MINERAL PROPERTIES



Individual **minerals** have unique physical and chemical properties that allow us to tell them apart. Differences in **chemical composition** and **crystal structure** establish the mineral's **species**. Within a mineral species, there may be multiple varieties determined by differing **physical properties** or impurities. For example, amethyst is a variation of quartz. The proportions of elements within a compound is known as its composition, and the way that its atoms are arranged are known as its structure. These two things help determine a mineral's properties.

Hardness is the ability of a mineral to resist abrasion or scratching. It is measured on the **Mohs scale of hardness**, an ordinal scale of 1 to 10. **Cleavage** is the tendency for a mineral to break along parallel planes, where atomic bonds are weakest. A mineral may have multiple cleavage planes, in different directions. **Habit** is the external shape of the mineral, and its physical proportions. It may have smooth, geometric crystals, or poorly-formed, fine-grained aggregates. It may be cubic, hexagonal, prismatic, bladed, and so on.









Lustre is the style and extent to which a mineral reflects light. It may be considered metallic, or non-metallic, with further distinctions such as waxy, pearly, or earthy. Almost 70% of minerals show a vitreous (glass-like) lustre, and 15% are metallic. **Colour**, resulting from the reflection and absorption of different wavelengths of light, is a limited way to identify a mineral, since the same compound may exhibit different colours due to slight variations in chemical composition. However, **streak**—the colour revealed when a mineral is dragged across a porcelain plate—is much more reliable.



Some other chemical properties that are used to identify minerals include: **fluorescence**, **magnetism**, **solubility**, and the **specific gravity**, or **density**, of the compound.

MINERAL PROPERTIES



For this activity, we recommend purchasing a mineral kit from https://www.geoprime.com/kits/index.htm choose the PROPERTIES OF MINERALS - ES-500 kit.

You will need:



- Minerals!
- Penny
- Steel nail
- Streak plate (unglazed porcelain)
- Glass plate
- Magnet



If you prefer to use your own minerals, you can find a mineral test kit with most of the materials pictured above from many places online. These kits generally cost under \$15. To make the activity easier, consider purchasing this type of kit. Some even come with extra mineral samples!

Questions for these categories on next page!

Mineral Name	Hardness	Cleavage or Fracture	Habit	Lustre	Colour	Streak	Magnetic Attraction	Specific Gravity

Gypsum	Calcite	Fluorite	Apatite	Microcline
Topaz	Corundum	Galena	Museovite	Halite
	Manager	Pyrite		Barite-crystalline
	Topaz	Topaz	Topaz Corundum Galena	Topaz Corundum Galena Muscovite

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Use these questions to complete the chart on the last page

1 Hardness

Using the Mohs Hardness scale below to find out how hard your mineral is.

- **1 -** Does it feel soapy or greasy?
- 2 Can you scratch it with your nail?
- **3 -** Can you scratch it with a penny?
- **4 -** Can it scratch a penny?
- **5 -** Can you scratch it with a steel nail?
- 6 Can it scratch steel?
- 7 to 10 Can it scratch glass?

2 Cleavage

Does the mineral show regular surfaces or planes? (**Cleavage**)

Or, does the mineral have an irregular, broken surface? (**Fracture**)

3 Habit

What is the general, external shape of the mineral (e.g. cubic, prismatic, fibrous, pyramid, equant, radial, etc.)?

4 Lustre

Is your mineral shiny or dull or....?

- Glassy/vitreous (Shines like glass)
- Earthy/chalky (Dull)
- Metallic (Looks like metal)
- Waxy/silky/pearly (Has a muted shine)

5 Colour

What is the primary colour of the mineral?

6 Streak

When you scratch the mineral across the streak plate (the porcelain), what color is the streak?

7 Magnetic Attraction

Is the mineral attracted to a magnet?

8 Specific Gravity

This property is the weight of the mineral relative to the weight of an equal volume of water.

Minerals with a high specific gravity feel heavy for their size. Is the mineral heavy or light weight relative to its size?

