

Old Mr. Mohs

ACTIVITY 5

Objective:

To understand the hardness scale as one way of classifying minerals.

Vocabulary:

Mohs' Hardness Scale, physical properties

Materials:

- Reference books and field guides
- Internet access if available
- 8.5 x 11 or 9 x 12 inch poster board
- *Old Mr. Mohs* song
- Timer

Check for Understanding:

Place a poster face down on each desk of ten students. When the signal is given all ten students run to the front of the room with their posters held in front of them and arrange themselves in order while being timed. Repeat with another ten students until everyone has had at least one chance. Try to decrease the time needed.

Alternative: Shuffle the posters and allow individual students to compete with the clock in a "Mohs' Olympics."

Extensions:

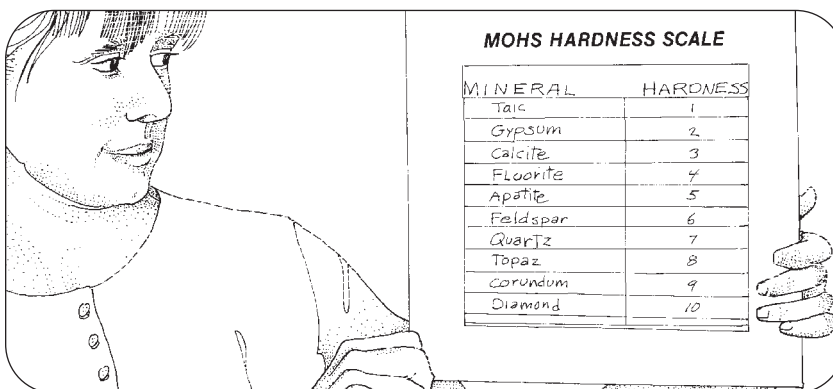
- Discuss and/or demonstrate other ways of classifying or grouping minerals.

Introduction:

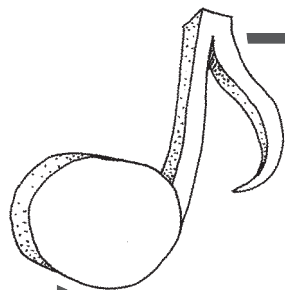
One of the physical properties used in distinguishing one mineral from another is hardness, defined as the ability of an object or mineral to scratch another substance. In 1822 a German mineralogist, Friedrich Mohs, set up a 1–10 scale for ranking minerals according to relative hardness. The numbers on the scale do not correspond to a precise mathematical relationship. He assigned a representative mineral to each value, and all other minerals can be compared to these ten, known as "Mohs' Hardness Scale." Refer to the song lyrics for a list of the ten minerals in increasing order of hardness.

One need only carry out a scratch test to learn the "hardness" of a mineral. If a person has samples of each of the minerals in Mohs' list, a simple scratch test can be conducted. Using the mineral to be tested, place a scratch on each of the minerals in Mohs' list. Of course, this process could be reversed, using each of the minerals from Mohs' list to see which would scratch the mineral of unknown hardness. In the absence of these ten minerals, however, an approximate hardness can be determined by substituting the following:

Fingernail	hardness 2.5
Silver	hardness 2.5-3
Copper penny	hardness 3.5
Steel knife (nail)	hardness 5.5
Glass	hardness 6



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



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If a mineral can be scratched with your fingernail, its hardness is less than 2.5. If a mineral cannot be scratched by glass, but can itself scratch glass, its hardness is greater than 6.

Procedures:

1. Discuss Mohs' Hardness Scale as one way to classify or group minerals. Play *Old Mr. Mohs* for the students and have them sing along. List the ten minerals used in the scale on the board or use a transparency to display them.
2. Assign a group of students to each mineral in Mohs' Hardness Scale collection. Students should research the mineral to determine:
 - appearance
 - uses, especially any uses directly related to the mineral's hardness, such as gems and abrasives
 - any other interesting physical properties
3. Have the students write this information on the poster board in a pre-determined standard arrangement with the name and number of the mineral in bold letters across the top.
4. As students finish their posters, have the following sponge activity set up for them to do. Obtain samples of some common minerals (make sure they are minerals and not rocks which contain more than one mineral) and allow students to perform the hardness test. Use a mineral guide to check the results.
5. Once all groups are ready with their posters, a representative from each group can come to the front of the room, bringing the group's poster. Each student can tell the class about their particular mineral and then remain in the front. The students form a row across the room, with all the minerals in order from softest to hardest.
6. Later the posters can be displayed in order on the wall.

