seen under a high-power microscope.)

The colorful, banded variety of chalcedony is known as _____.



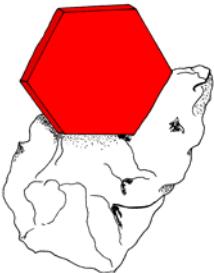
This mica mineral (seen here with tourmaline crystals) is a source of the important element lithium. What is this mica mineral called?



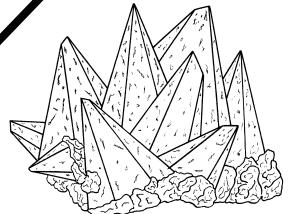
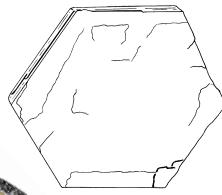
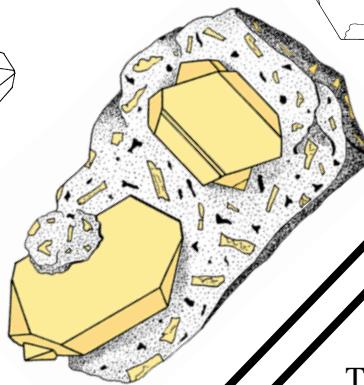
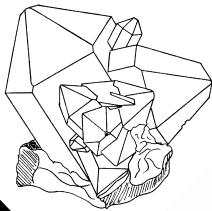
This mineral will create an electric pulse when it is put under pressure. (This is a property called *piezoelectricity*.) What is this mineral?

Name the three minerals that make up the igneous rock called granite.

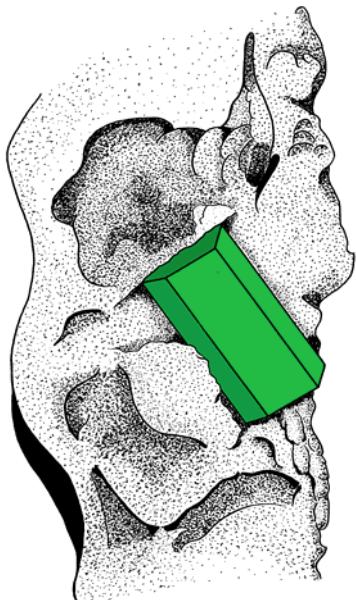
1. _____
2. _____
3. _____



The red variety of corundum is called what?



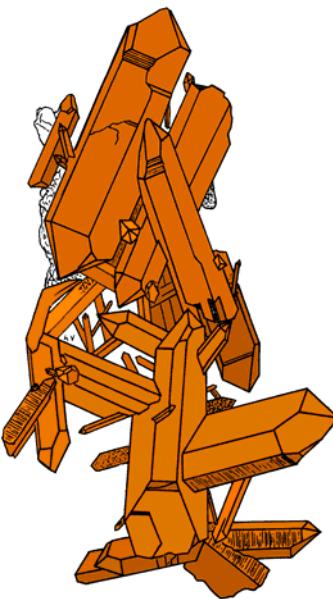
The metamorphic rock called marble is made from metamorphosed limestone. It has the same chemical formulas which mineral?



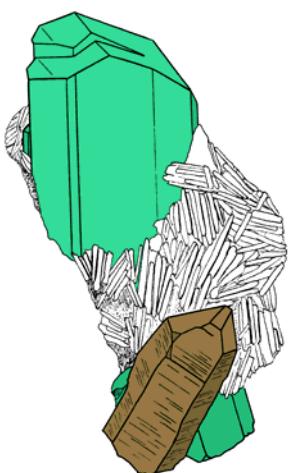
Green beryl is known by what name?

What is yellow beryl called?

What is blue beryl called?

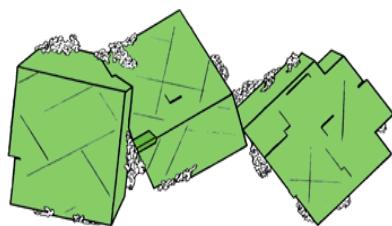


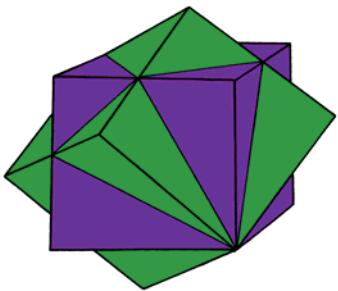
What do mineralogists call the yellow to orange variety of quartz?



When minerals have different colors, they are given *varietal names*. The green variety of feldspar is called what?

Name any five minerals that are harder than fluorite.



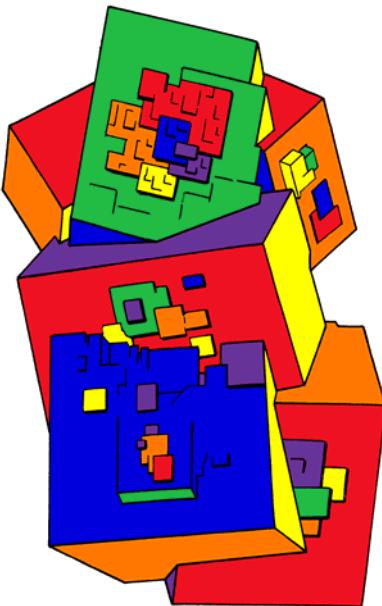


What do mineralogists call a specimen in which two individual crystals have grown together in a pattern?

Like silver and gold, copper can be pulled into very long wires without breaking. A metal that has this property is described as what?



Explain why color is not the best physical property to use to identify an unknown mineral.

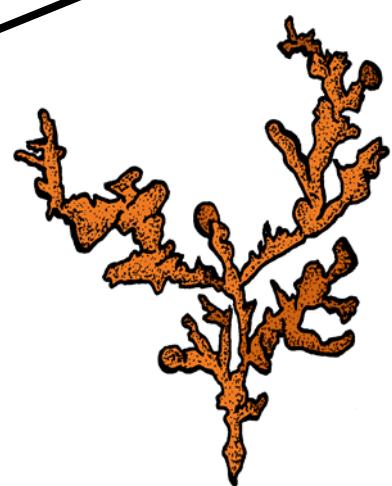


Copper, silver, platinum and gold can be hammered into very thin sheets without breaking. A metal that has this property is described as what?

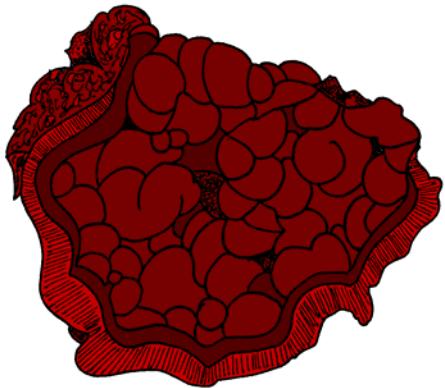


Here is a list of mineral names. Which ones do not have metallic luster?

Galena, tourmaline, calcite, pyrite, malachite, gold, azurite, silver, sulfur, platinum, marcasite, talc, corundum, diamond, copper, garnet, halite, platinum.

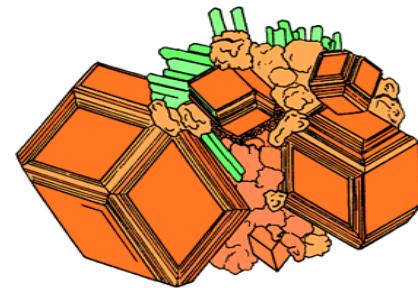
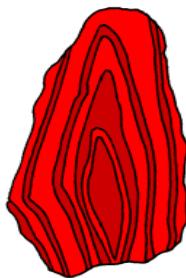


What is the streak test in mineralogy?



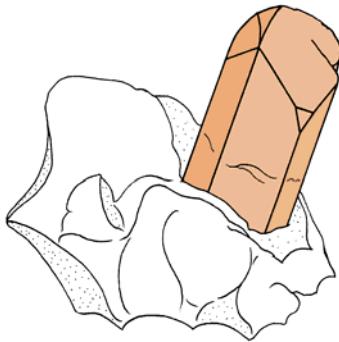
Uvarovite,
andradite, pyrope,
almandine, hessonite
are all names for different varieties
of which mineral species?

Red
chalcedony is
known by what name?



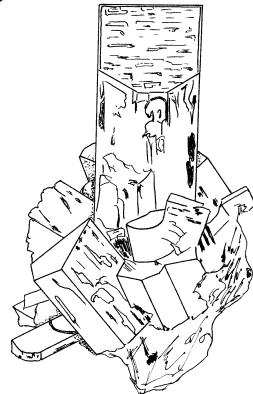
Old joke worth repeating:
What do you get when you drop a piano down a mine shaft?

A Flat Miner!



Which
mineral is
number 8 on
the hardness scale?

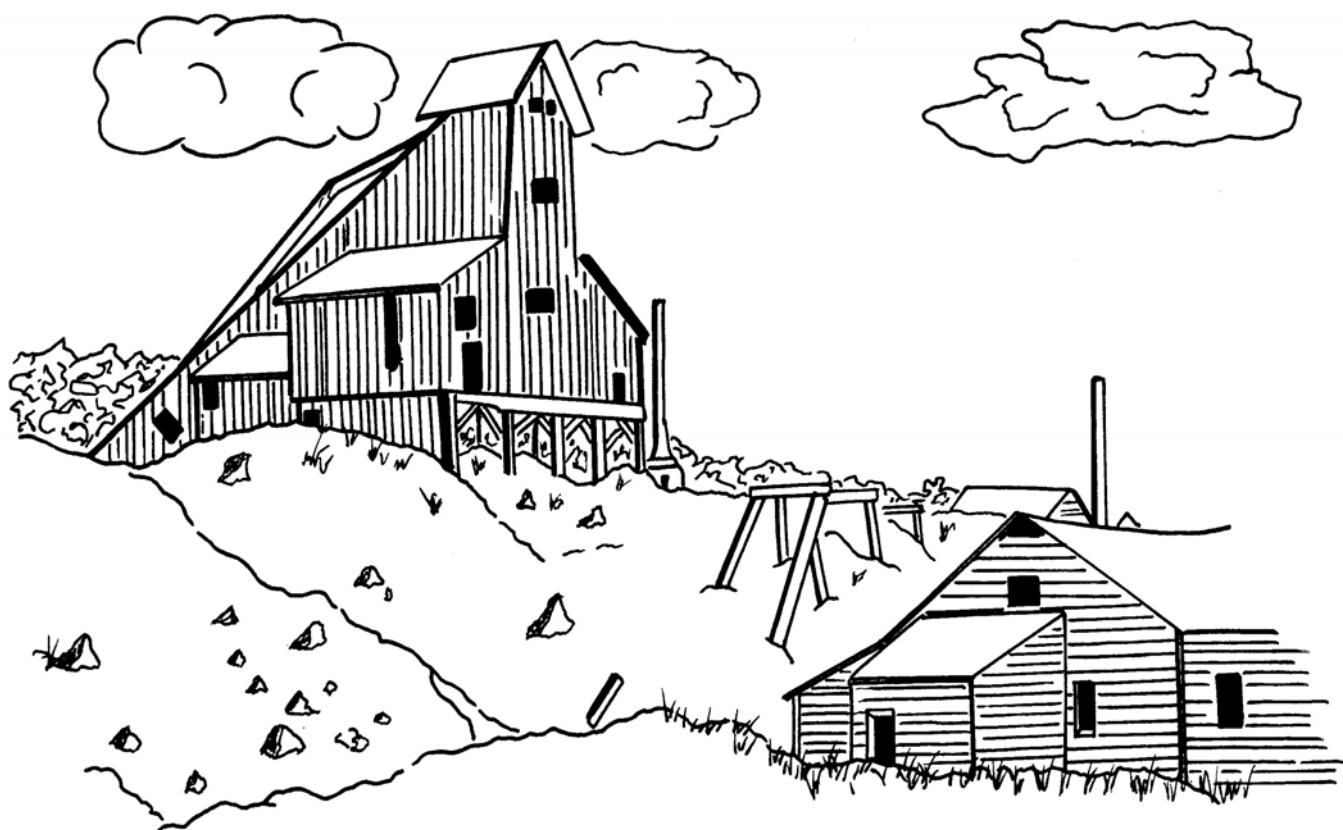
Name two
more uses
for
feldspar.

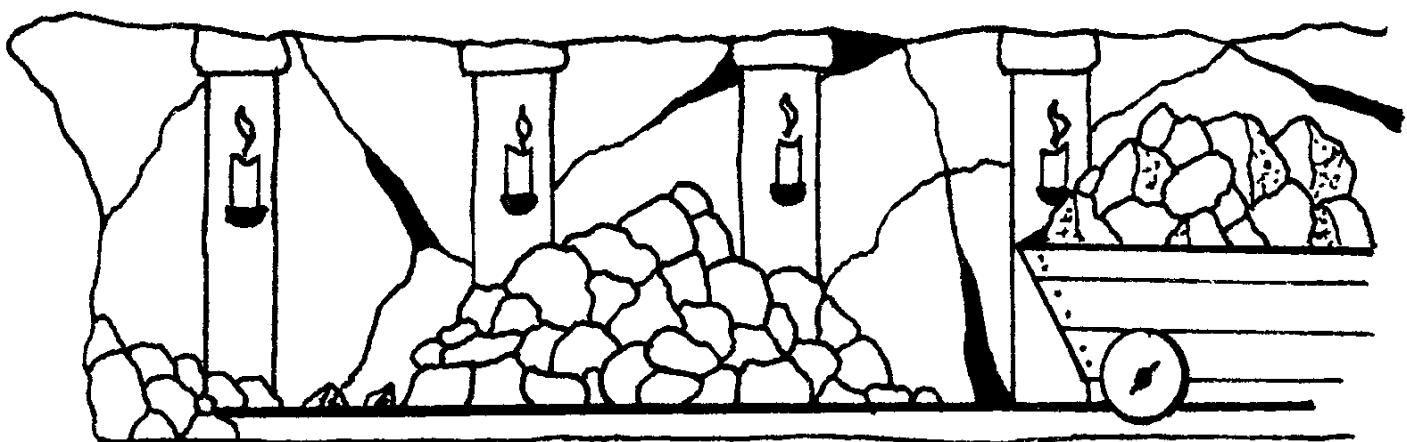
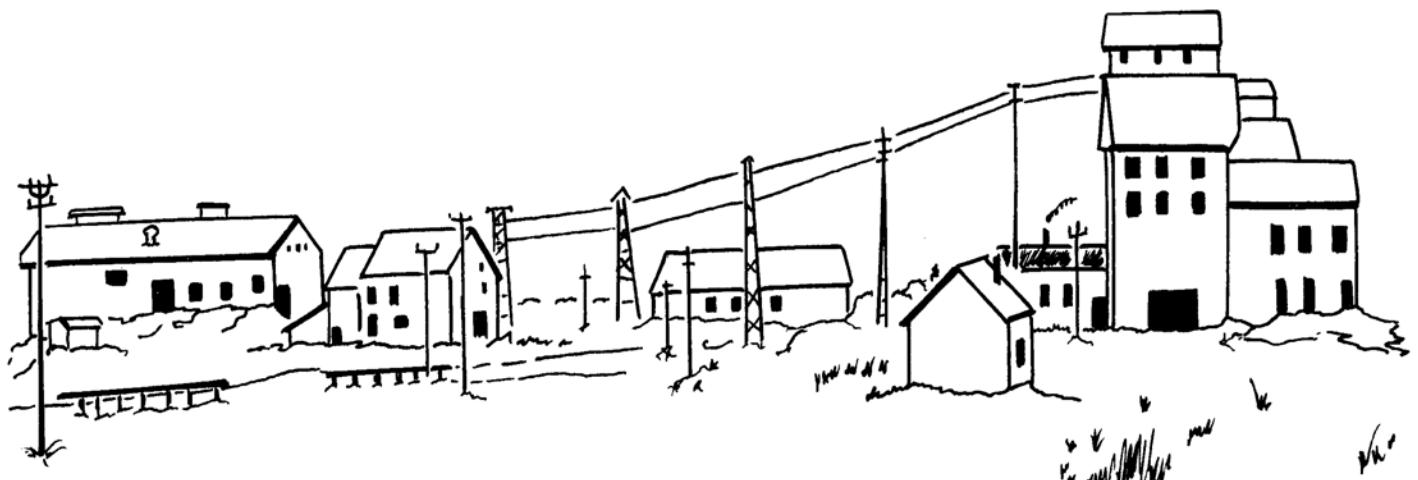


MINING SCENES TO COLOR

There's something about coloring a good picture that is just a load of fun. So, for the youngest *and* the oldest mineral enthusiasts, here are some mining scenes to color! Enjoy!







WHAT DO YA KNOW ABOUT MINERALS? CHALLENGE

Page 7:

Mineral that does not belong in the list: Barite. Why? Because all the other minerals listed are in the mineral hardness scale.

Cleavage: Perfect octahedral.

Fluorine is removed to make fluoride for toothpaste.

Cleavage: Galena has perfect cubic cleavage.

Hematite is easily identified by its deep, blood-red streak.

Azurite is always blue. Malachite is always green.

Page 8:

Halite

Minerals without metallic luster: Quartz, Diamond, Calcite, Talc, Feldspar, Sulfur, Graphite.

Minerals with metallic luster: Galena, Gold, Silver, Platinum, Copper, Pyrite

Glassy=Vitreous

The most dense non-metal mineral is barite. In other words, barite has the highest specific gravity of all the non-metallic minerals.

Hardness: Corundum

Page 9:

Cleavage

Streak: The streak test is the color of a mineral when it is ground to a powder. This is easily done by rubbing a mineral specimen over a piece of unglazed porcelain.

Streaks:

Galena = Lead gray; Calcite = white; Fluorite = white; Graphite = gray; Hematite = blood-red;

Gypsum = white; Pyrite = dull green; Malachite = green; Azurite = blue.

If a drop of weak hydrochloric acid is placed on a piece of calcite, the acid will fizz. (The acid test.)

Mercury is unique because it is the only mineral (and metal and element) that is a liquid at room temperature.

Asbestos is unique because it does not burn. (Actually it does burn, but only in extremely high temperatures.)

Magnetite is unique because it is naturally magnetic.

Page 10:

Gypsum is used to make plaster and wall board (also called sheet rock). Your walls are made of sheet rock.

Quartz is used to make glass and in watches and scientific equipment.

Gold is used to fix broken teeth, is used in computer circuit boards and in some special drugs used to fight cancer.

Fluorite is a flux (it helps iron come out of iron ore at lower temperatures). It is a source of the element fluorine.

Feldspar is used to make porcelain. It is a filler in paint.

Page 11:

Silver is used to make high quality utensils (forks, spoons, knives). It is used in film for pictures.

Sulfur has hundreds of uses. It is used to make sulfuric acid for many uses in industry. It is used in the process of making rubber tires. It is used in matches. It is used in special medicines and fertilizers.

Page 11, con'd.

A gemstone.

Talc is used to make baby powder. It is slippery when crushed so it can also be used as a “dry lubricant.”

Graphite is mixed with clay to make pencils. It is also used as a dry lubricant.

Page 12:

Mineral named for “fire” is pyrite. The mineral name that means “to flow” is fluorite. Diamond is “invincible.”

Number 7 on hardness scale: Quartz

Pomegranate: The mineral garnet.

Pencil “lead” is made of graphite (mixed with clay).

Celestite (sometimes spelled “Celestine”) is named after its sky-blue color.

The mineral from Cyprus: Copper.

Page 13:

Named after James Smithson: Smithsonite

Named after von Goethe: Goethite

Colorful Tourmaline: Elbaite

Named after saffron: Crocoite

Hardness scale in order from softest (1) to hardest (10): Talc, Gypsum, Calcite, Fluorite, Apatite, Orthoclase Feldspar, Quartz, Topaz, Corundum, Diamond.

Page 14:

Teeth and bones.

Scientific name of this mineral is Halite (common name: salt)

Nephrite Jade

Banded Chalcedony: Agate

Purple mica that is a source of the element lithium: lepidolite.

Tourmaline creates an electric pulse when put under pressure.

Page 15:

Granite: Feldspar, quartz, biotite mica

Red corundum = ruby

Marble has the same chemical formula as calcite

Green beryl is emerald. Yellow beryl is heliodor. Blue beryl is aquamarine.

Yellow quartz is citrine.

Green feldspar is called amazonite.

Minerals harder than fluorite (harder than 4 on the hardness scale): apatite, quartz, topaz, corundum, diamond, tourmaline, galena, all feldspar minerals, garnets, beryls,

Page 16:

Two intergrown crystals: twinned crystals

Copper is ductile: it can be pulled into long wires without breaking.

Color is a poor physical property to use to identify a mineral because many minerals are the same color. Hardness, streak, crystal form, specific gravity are better physical properties to use.

Minerals that can be pounded into thin sheets without breaking are described as malleable.

Minerals that do not have metallic luster: tourmaline, calcite, malachite, azurite, sulfur, talc, corundum, diamond, garnet, halite.

Page 17:

The streak test is a simple way to identify the color of a mineral when it is crushed to a powder.

Red chalcedony is called jasper.

Different names for the mineral species "garnet."

Number 8: Topaz

Feldspar is used to make spark plugs (the porcelain portion). It is ground into powder and used as an abrasive (ground up feldspar is used in some toothpaste formulas. It helps polish your teeth when you brush!)