# Mineral Crystals

Instructions for demonstrators

## About this activity

‘Mineral Crystals’ allows participants to look at quartz and amethyst crystals we have borrowed from the Lapworth Museum. There are plenty of talking points suitable for all ages about crystal formation in nature as well as the crystallisation research at UoB.

## Key information

Science topic(s): Crystals, crystallisation, framework materials, geology.

Age range: 2+, including adults.

Activity duration: 2 – 10 minutes.

Health and safety considerations: Crystals may be sharp and heavy.

Special requirements:

A rock with crystals on it

Description automatically generated

## What’s in the box?

1. These instructions for demonstrators.
2. Risk assessment.
3. Materials for the activity:
   1. Quartz and amethyst crystals
   2. Magnifying glass
4. Information to display about the activity (laminated A4 sheet).
5. Postcards about the activity to give out (A6 card).
6. Stickers for giving out to/counting participants.

## How to set up this activity

1. Carefully lift the crystal(s) onto the tabletop and put the magnifying glass next to it.

## How to demonstrate this activity

1. Warning – heavy and sharp mineral specimens. Do not lift unless well supervised. Participants are allowed to carefully touch the crystals provided they are under supervision of a demonstrator. Please warn them that they are sharp!
2. Invite people to look at the shape and colour of the crystals. Discuss the differences between the crystals and why they may be different colours (impurities).
3. Allow people to use the magnifying glass to look at the clear shards coming out of the crystal and describe the rigid and repetitive structure the molecules have assembled in in order to produce this crystal.

Potential discussion points:

Crystals are all around us, from metals and rocks to cellulose in plants and polymers in plastics. The Yeung research group at UoB is investigating how crystals form in materials known as ‘metal-organic frameworks’.

Potential discussion point: These crystals have come from the UoB Lapworth Museum, which is open every day and free to visit. Quartz and amethyst crystals are commonly used in everyday life. Crystals still have a regular and repetitive structure that is demonstrated in our various activities.

## Taking this activity further

You can use the activity to discuss any of these subjects:

* Defects
* Impurities
* Amorphous material
* Framework materials

## How to pack this activity away

* Carefully place the crystals back into the boxes they came in and surround with protective padding (e.g., scrunched up paper).
* Put the magnifying glass back into its packaging and into the box as well.

## This activity goes well with…

* The Nucleation Game
* Jigsaw puzzle nucleation
* Magnetic tile crystals
* Crystallisation of a magic crystal tree

## More information about the science and research

A very common mineral crystal is **quartz**, the second most abundant mineral in the Earth’s crust. Quartz is formed when **magma cools** in the Earth’s crust where silicon and oxygen (**silicon dioxide**) become really hot and then takes a **crystalline** structure as it cools.

Without any impurities, quartz appears colourless. However, our crystals do have impurities. The amethyst quartz crystal contains iron impurities, with the higher the concentration of iron the deeper the purple colour of amethyst appears. Heat treatments, UV light or water with certain minerals can alter the purple colour. The milky white/yellow coloured quartz crystal comes from either iron impurities as well or small bubbles of liquid or gas that gets trapped in the crystal structure during formation.

## Frequently asked questions

Q: Properties of crystals?

A: Crystals have lots of different properties, a lot of which we can measure, such as gas storage or electrical conductivity.

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