

Station #1 – Hardness

1. Read the article on hardness and answer the questions.
2. Identify the minerals using Moh's Scale of Mineral Hardness
3. Answer the conclusion questions.

Hardness

One of the most common ways to identify minerals is by their hardness. Hardness is the resistance of a mineral to being scratched. The degree of hardness is compared with that of ten standard minerals, known as Moh's Scale of Mineral Hardness (below). To identify a mineral using its hardness, a mineral is scratch by a known mineral or a simple tool. A harder mineral will leave a scratch on a softer mineral.

Moh's #	Mineral	Description of Hardness
1	Talc	Fingernail scratches easily
2	Selenite	Fingernail scratches
3	Calcite	Harder than fingernail
4	Fluorite	Scratches penny
5	Apatite	As hard as an iron nail
6	Feldspar	Scratches glass
7	Quartz	Hard as a steel nail
8	Topaz	Scratches quartz
9	Corundum	Scratches topaz
10	Diamond	Scratches all other minerals

1. What is hardness? _____
2. How can you identify a mineral using its hardness? _____

3. Open the bag of minerals and take out the three white minerals. Place them in order of softest to hardest on your table.
4. Take out the two green minerals. Place them in order of softest to hardest on your table.
5. Take out the reddish-orange mineral. Using the hardness test, figure out where it goes between the other minerals on the table.
6. Take out the last mineral. Using the hardness test, figure out where is goes among the other minerals on the table.

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Hardness, continued...

7. Using Moh's Scale, label the minerals next to the correct number on the chart below.

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8. Draw a detailed picture of each mineral (including color) in the box above.

9. Place all 7 minerals back in the bag.

10. Answer the following questions using Moh's Scale of Mineral Hardness.

- A. A mineral scratches selenite but not fluorite. What mineral might it be? _____
- B. A mineral scratches feldspar but not topaz. What mineral might it be? _____
- C. A mineral is scratched by all other minerals. What mineral might it be? _____
- D. A mineral is scratched by topaz but doesn't scratch feldspar. What mineral might it be? _____
- E. A mineral scratches all other minerals. What mineral might it be? _____
- F. A mineral scratches talc and calcite and is scratched by apatite. What mineral might it be? _____
- G. A mineral can only scratch talc. What mineral might it be? _____
- H. A mineral scratches topaz but not diamond. What mineral might it be? _____
- I. A mineral is scratched by quartz but not apatite. What mineral might it be? _____
- J. A mineral scratches quartz but not corundum. What mineral might it be? _____

Station #2 – Cleavage & Fracture

4. Read the article on cleavage & fracture and answer the questions.
5. Follow the directions to identify the minerals.
6. Answer the conclusion questions.

Cleavage & Fracture

When you are collecting minerals you may try to use your hammer and chisel to remove a nice crystal from a rock, only to have the crystal break into a dozen or more pieces. How disappointing! If you look closely at the pieces, though, you may see that they have sharp, straight edges or smooth, flat surfaces where they broke apart. It might even seem as if the crystal had been polished on some of the surfaces.

This amazing manner of breaking is common to many minerals. If a mineral breaks along a smooth surface is cleavage. Some minerals will not break along flat surfaces – any break that is irregular or uneven is called fracture.

11. What is cleavage? _____
12. What is fracture? _____
13. Open the bag of minerals and take out the eight minerals.
14. Sort the minerals into two piles – one for minerals that show cleavage, the other for those that show fracture. There should be four minerals in each pile.
15. Look at the four minerals in the fracture pile. Use the descriptions of each type of fracture to help you identify each of the four minerals. Draw a detailed picture of the mineral in the correct place on the chart.

Type of Fracture	Description of Fracture	Name of Mineral	Picture of Mineral
Even	Broken into a flat piece, usually with an even but not smooth surface	Limestone	
Uneven	Broken into a rough shape with no definite or smooth surfaces	Serpentine	
Conchoidal	Broken along a smooth, curved surface	Obsidian	
Hackly	A rough break, looks like a common, rough rock	Copper	

16. Now look at the four minerals in the cleavage pile. Use the descriptions of each type of cleavage to help you identify each of the four minerals. Draw a detailed picture of the mineral in the correct place on the chart.

Type of Cleavage	Description of Cleavage	Name of Mineral	Picture of Mineral
Basal	Smooth & flat like a piece of paper, breaks into thin sheets	Mica	
Cubic	Has six definite, smooth sides, looks like a cube	Halite	
Rhombohedral	Looks like a rhombus from the side, has smooth edges & surfaces	Calcite	
Octahedral	Has smooth & angled surfaces, may be rough on one or more sides	Flourite	

17. Answer the following questions about fracture & cleavage.

- A. Mica breaks in to thin sheets. Does it **fracture** or have **cleavage**? _____
- B. A mineral breaks in no special way and it looks like a chunk of rock. Does it **fracture** or have **cleavage**? _____
- C. Every time you break this mineral, it looks like a cube. What mineral might it be? _____
- D. If mineral has basal cleavage, how will it break? _____
- E. What geometric shape does a mineral that has rhombohedral cleavage look like? _____
- F. What type of fracture is it when a mineral breaks along a smooth, curved surface? _____

Station #3 – Color & Streak

Directions: Read the paragraph on streak below, then answer the questions. When you are finished, perform the streak test as described in the directions below!

What is the Streak Test?

The **streak** (also called **powder color**) of a [mineral](#) is the [color](#) of the powder produced when it is dragged across a ceramic plate. While it may be easier to just look at the color the mineral seems to be, many minerals leave a streak different than the color they appear to be. For example, Magnetite, which is grey-colored, leaves a red streak! If no streak seems to be made, the mineral's streak is said to be **white or colorless**.

Streak color is a more accurate way to identify minerals than color of the mineral itself, as some minerals (like Quartz) come in many different colors. These different colors are often due to tiny impurities present in the mineral

The surface across which the mineral is dragged is called a "**streak plate**," and is generally made of a ceramic tile. Because the trail left behind results from the mineral being crushed into powder, a streak can only be made of minerals softer than the streak plate, around 7 on the [Mohs scale of mineral hardness](#). In case of harder minerals, the color of the powder can be determined by filing or crushing with a hammer a small sample, which is then usually rubbed on a streak plate. Most minerals that are harder have an unhelpful white streak.

1. What is the streak of a mineral?
2. Why is using a streak a more accurate way to identify minerals than looking at the color?
3. Approximately how hard (on the Mohs scale) are minerals that **do not** leave a streak?
4. Minerals harder than 7 often leave an unhelpful _____ (*color*) streak.
5. Is the streak color always the same as the color of the mineral? Yes or No?

Station #3 – Color & Streak

Directions: Perform the streak test by firmly grasping the mineral and pulling it once (hard) across the white or red plate. Whether you use the white or red plate will depend on the color of the streak you are getting. Example: If it is a light colored streak, and it is too hard to see on the white plate, use the red plate instead!

Take one mineral at a time, record the mineral number and the color of the streak in the table below. Then, use the information below to help you figure out the name of the mineral!

Mineral Number	Color of Mineral	Color of Streak	Name of Mineral
1			
2			
3			
4			
5			
6			
7			
8			
9			

Name of Mineral	Streak Color	Other Identifying Information
Galena	Lead Grey	Shiny
Graphite	Lead Grey	Softer than Galena
Magnetite	Black	
Quartz	White	Pinkish or whitish
Calcite	White	Rhomboidal cleavage (rhombus!)
Limonite	Orange-Yellow	
Hematite	Red	
Sulfur	Bright Yellow	
Chromite	Brown	

Station #4 – Luster

Luster is the term that describes how light reflects off a mineral. Luster is not a highly useful way to identify minerals by itself, but when combined with other characteristics such as hardness, streak and cleavage, it can be used to distinguish between minerals.

You are going to break the luster of minerals up into two main categories: **Metallic** and **Non-Metallic** Luster. Quite simply, those minerals whose sheen resembles a metal are put into the Metallic luster category, while those who do not resemble how metals reflect light are put into the Non-Metallic category.

You will further break up the non-metallic minerals into three sub-categories: dull/earthy, pearly/waxy, and glassy. Dull/earthy minerals reflect very little light. Pearly/waxy minerals resemble pearls or wax, while glassy minerals are often clear or semi-clear, allowing some light to pass through. To help you with the task at hand, you have been provided with a sample of a mineral for each category. Use these minerals as references to help you. Keep in mind, luster can vary greatly from sample to sample! The green boxes have a key telling you the name which matches the numbers on the minerals. **Please write the mineral names in the chart below!**

Metallic Luster	Non-Metallic Luster		
	Pearly/Waxy	Dull/Earthy	Glassy