

# Investigating Minerals in the Classroom

Some ideas for hands-on activities for KS1-3



Sedgwick Museum  
of Earth Sciences

Children are captivated by gorgeous gemstones and sparkling minerals. Be creative and try using them in your teaching across the curriculum as a way to embed scientific enquiry into other tasks.

Here are a few suggestions of simple ways of working with minerals in the classroom, as well as some useful background information to support your subject knowledge.

## Investigating minerals



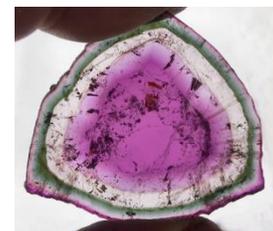
### What is a mineral?

Scientists have been refining the definition of a mineral for the past 150 years since they were first seriously studied!

Here are two recent definitions:

1. Minerals are naturally-occurring inorganic substances with a definite and predictable chemical composition and physical properties. They are always crystalline, but the crystals may be so tiny that they are only visible using a microscope.
2. A mineral is a substance with these characteristics:
  - It is crystalline - has an ordered and predictable arrangement of atoms
  - It has a definite chemical composition
  - It is naturally occurring
  - It is inorganic. Minerals have never lived.

These 4 criteria together cause each type of mineral to have its own unique set of properties.



*Scientists who study and investigate minerals are called mineralogists. The word mineral comes from “minerale”, the Medieval Latin word which means “something mined”.*

Some common examples of minerals are quartz, calcite, iron pyrite (Fool’s Gold) and halite (rock salt).





### What is a crystal?

All minerals are crystalline (formed from crystals). A crystal is a geometric solid that forms in a definite, repeating pattern. The external shape of the crystal is smooth and symmetrically arranged, reflecting the internal arrangement of its atoms.

### What is a geode?

A geode is a hollow, rounded rock. The hollow is usually filled with crystals of one or more minerals. Amethyst (the purple variety of quartz) is a common geode-filling mineral. A geode begins as a bubble in volcanic rock or a hollow in sedimentary rock which slowly hardens. Minerals begin to precipitate from gas or fluid trapped in the rock and over thousands of years, many layers of crystals form inside the geode.



### What is a gemstone?

A gemstone is any rock, mineral, or other substance used for adornment. A gemstone has three qualities that separate it from other materials: rarity, beauty, and durability. Rarity and beauty both increase the value of a gemstone. Durability, or hardness, can also increase the value as many harder minerals can take a better cut and the result will be much more sparkly! It also ensures the gemstone will last through time. Diamond, garnet and beryl (ruby and sapphire) are all minerals that are used as gemstones.

### Why do we study minerals?

- Minerals are the chemical building blocks that rocks are made from, so are the basic materials that form the Earth
- Minerals are the building blocks of us! Our skeletons are made of minerals, and many of the complex processes that keep us alive require minerals to work properly.
- Minerals are the basis of raw materials we use to build our homes and make them comfortable, keep our teeth healthy and make computers work...
- Having a better understanding of how minerals form can help us to find more of what we want either for industrial applications or because they are beautiful and covetable.
- Some minerals are the key to working out the age of the rock they are found in, which in turn helps us to learn more about the Earth

### Mineral facts

The oldest minerals found on Earth are older than the oldest rocks! They are about 4.4 billion years old. Zircon crystals have a very high melting temperature, and these ones have possibly survived several episodes of being recycled without being changed by the processes of metamorphism. The ancient rocks that contain these crystals are found in Western Australia.





Minerals are different colours because of the chemicals they contain. Their structure will determine how they interact with light. Some minerals that have the same composition overall will have different colours because of a tiny chemical difference. Ruby and sapphire are precious varieties of the same mineral (corundum) but tiny differences in their composition make them look completely different colours. Ruby contains tiny amounts of chromium which makes it look red, blue sapphire gets its colour from the presence of iron and titanium.

Some minerals can “glow” when exposed to ultra-violet radiation! This happens because the structure of the mineral is such that it can store and emit the energy provided by the UV source as visible light. This property is called fluorescence. Washing powder contains fluorite, the mineral that this property is named after. It helps to make your whites look whiter because the fabric fibres pick up tiny amounts of the mineral which responds to the UV energy in sunlight.

