

MINI MINERS MONTHLY

A MONTHLY PUBLICATION FOR YOUNG MINERAL COLLECTORS

VOL. 12 NO. 9

SEPTEMBER 2020

Making Minerals FUN, FUN, FUN!!

Well, it looks like a whole lot of you are going to be going to school at home this fall...or for some, a little at home and a little at school. So, for the rest of this year, Mini Miners Monthly will present to you in fun and colorful ways the information that schools will teach you about minerals. This will include their physical properties and their uses. In this issue, we will focus on the definition of "Mineral." What is a mineral, anyway? And how are they different from rocks?

Each month we will show you a special property in the world of minerals. Did you know you can use quartz to make light? And pyrite to start a campfire? And borax to make slime? The list goes on and on.

It is also important that you know that we mine minerals because they are important to our lives. They help us make items that are useful every day. This month we're going to take a walk through your kitchen and discover what minerals are needed to make the pieces and parts that make up your kitchen.

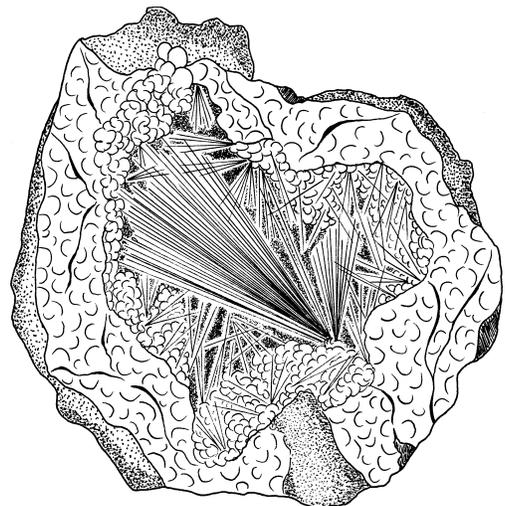
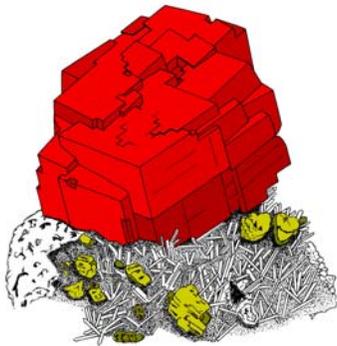
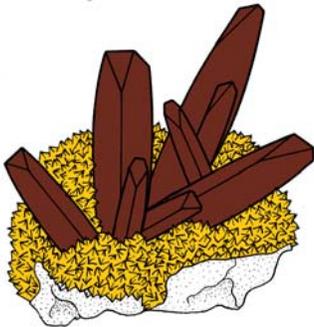
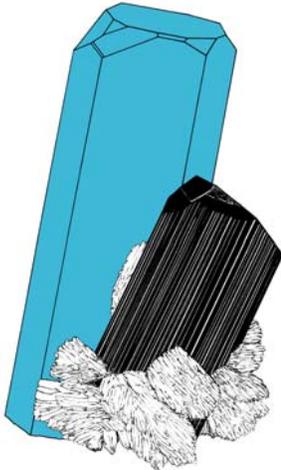
And, of course, many of you enjoy Mini Miners Monthly because it is the only publication for young mineral collectors, and we want you to enjoy success in building your own mineral collections. We will continue to have information to help you grow your collections.

BE SURE YOU CHECK OUT THE VERY LAST PAGE OF THIS ISSUE. "MINI MINERS WITH DIAMOND DAN" IS COMING TO YOUTUBE IN SEPTEMBER.

What Mineral Am I?

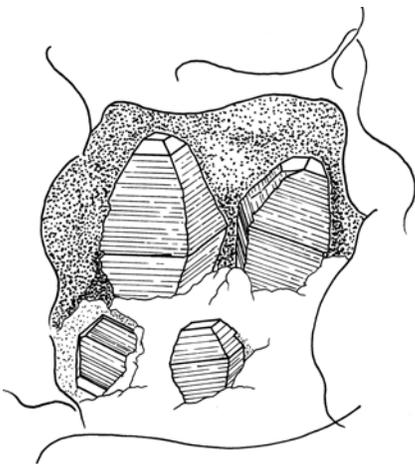
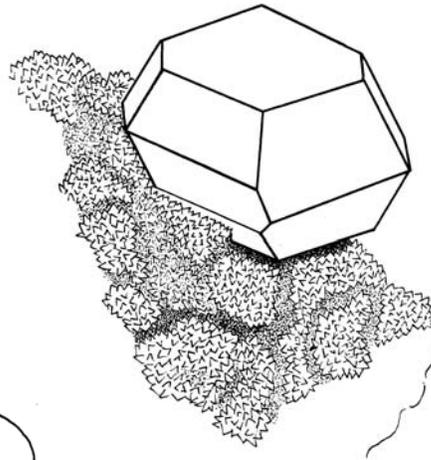
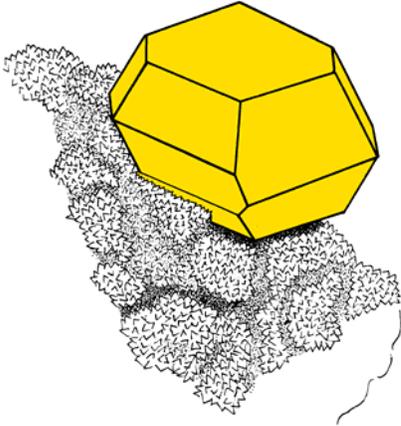
I have metallic luster and my color is brassy-yellow. I am a sulfide mineral which means that I am a metal (nickel) attached to sulfur: NiS, nickel sulfide. I crystallize in the Trigonal crystal system, but my crystals are usually very long, thin wires. I am named after the Welsh mineralogist and crystallographer, William Hallowes Miller. My mineral name is _____.

Check your answer on the next page.



Mineral of the Month

Sulfur



Color: Bright lemon-yellow to brownish-yellow.
Luster: Resinous to Greasy; **Hardness:** 1 1/2 - 2 1/2;
Specific Gravity: 2.0; **Crystal System:** Orthorhombic;
Chemical Formula: S

Sulfur is a “Native Element” which means that it is an element that occurs naturally. Graphite is another native element, carbon. Diamond is another, and it is also made of carbon. Other Native Elements are gold, copper, silver, platinum, lead, bismuth, antimony, iron (as meteorites), and arsenic.

Sulfur does not absorb heat very well. Scientists say it has “poor thermal conductivity.” If you touch a fine sulfur crystal with your finger, the heat from your body can be enough to cause the surface of the crystal to crack because it cannot move the heat from your hand into the crystal easily. Quartz, by comparison, has very high thermal conductivity. Touch a quartz crystal with your hand and you will feel that it is very cool. This is because quartz easily moves heat from your hand into the crystal.

When Sulfur is heated, it melts to a blood-red liquid. A match flame is hot enough to make sulfur melt and burn. This liquid burns with a blue flame and gives off sulfur dioxide gas. This gas smells like rotting eggs.

The important group of sulfide minerals are minerals that contain a metal and sulfur. Sulfide minerals are very important ore minerals.

What mineral am I? Answer: Millerite



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Sulfur Crystals from China Real or Fake?

Mineral collecting is a very popular hobby. It is also very big business. Millions and millions of dollars worth of mineral specimens are sold every year. People have discovered that serious mineral collectors are willing to spend hundreds and sometimes many thousands of dollars to have certain mineral specimens in their collections.

Are they
natural or were
they created in
a laboratory?

So some people have discovered that if they can make a very special mineral specimen, collectors would pay a lot of money for them. These are called FAKES! If a specimen is not made by nature, in nature, then it is FAKE.

Some fake mineral specimens that have been sold in recent years (sometimes for VERY HIGH prices) are green, blue and red Okenite balls. Natural Okenite is white and is found as rounded groups of hair-like crystals that look like cotton balls. They are

found in India. Some creative mineral dealers colored them with bright dyes and tried to sell them as "natural."

Another way of faking a mineral specimen is to create it! A few years ago, a mineral dealer took some average calcite crystals and very carefully glued them to a low-quality calcite matrix. The specimens he created were really very attractive. And some were very expensive. A suspicious collector bought one and, when he was back at the hotel, looked at it very, very closely. And he discovered that the individual calcite crystals had been glued to the matrix. He now owned a very expensive fake mineral specimen.

Recently specimens of sulfur crystals on matrix have been for sale on the internet. We found them on eBay. They are very pretty, bright yellow,



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sharp crystals. Sometimes they are on fluorite. Sometimes on other generic matrix. Are they natural or were they created in a laboratory? Some experts believe they are fakes. One reason is that the dealers selling them do not say *where* the specimens were mined. Another reason is that they are on fluorite and it would be very unusual for fluorite and sulfur to form in the same deposit. Other experts believe they are natural.

Here's a fake in Diamond Dan's collection. It is actually a combination of two real specimens from the same quarry. So...it is very possible that they would form together in the quarry. But, I found them in different piles of rocks in the quarry. (By the way, the quarry was Walworth Quarry in Walworth, New York.) See the picture here. It is a very large, beautiful, light blue, sharp fluorite cube. The matrix is a large chunk of dolomite rock covered with sharp, white, small dolomite crystals. I noticed there was a nice indentation in the dolomite and that the fluorite fit just perfectly in that space. So I connected the two together with two small pieces of wax.

So, what do we have here? A fake specimen or a real specimen? Let's be honest about it, we have A FAKE SPECIMEN made up of two real (and really nice) mineral specimens. There's actually nothing wrong with this AS LONG AS YOU LET OTHER PEOPLE KNOW THAT IT IS CREATED (FAKE) AND NOT COMPLETELY FORMED IN NATURE!

What do you think? Are they natural or fake? Have you seen fake specimens at mineral shows? Do you think fake specimens ever make it into museums?



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This is the year of COVID-19. And many Mini Miners are learning at home. And for many Mini Miners, this is the year you will study rocks and minerals in school. So, each issue of Mini Miners Monthly will have some information about rocks and minerals that you would usually learn in school. Who needs school?! You've got Mini Miners Monthly. So here we go... your first rock and mineral lesson.

IS IT A ROCK OR A MINERAL?

Is there a difference anyway?



YES! There is a difference between a "rock" and a "mineral."

Let's start with rocks. What is the definition of a "rock"?

A "rock" is...

...Natural, which means it is made by nature and not by humans.

...A solid material.

...Usually composed of two or more types of minerals.

...Sometimes composed of only one type of mineral.

There are three types of rocks.

1. **Metamorphic Rocks**, which are created when any rock material is changed by very, very, very, very high pressures and temperatures deep in the earth. "Metamorphose" means "to change." The word comes from Greek words.
2. **Sedimentary Rocks**, which are created by moving water or wind which deposit layers of sediments which are later hardened by geologic processes.
3. **Igneous Rocks**, which are melted rock material that cools off and hardens.

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You're the Geologist! What Did You Find?

It would be way too easy to tell you about the different rocks you could find in the field, show you a picture and put you to sleep. So...you have to be the geologist, even if that means an internet-surfing geologist.

On the left are the names of rocks. Some are sedimentary, some are metamorphic and some are igneous. On the right are pictures of rock samples. Your challenge, young geologist, is to match the rock name with the correct picture. Then, on

the following pages, you will find more information about these rocks.

Let's get at it!

Basalt

Conglomerate

Marble

Pumice

Sandstone

Limestone

Quartzite

Granite

Obsidian



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Well, that wasn't a lot of fun!

Here's the problem: the best way to learn about rocks and minerals is to have actual samples of rocks and minerals in your hands, so you can look closely at them, study them and see how one is different from the other.

To be fair to you, here's a "Cheat Sheet" of information. When you finally do have an actual rock in your hand, that you can study up close, here's some information that will help you identify the rock.

Igneous Rocks: Liquid (magma and lava) that cools into hard rock.

Granite

Light-colored (tan, pink)

Three minerals: feldspar, quartz and mica

Cooled slowly, so the mineral grains are big enough to see.



Basalt

Dark green to black

Cooled quickly, so the mineral grains are too small to see.



Pumice

Light color, usually gray

Very, very light and full of small holes that are filled with air

So light it will float in water. The only rock that floats!



Obsidian

"Volcanic glass": It looks like dark glass

Breaks into thin, very, very sharp flakes

Cooled so fast that no grains formed at all



*Next month, Metamorphic and Sedimentary
Rocks (we want to give you a reason to come back!!)*

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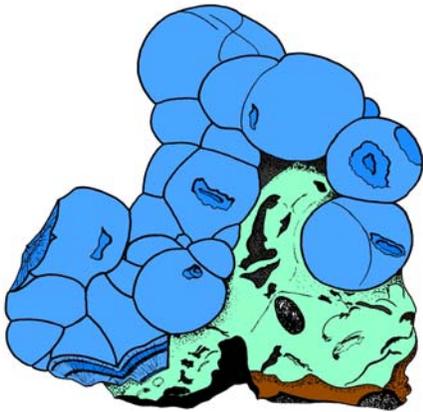
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WHAT IS A MINERAL?

There is a very specific definition of "mineral."

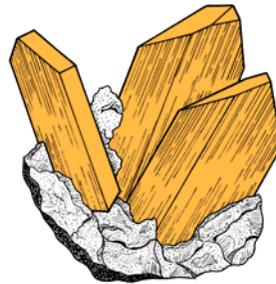
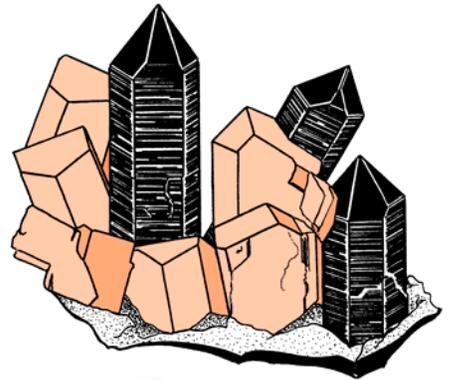


Just like rocks, a mineral is a "solid chemical compound." Which simply means it is hard. Not hard like a tree. But hard like a rock. **BUT REMEMBER, a rock is not a mineral!**

Some minerals are harder than others.

Mineralogists use "Mohs' Scale of Hardness" (which is also called the "Mineral Hardness Scale") to compare one mineral to another to figure out its actual hardness. Here it is...

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



Fluorite is harder than calcite, gypsum and talc. But it is softer than apatite, feldspar, quartz, topaz, corundum and diamond.

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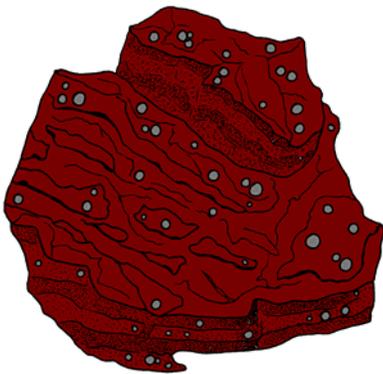
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Fun fact: Every mineral and every rock in the world is softer than diamond!

There is one (and only one) exception to the rule that all minerals are, by definition, solid. And that one exception is ...



MERCURY

Mercury is a mineral, an element and a metal. And mercury is the only mineral, and the only element, and the only metal that is liquid at room temperature.

The second part of the definition of "Mineral"

A "mineral" has a well-defined chemical composition.

$\text{Al}_6\text{B}_3\text{Fe}_3\text{H}_{10}\text{NaO}_{31}\text{Si}_6$
The chemical formula of Tourmaline

Now, go and grab your mineral field guide. By the way, every serious mineral collector must have a copy of a good "field guide" of minerals. "Field guides" are small and information-packed books that could be taken into the field to help you with studying the minerals and rocks that you find. We recommend these three:

"A Field Guide to Rocks and Minerals" by Frederick H. Pough
(The Peterson Field Guide Series)

Simon & Schuster's Guide to "Rocks & Minerals"

"A Guide to Field Identification: Minerals of the World" by Charles A. Sorrell

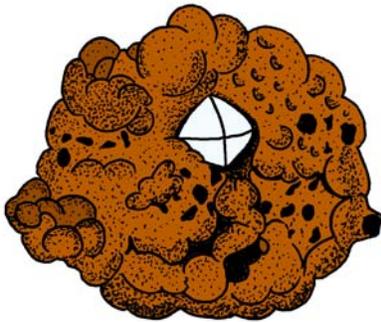
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So, grab your field guide and look up 5 different minerals. They are listed below. Then, write the chemical formula you see in the book to the right of the mineral name. We just want you to see that every mineral has a chemical formula that is unique to that mineral.



Diamond _____

Adamite _____

Beryl _____

Galena _____

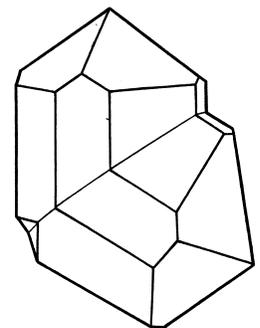
Pyrite _____

The third part of the definition of "Mineral"

A "mineral" has a specific crystal structure.

Mineralogists know that even though there are 5,562 official mineral species (as of March 2020). However, these mineral species crystallize in one of only 7 different crystal systems. These crystal systems are...

1. The Isometric System (also called the Cubic System)
 2. The Hexagonal System
 3. The Tetragonal System
 4. The Orthorhombic System
 5. The Monoclinic System
 6. The Triclinic System



(Do you want a fun and pretty simple book about crystals and the crystal systems? Check out our book, "Crystals & Crystal Forms." You can find it at this link on our website:

<http://www.diamonddanpublications.net/crystals--crystal-forms.html>

This low-cost, high-quality book will be a great addition to your mineral library. Copies are only \$9.95, postage paid.)

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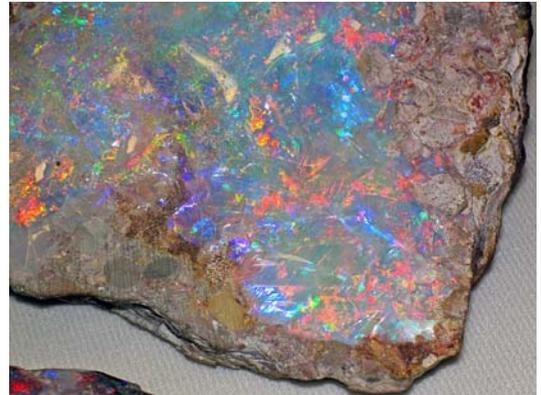
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Mineraloids

There are some mineral-like materials that occur naturally. They are solid. They have a specific chemical composition. And they are not made in a laboratory. HOWEVER, they do not have a specific crystal structure. The best example is opal. Opal is a collection of microscopic spheres (balls) of silicon dioxide (quartz) that *do not have a crystal structure.*



The fourth part of the definition of "Mineral"

A "mineral" occurs in nature and is created by natural processes. If a solid material that has a chemical composition and a specific crystal structure, but it is made in a laboratory, *it is not a mineral.*



There are some really cool crystals and crystal groups that look like minerals, but they are made in a laboratory. They are cubic crystals of Bismuth. Here is a specimen, to the left. They have all the features of a true mineral - solid, chemical composition, and crystal form. But they were not made in nature, so they are, by definition, NOT a mineral.

The fifth part

of the definition of "Mineral"

A "mineral" is not made by a living organism or from the remains of a living organism.



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There are other hard substances that are completely natural. They are NOT, however, minerals. Pearls are made by oysters. Jet is very hard, black coal that was formed from the remains of ancient trees and plants. Amber is hardened resin from ancient trees. They are beautiful and are used for jewelry and other decorative items. But they are not, by definition, minerals.

OK, Smarty Mineralogist, What do you know?

Let's see how much you now know about the definition of the word "Mineral." Below is a list of different substances. Are they minerals? If the answer is YES, circle the word "Yes" and you're done with that item. If the answer is NO, circle the word "No" and then say why it is not a mineral, by definition.

Cement Yes or No _____

Ice Yes or No _____

Quartz Yes or No _____

Pyrolusite Yes or No _____

Red Coral Yes or No _____

Galena Yes or No _____

Mercury Yes or No _____

Fluorite Yes or No _____

Tar (like on your driveway or road) Yes or No _____

Hematite Yes or No _____

Pearl Yes or No _____

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Glass Yes or No _____

Diamond Yes or No _____

Copper Yes or No _____

Stibnite Yes or No _____

Hard Plastic Yes or No _____

The solutions for this challenge are at the end of this issue of mini miners monthly.

Minerals to Color!

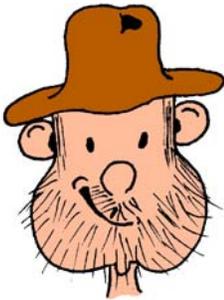


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A BUNCH OF MINERALS ON A SHELF IS NOT A MINERAL COLLECTION, UNTIL...

So, you have a bunch of mineral specimens. And you have put them on a shelf in your bedroom. Here's a question for you:

Is that a mineral collection? The answer is "NO!" It is a bunch of minerals on a shelf.

If you want to be a successful mineral collector, you will want to do much more than put specimens on a shelf. That can be called "a bunch of minerals." It will become a collection when you take some steps to take better care of it.

As a matter of fact, if you take some simple, but important, steps, you will become **a curator.**

A "curator" is a specialist in a subject that takes care of a museum, which is a collection of items from that subject. You can become a curator of your very own mineral museum. (Personally, I wish that someone had told me when I was young that one day I could become a curator of an important museum or mineral collection if I worked hard to prepare for it. YOU can become a curator of a major, important mineral collection. Start by learning to be the curator of your own collection.)

Over the next few months, we want to help you to

become a curator and be a successful mineral collector.

The first step is to do much more than put a bunch of minerals on a shelf. It is way too easy for them to bump into each other and get damaged. AND, there is no information for those who are looking at them to help them know what they are looking at.

To learn more about becoming a Curator and successfully building a fine mineral collection, see Diamond Dan's online Mineral School on YouTube.

See the next page for more information...

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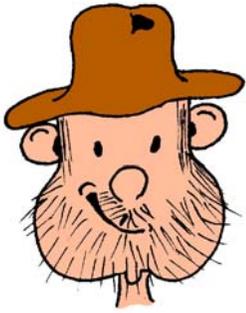
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Mineral Definition Solution

Cement	Yes or No	No, it is made by humans, not nature.
Ice	Yes or No	Yes, as long as it is made by nature, ice or snow.
Quartz	Yes or No	Yes
Pyrolusite	Yes or No	Yes
Red Coral	Yes or No	No. It is made by an organism.
Galena	Yes or No	Yes
Mercury	Yes or No	Yes. It is the only liquid mineral. It becomes solid at -38.83 degrees Centigrade. Liquid nitrogen is much colder than that, so it can freeze and solidify mercury. See this YouTube link for a fun video showing mercury being frozen by liquid nitrogen. https://www.youtube.com/watch?v=xFpeeQQiBJQ
Fluorite	Yes or No	Yes
Tar (like on your driveway or road)	Yes or No	No. It is made by human processes and is not crystalline.
Hematite	Yes or No	Yes
Pearl	Yes or No	No. It is made by an organism.
Glass	Yes or No	No. Most glass is made by humans. Natural glass does not have a crystal structure.
Diamond	Yes or No	Yes, when it is made by nature. Synthetic diamonds are not minerals, by definition!
Copper	Yes or No	Yes
Stibnite	Yes or No	Yes
Hard Plastic	Yes or No	No. It is made by humans.



DIAMOND DAN'S

"ONLINE

MINERAL ACADEMY"

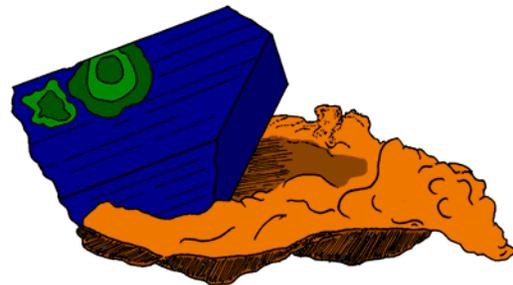
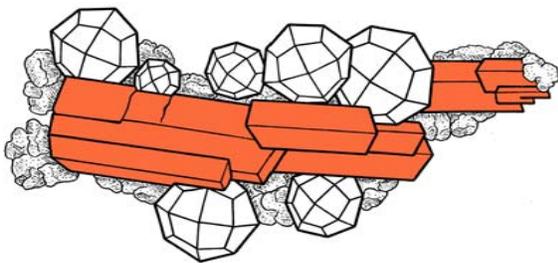
You will be doing a lot of schooling at home and online this year.

When you need a break from Math and Social Studies, check out Diamond Dan on YouTube for some fun videos about minerals, mineralogy and mineral collecting.

On YouTube, search for

MINI MINERS WITH DIAMOND DAN

Every few days we'll have a new video for you. They will have tips for successful collecting, fun mineral facts, mineral uses, mineral books and magazines, and much, much more.



"Mini Miners with Diamond Dan" goes live on
September 15! Stay tuned...