

Name _____
Literacy Lab #4 - What's A Mineral?

Date _____
Earth Science - Breed - 2012/2013

Directions: Take a few minutes to read the article below either online (or on the back of this page.) Write responses to the statements or questions below. Cut/copy/paste is not allowed – use your own words and thoughts, based in research if needed.

Read more: <http://geology.com/minerals/what-is-a-mineral.shtml>

Fact-finding: List three facts that you learned in this article.

1.

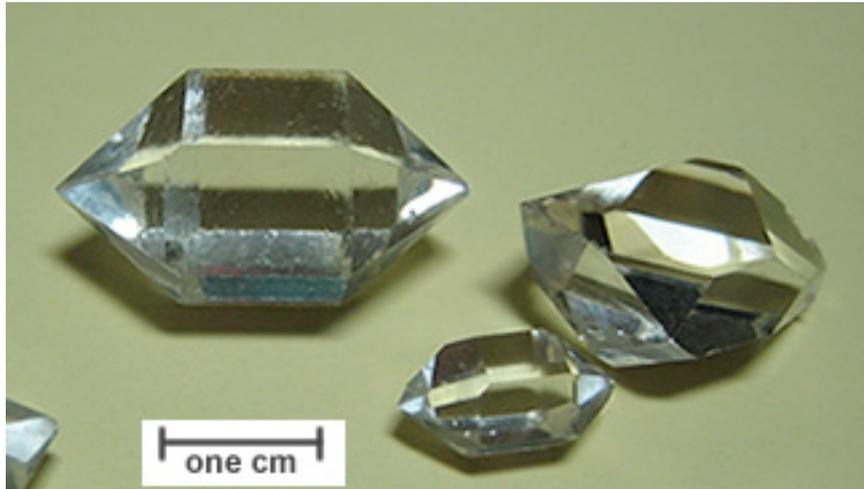
2.

3.

Vocabulary: List and define three unfamiliar words in the space below.

Implications: What are your feelings about this “discovery”? Express your feelings (tactfully) about whether this is an advancement of science or a bad idea.

Secrets About Mining Herkimer Diamond Quartz Crystals - GEOLOGY.com



Herkimer Diamond Quartz Crystals

"Herkimer Diamonds" is the name given to the doubly terminated quartz crystals found in Herkimer County, New York and surrounding areas. Examples of these crystals are shown in the photo at right. Note that these crystals have the typical hexagonal habit of quartz, however, instead of having a termination on one end they are doubly terminated. This is a result of the crystals growing with very little or no contact with their host rock. Such doubly terminated crystals are very rare and this is part of what makes Herkimer Diamonds so popular with mineral collectors.

The host rock for Herkimer Diamonds is the Cambrian-age, Little Falls Dolostone. The Little Falls Dolostone was deposited about 500 million years ago and the Herkimer Diamonds formed in cavities within the dolostone. These cavities are frequently lined with drusy quartz crystals and often are coated with a tarry hydrocarbon (see image below).

Although Herkimer County, New York is the location for which these crystals are named, similar doubly terminated quartz crystals have been found in a few other locations, including Arizona, Afghanistan, Norway, Ukraine and China. They have the same appearance but can not rightfully be called "Herkimers".



Who Discovered Herkimer Diamonds?

The Herkimer Diamonds of New York are not a recent discovery. The Mohawk Indians and early settlers knew about the crystals. They found them in stream sediments and plowed fields. These people were amazed with the crystals and immediately held them in high esteem.

Herkimer Diamond Mines

Some of the best places to find Herkimer Diamonds today are located along New York State Route 28 in Middleville, New York. (When visiting this area it is important to remember that all land in New York either belongs to the government or is private property. Collecting minerals from government lands is illegal in New York and collecting on private property always requires permission in advance.)

There are two commercial mines on New York State Route 28 at Middleville, New York. These are: [Ace of Diamonds Mine](#) and [Herkimer Diamond Mine](#). Both allow collectors to enter and prospect for a nominal fee. Both locations also rent equipment such as hammers, wedges and other small tools. They also have small exhibit areas where you can view and/or purchase specimens.

Mining for Herkimer Diamonds

The key to finding Herkimer Diamonds is a knowledge that they occur in cavities (vugs) within the Little Falls Dolostone (see photo above). These cavities can be smaller than a pea or several feet across. At both of the mines listed above the Little Falls

Dolostone is exposed at the surface and a significant amount of broken rock is scattered across the quarry floor.

"Find and Break" Prospecting

The easy way to prospect is to find pieces of vuggy rock and break them open with a heavy hammer. If you are lucky the rock will break to reveal one or several Herkimer Diamonds within a cavity. If your visit to the mine will last just a few hours or even a single day this is a good way to spend your time.

Dolomite is a very tough rock so expect to work hard. The use of safety glasses is required and wise collectors wear gloves to protect their hands. We always wear jeans or heavy long pants and a long sleeve shirt for "find and break" prospecting. Small pieces of dolomite will sometimes fly when a rock breaks and they can easily cut or bruise a person wearing short pants. The "find and break" prospecting method described above is employed by many people who visit these mines and can lead to a few good finds. The keys to success are selection of good rocks to break and not being discouraged if you break fifty rocks without finding a crystal. (See image below to know what "vuggy rock" looks like. Click the image for a closer view.)



Vuggy rock containing a nice Herkimer Diamond. Rock is about six inches across.

"Scavenger" Prospecting

Some visitors to the mines have been successful by simply searching the rock rubble for exposed crystals or searching the quarry floor for loose crystals. We found several really nice crystals this way and lots of tiny ones. We have also seen children find many nice crystals this way.

"Cavity" Prospecting

For finding large quantities of crystals, the most successful mining method is to break into large cavities in the quarry walls and floors using sledge hammers and wedges (power equipment is not permitted at the mines listed in this article). This method requires tools, patience, time and a knowledge of how to break an extremely durable dolostone.

On a recent visit to the [Ace of Diamonds Mine](#) at Middleville, New York we met Bill McIlquham of Peterborough, Ontario. Bill was mining for Herkimers with his wife Anne, their friend Laurie Mullett and mascot Duffy the Rockhound. They had located a large cavity and were carefully opening it. (Photos of their work shown here were kindly shared with Geology.com by Bill and fellow miners Cheryl Haberman and Alan Summer.)

The McIlquhams have been mining for Herkimers for about 12 years and have found many large cavities. A key element in their success is a nice array of hammers, wedges and pry-bars. Instead of bashing the dolomite repeatedly with a hammer to break it into tiny pieces, Bill uses a sledge hammer and wedges to very carefully exploit existing fractures in the rock. He begins by placing one wedge in a fracture and tapping it an inch or two deep. A second wedge is tapped into the fracture and additional wedges are used if needed. These wedges exert forces that penetrate into the rock and break large blocks of dolostone free. Fractures within the large dolostone blocks are then located and exploited until the large block has been reduced to smaller pieces that can be lifted from the quarry.



Anne, Bill & Duffy relax after opening a nice cavity.

Photo © Bill McIlquham

If a collector is lucky and determined to prevail over the durable dolostone, the reward could be breaking into a cavity. These cavities can contain a few to a few thousand nice Herkimer Diamonds that range in size from a couple of millimeters to over twenty centimeters in size. Perfect single crystals, doubles and crystal clusters might all be found in a single cavity.

The cavity shown above was opened by Anne and Bill. It contained over one hundred quartz crystals in a variety of sizes, ranging from a few millimeters to several centimeters in length. A very nice prize for a day's work! Two large clusters from the cavity are shown below

Herkimer Diamond Specimens & Jewelry

Why hunt for Herkimer Diamonds? It's great fun and every time you break open a rock you will look with anticipation to see if you liberated an unseen quartz crystal. Nice Herkimer Diamonds are highly prized mineral specimens and are sought by mineral collectors worldwide. Large numbers of Herkimer crystals are also used in jewelry because their natural facets are both beautiful and interesting. Some people also seek Herkimer diamonds because they are thought to have "holistic qualities".

If you like minerals and have an opportunity to visit the Herkimer County area of New York, consider spending a day looking for Herkimer Diamonds. Be sure to wear clothes that are suitable for working outdoors. Safety glasses are required and you will be sorry if you don't wear gloves. If you need a sledge hammer or other tools you can rent them at the mine for a very small fee. If you want to obtain some nice Herkimer Diamonds but are unable to visit Herkimer to mine them yourself please visit Bill's site at HerkimerDiamonds.ca.