

Why Study Rocks – Teacher Notes

There are many practical advantages if you understand minerals and the rock cycle. Rocks and minerals are very important to our economy, to our food production, and to making our lives easier.

How are rocks related to our money and economy?

Coin is made from metal because of its ability to withstand wear. Most people's jobs depend directly or indirectly on the product of rocks. Income in WA depends a lot on oil, gas, iron ore, gold copper, nickel and other mineral resources.....and don't forget gold prospectors!

How are rocks related to our food?



Soil is the basis for all the food we eat, it even provides minerals for sea plants and animals. The non-living part of soil is made from weathered rock. Different rocks and different climates produce many different soils. The materials we use for cultivating, preparing and eating food are mostly minerals and energy sources we get from rocks. Metals such as iron and steel are produced from rock minerals.

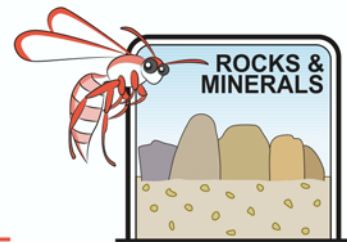
How do rocks make our lives easier?

Oil, gas and coal are energy sources found in rocks. Cars, bicycles, washing machines and even TVs are made from materials found in rocks.

Using Rocks to Build your House

You are heading to the rock shop to help your parents get some supplies for building your new house. Unfortunately your father has forgotten which rock is for which purpose. Use the information below to figure out which rocks are best suited to what you need in the house.

Information about the rock	Picture of the rock
<p>Granite is a crystalline intrusive igneous rock. Its crystals interlock, making it difficult to break. Quartz is common in granite, as are feldspars, micas, and amphiboles.</p>	
<p>Marble is a metamorphic rock. It was a limestone and has been partly recrystallised after being subjected to intense heat and pressure. Heat changed the lime into interlocking crystals of calcite.</p>	



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Slate is a metamorphic rock. It was a mudstone which has been partially recrystallised. The pressure of metamorphism has aligned the new minerals, so it can be split into flat, plate-like sheets.



Sandstone is a sedimentary rock, which was laid down in horizontal beds. The grains in sandstone are mostly quartz and sometimes some feldspar, and they are loosely cemented by either silica or calcite.



Since minerals are the building blocks of rocks, we can determine a lot about a rock by knowing about the minerals in that rock. For example, we can look at the hardness of minerals in a rock to decide if the rocks are strong enough for the purpose you need in the new house. *We can't test the hardness of a rock, but we can test the hardness of the minerals in a rock.*

In 1812, a German geologist called Friedrich Mohs made a simple non-linear scale of hardness of minerals by comparing them with each other and with other common objects such as fingernails and coins:

Moh's Scale of Hardness

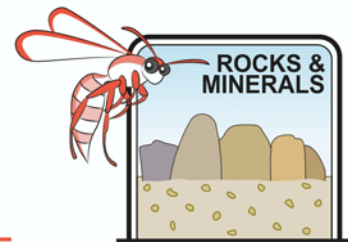
Mineral	Moh's Scale of Hardness	Relative hardness
Talc	1	very soft – can be scratched by a fingernail
Gypsum	2	
Calcite	3	pretty soft – a piece of glass is harder than this
Fluorite	4	
Apatite	5	about the same hardness as a knife blade
Feldspar	6	
Quartz	7	pretty hard – scratches most things
Topaz	8	
Corundum	9	very hard
Diamond	10	the hardest – nothing natural can scratch diamond

Use all the information above to determine which rock is best suited to each purpose listed below. Explain your answers.

In your new house, you need:

- An emu sculpture for the garden. The rock needs to be reasonably hard to withstand weathering, but soft enough to carve.

Marble is mostly calcite so although it is reasonably hard it is softer than granite and is easier to carve. Because it is not bedded like sandstone it is less likely to break



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- A kitchen bench top. The rock for the benchtop must be resistant to both water and heat.
Granite would be good because it is igneous and has interlocking crystals. It can withstand heat and will not allow liquids to penetrate and stain. It is easy to clean.
- Some waterproof tiles for the floor of the shower recess. This rock needs to be able to be split into flat squares which can be cemented to the floor.
Slate is easily split into flat sheets to line the recess. Its minerals are aligned so that water cannot penetrate and it will be easily cleaned.

Using Rocks in Everyday Life

Situation 1: You are visiting your cousins out in the Wheatbelt, the farming country east of Perth. Your uncle had tried to construct a dam by building dirt walls to retain water in a stream which sometimes flows in winter. He is very frustrated. A good rainstorm filled the dam, but after three days, the water had drained away through the permeable walls. Can you recommend something easily available that he could use to line the dam?

Plastic is good for the short term but it doesn't last long in sunlight. Clay is excellent as it is neither permeable nor porous and can change shape to fill in the bottom of the creek and dam.

Situation 2: You want to make some money for your next holiday. The pet shop at the end of the street has run out of gravel for the bottom of its freshwater fish tanks. Your little brother suggests that you go down to the ocean beach and collect coarse sand. Is this a good idea? Why or why not?

The salt in beach sand would kill freshwater fish. It would have to be very thoroughly washed. The sandy base of a river would provide good freshwater gravel for the bottom of the tank.

Situation 3: The mineral gypsum is used to make plaster for walls and ceilings. It forms today in WA where water flows into inland lakes which later dry up. Where do you suggest we should look for it? Why can it be easily dug up?

Look in an atlas or on Google Earth to find where inland salt lakes are. It is easily dug up because gypsum is very soft, being 2 on Mohs' scale.