Rocks & Minerals – Teacher Notes

Rocks and minerals are all around us, and especially useful in our homes.

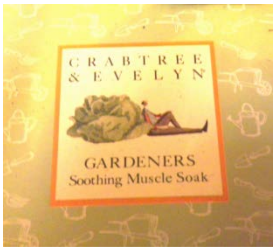
Rocks in my bathroom?
This felsic (silica-rich) igneous rock was explosively erupted out of a volcano in New Zealand fairly recently. I saw it floating on a lake, washed it, and brought it home to use in my bathroom.

What is the name of this rock? Pumice.

How could a rock possibly float on water?
It was full of gas bubbles when it was molten and exploded from the volcano. In cool air or water, it rapidly hardened into rock with the gassy bubbles trapped (leaving holes). Pumice is solidified rock froth. This is what makes the rock less dense than water. It is also not permeable so water will not pass through it causing it to sink.

What special characteristics does this particular rock have that make it popular in bathrooms all around the world?
Pumice contains a lot of silica (quartz) that makes it very hard (7 on Mohs' scale). Because it didn't have time to cool slowly it could not crystallise properly leaving small thin glassy shards that are scratchy. After a shower, pumice abrades/scratches off/removes dead skin from my feet, making heels and soles smooth.
Pumice is also used for smoothing metals surfaces.

Minerals in my bathroom?
Throughout history, humans have enjoyed soaking our bodies in mineral springs and spas. At home, we can get the same effect by using bath salts that are mostly made from magnesium sulphate, commonly called 'Epsom salts'. They are formed when inland seas have dried up. Many of the magnesium sulphate deposits in southern Europe were created when the African tectonic plate swung northwards towards Europe, which closed the great Tethys Sea between them and pushed up the Alps Mountain Range.



Where might we find salt deposits on Earth today?
In deserts and dried up estuaries and lakes.

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Rocks in my kitchen?

I enjoy pounding and grinding herbs and spices for my cooking. This mortar (the 'club') and pestle (the 'bowl') is made from basalt, an igneous mafic rock. It is ideal for this purpose.

What characteristics of basalt make it a good material for a mortar and pestle?

Basalt is an extrusive igneous rock so its crystals are small and intergrown. This produces a hard polished surface for grinding spices and crushing nuts. The smooth surface also makes it easy to clean and fragments of herbs will not be left in cracks and hollows to rot or to contaminate flavours. Basalt is rich in iron and magnesium so its density/weight make crushing easier.

Minerals in my kitchen?

We eat minerals. This mineral (left) is found on most dinner tables. Could it be sugar? No. Sugar is made from a living thing (sugar cane) and therefore cannot be a mineral.

The mineral is found in chemical sediments called evaporites. It is much prized for use in preserving food and enhancing flavours in cooking. What is this mineral called?

Salt or sodium chloride.

Minerals were used to make some of the objects you use at the table (pictured below). Identify which minerals are found in which objects**.**

Clay minerals were baked to make the plate. Iron minerals were smelted to make the steel for the knives, forks and spoons. The placemat was plastic which comes from oil formed from organic materials and cannot be a mineral.

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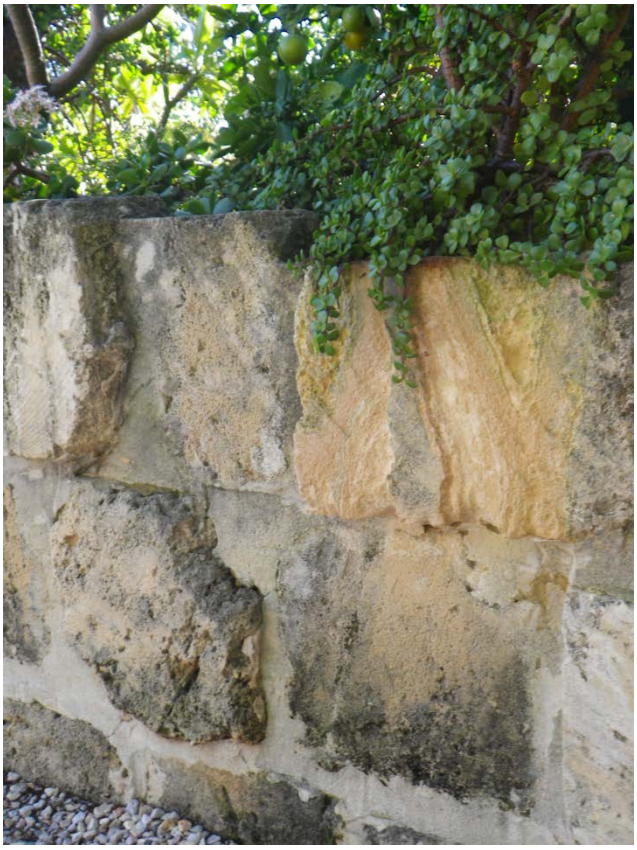
Rocks in my garden?
I have used both granite and limestone rocks in my garden. I used these small (9cm X 9cm X 1 cm) unpolished granite slabs for paving curved pathways through my garden.

What characteristics of granite make it a good material for paving stones in the garden?
Granite is an igneous rock with inter-grown crystals, which makes it hard and water resistant.
Dead leaves and soil can easily be brushed away or hosed away.

Polished granite shines and makes magnificent monuments and gravestones. Why did I choose unpolished granite?
Its rough unpolished surface stop feet slipping when it rains. The small size of the tiles makes them easier to lift and adjust to create curves in the paths.



I used limestone blocks (approx. 40cm X 25cm X 10cm) to build retaining walls in my garden. I was restricted in size by what I could lift. Why did I not use granite for this retaining wall?
Granite is much more dense/heavier. A block and tackle would be needed to lift granite blocks this size.
Granite is more difficult to cut to size and is much more expensive.

Why did I NOT use limestone for paving stones?
Limestone is a sedimentary rock and is much softer than granite. It would wear away underfoot. It is also permeable to water and would grow mosses and lichens making it slippery in damp weather.

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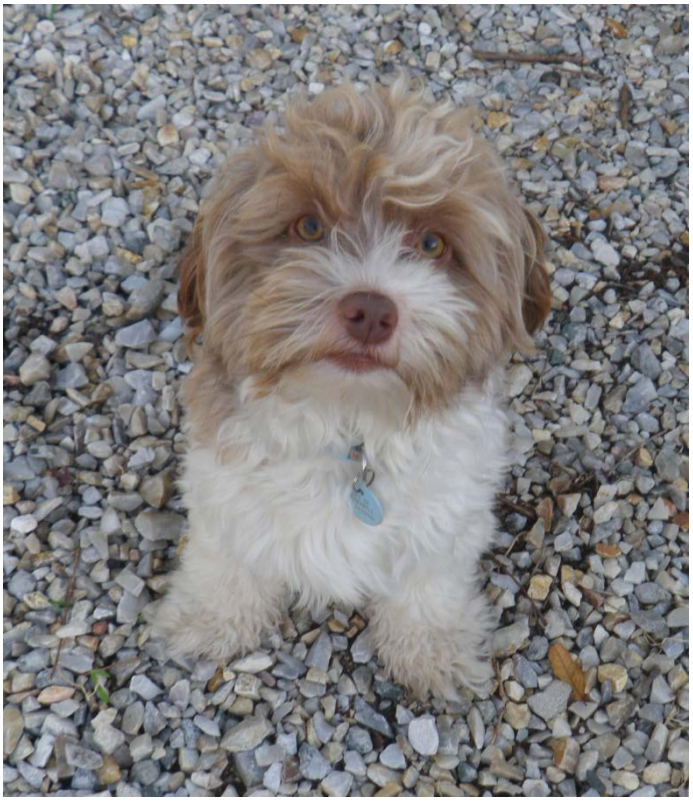
I chose crushed mineral quartz to make a pathway in my garden.

Why did I choose quartz and not calcite?

Quartz is much harder than calcite (In Mohs' scale, quartz has a hardness of 7 while calcite has a hardness of 3).



Why was my dog not so happy with my choice?

The hard sharp quartz pebbles were uncomfortable for him to walk across.

Why did my insurance salesman tell I had made a wise choice?

Apparently burglars do not like gravel paths because they make a noise when they are walked over and this will alert the dog, who will bark!

Extra for Experts

This metamorphic rock called slate was found in the ruins of an old hut built about 1870. The thin sheet of rock is about 20cm long by 10cm wide. It has a hole drilled at one end. Can you guess what it was used for?

This rock is a roof slate. During metamorphosis pressure changed and aligned its minerals making it waterproof and able to be split into flat plates. Some of the dark marks on its surface are from fire smoke. The hole at the end was to allow it to be nailed to wooden roof beams.