

UC Earth Science Garden

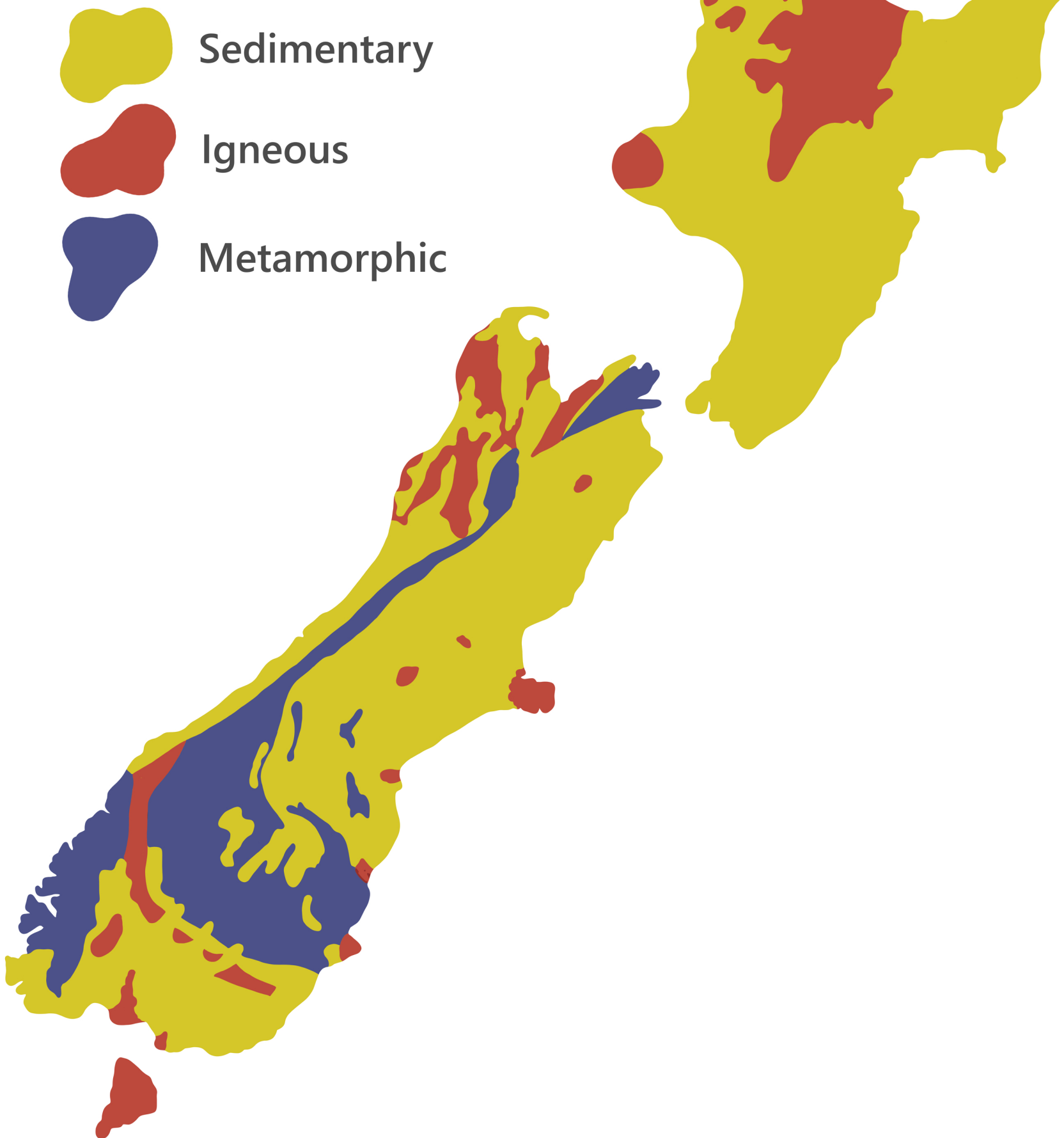
Geology Landscapes of Te Wai Pounamu South Island



Rock Hunters

Become a Geologist for the day

Rock types of Aotearoa - New Zealand



Welcome to the Rock Garden

Today you get to become a geologist!



But what is geology?

Geology is the study of the Earth – especially the rocks, land, mountains, volcanoes, fossils, and how our planet changes over time.

A geologist is like a detective for the Earth.

They look for clues in rocks, soil, and landscapes to discover what happened long ago.



Why is geology important?

Geology is important because it helps people:



Find water and useful minerals



Understand natural hazards like earthquakes and volcanoes



Protect the environment



Learn about Earth's history.

Geology helps us understand the story of our planet.

You could think of Earth like a giant history book!



Go - Go - Gadget Geologist!

Geologists spend a lot of time outdoors and need special gadgets and gear to do their job.

Today you will get to use some of this special equipment.

Protection

Colour in the things these geologist are wearing to keep themselves safe. Explain to a buddy why they are wearing these things.

A clipboard with a checklist. The checklist has five empty boxes for marking items. The items are not listed, but the boxes are provided for the user to write or mark.

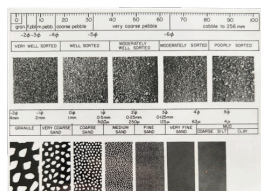
☐	_____
☐	_____
☐	_____
☐	_____
☐	_____

Can you think of other things they might carry with them to keep safe?

Specialist Equipment



Hand lens for looking at minerals



Grain size comparator



Hydrochloric acid



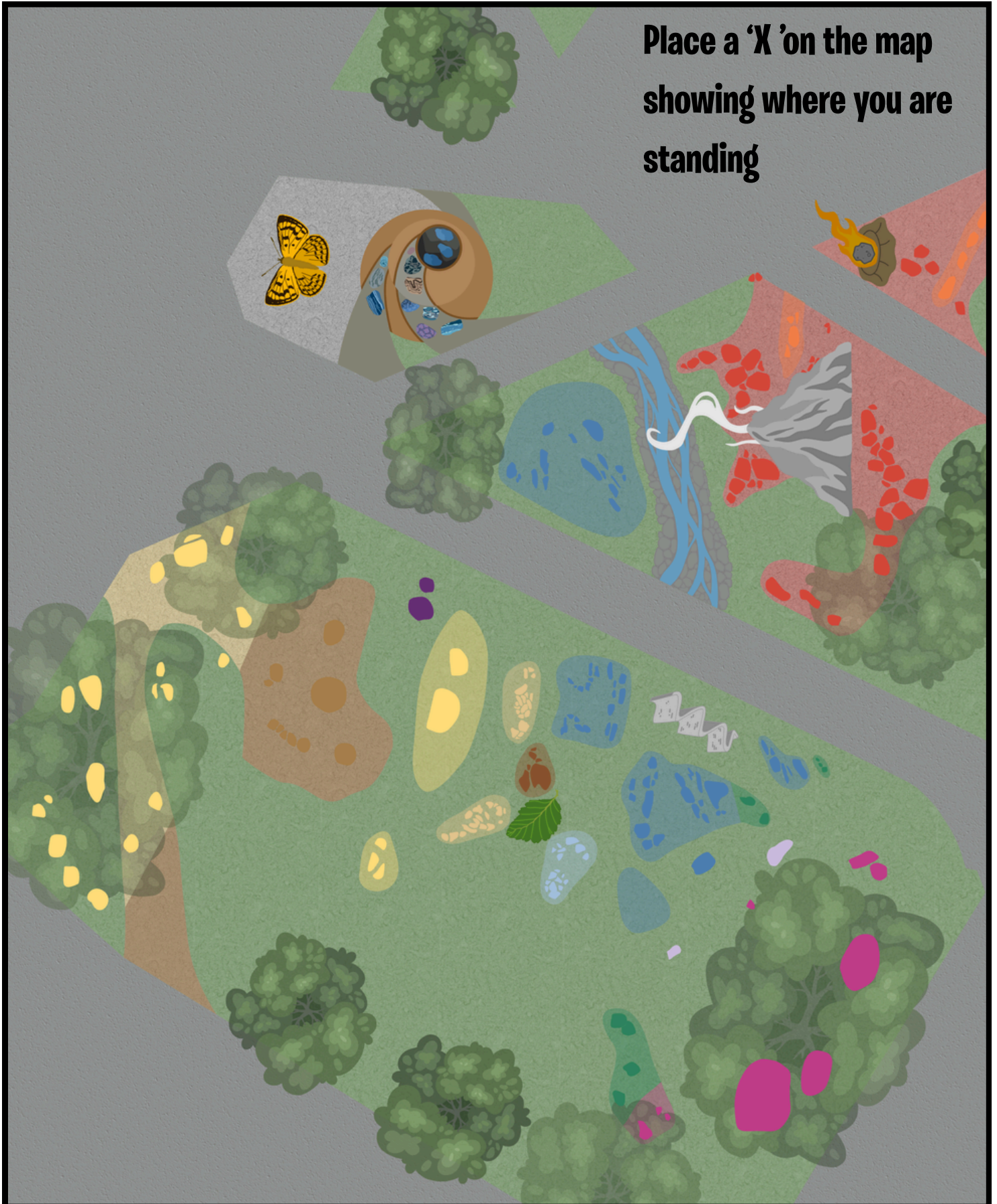
Compass



Hammer

Rock Hunters Map

**Place a 'X' on the map
showing where you are
standing**



Find these rocks and mark their location on your map





Rock Detectives

1. Choose any rock in the garden
2. Mark the location of the rock on your map
3. Draw a detailed picture of the rock (see tips below)

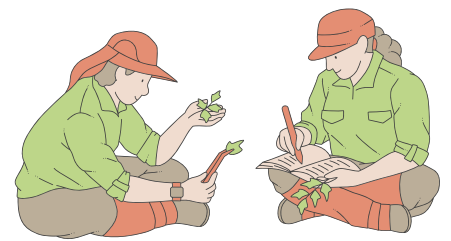
Drawing Checklist:

- ☐ Add a title, date and location to the top of your page
- ☐ The drawing should take up more than half the space
- ☐ Use a sharp pencil first, then add colour with coloured pencils later
- ☐ Add texture using your pencil such as dots and lines
- ☐ Add clear labels to describe your drawing
- ☐ Proportions - make sure the details are the right size compared to the other parts
- ☐ Note the viewpoint you are drawing from - side, top, birds-eye
- ☐ Add a scale

Possible Labels

Colour
Shape
Texture changes
Crystals
Fossils
Layers

5. Describe your rock like a geologist.



These words might help you get started.

How it looks:

colours, light, dark, pale, deep, bright, dull, faded, patterned, speckled, spotted, flecked, mottled, banded, striped, layered, streaked, marbled, swirled, patchy, shiny, metallic, sparkly, glittery, glassy, translucent, opaque, uneven, flat, flaky, layered, rounded edges, angular edges, porous (has holes), vesicular (gas bubble holes) compact, dense

What it feels like

smooth, rough, bumpy, jagged, sharp, gritty, sandy, chalky, powdery, slippery, waxy



Look closer!

Grain Size (what do you see within the rock?)

grainy, rounded, angular, long, stumpy, random



Concretions

Concretions are so perfectly round that some people think humans must have made them.

But they are completely natural!

Some interesting information

Here's how these Waipara Concretions were formed.

Millions of years ago, this part of New Zealand was under the ocean. Thick layers of mud built up on the sea floor. Over time, more and more mud piled on top, burying the older mud deep underground. Inside this buried mud, something small – like a piece of wood, a shell, or even a bone – became the centre of a rock ball. Minerals in the water, especially calcite (a type of calcium carbonate), slowly gathered around the object. The rock grew outward in all directions inside the mud, layer by layer, like a snowball getting bigger. This took millions of years! These round rocks are called concretions. They are much harder than the soft mudstone around them. Over time, wind and rain wore away the softer rock, but the hard round concretions stayed behind. That's why we can see them today.

The Waipara Gorge is extra special because some of the concretions formed around fossil bones from ancient sea reptiles called Mosasaur and Plesiosaur. These creatures were swimming in the ocean more than 65 million years ago – back when dinosaurs were still alive on land!

Can you think of a way of measuring the concretion? How big is it?

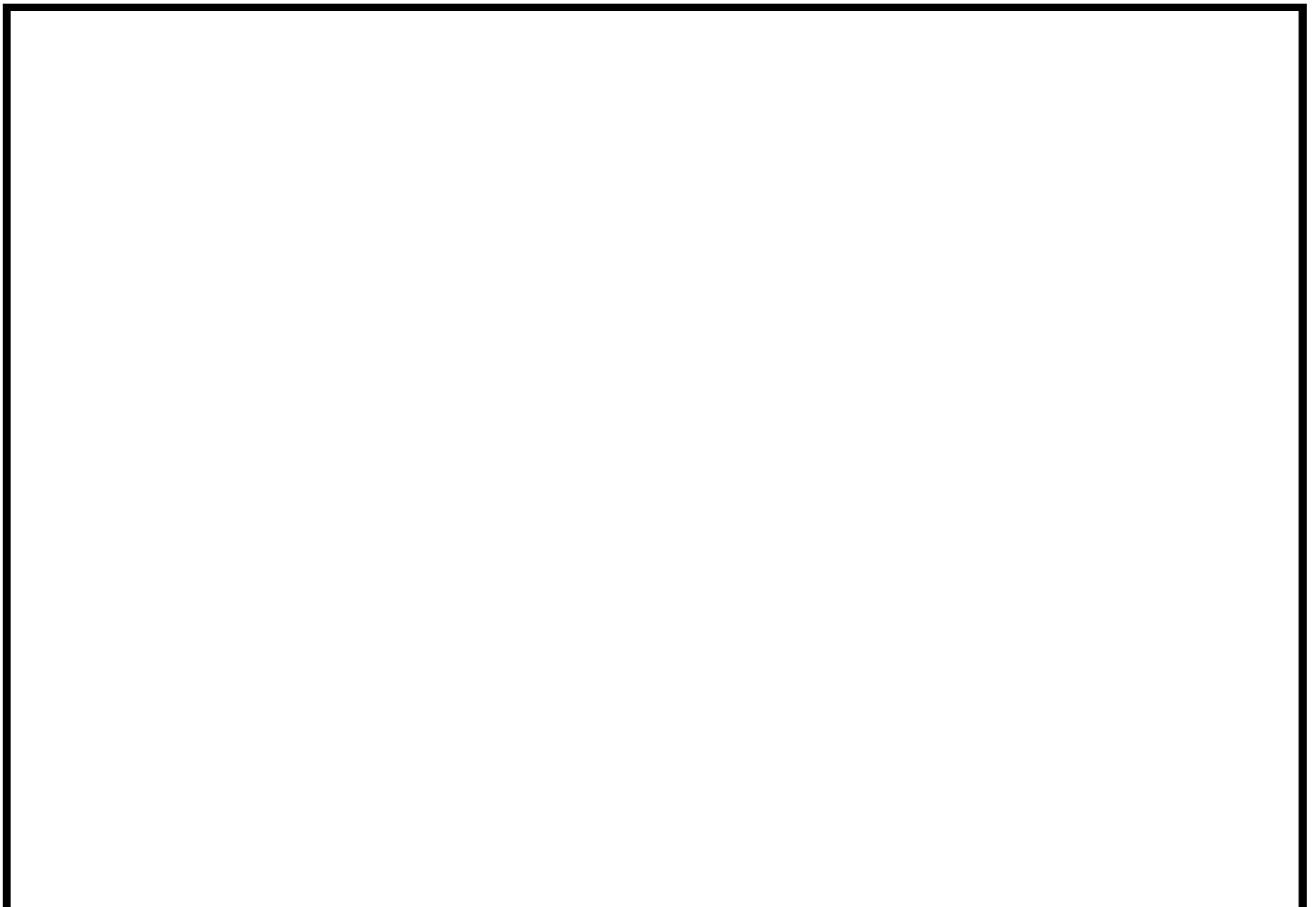


One of the concretions broke open when it was moved to the garden, and inside fossilised bones of a marine reptile were found. It is like discovering a hidden story inside the landscape!

Find the broken concretion and add the location of it to your map. Spend time carefully looking for evidence of bones such as vertebrae and ribs. Also look for layers that make up the concretion (a bit like an onion skin)



Use the space below to draw your observations. Label your drawing



What type of rock do I have?

Does my rock have bands ?



Yes

Are the bands made of crystals?

Yes —————→ Metamorphic

If No - Are the bands different coloured?

Yes —————→ Sedimentary

If No - Are they made of grains?

Yes —————→ Sedimentary

No

Move to the next card

Is my rock made of crystals?



Yes

Are they many different colours?

Yes —————→ Igneous

If No - Are they in bands of or layers?

Yes —————→ Metamorphic

If No - Are they made of grains?

Yes —————→ Metamorphic

No

Move to the next card

Is my rock made up of bits stuck together?



Yes

Does it contain shells or plant / animal fossils? Yes —————→ Sedimentary

If No - Is it made up of smaller rocks stuck together Yes —————→ Sedimentary

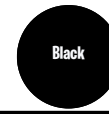
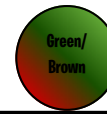
No

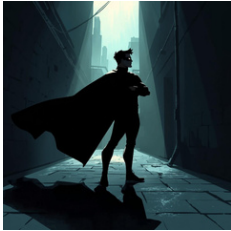
Look back at the other cards

I think my rock is ☐ Igneous ☐ Sedimentary ☐ Metamorphic

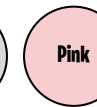
because _____

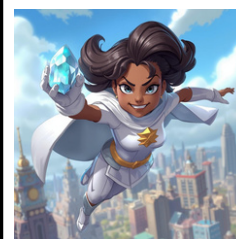
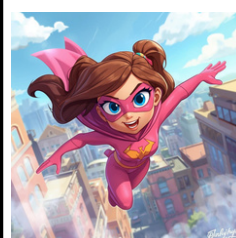
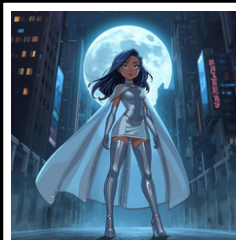
Rock Forming Dark Coloured Minerals



Colour	Shape	Secret Power!		Mineral
Dark Brown/ Black	Thin, flat sheets	The Shadow: Just like Muscovite, but it's black and shiny. Peels into thin "pages." Easy to scratch with steel		Biotite Mica
Green- Dark Green. Can appear black	Long thin needles/splinters	The Splinter: Crystals look like long, dark needles.		Amphibole
Green- Dark Green. Can appear black	Stubby rectangles	The Brick: Crystals are stubby and rectangular.		Pyroxene
Green colour but forms a rust brown/ orange colour when exposed to weathering	Even sided/ square	The Olive: A yellowish-green. It looks like a cluster of green glass beads. Has the power to turn to rust!		Olivine
Pink-red-dark red	Round "Soccer balls"	The Soccer Gem: Grows in 12-sided balls. Usually deep red and very, very hard		Garnet

Rock Forming Light Coloured Minerals



Colour	Shape	Secret Power!		Mineral
White-clear-grey	usually even sided or square	Invincible: It is the only one here that can easily scratch glass. No flat breaks - it splinters like broken glass. Glass is made from this mineral and it is used in watches to tell the time!		Quartz
Cream or greenish, sometimes grey	Chunky blocks/ rectangular	The Zebra: Look for tiny, perfectly straight "score marks" or lines on its flat faces.		Plagioclase Feldspar
Pink	Chunky blocks/ rectangular	The Flamingo: Usually pink or salmon-colored. It has smooth faces with no lines.		Alkali Feldspar
White - light yellow, tan	Slanted boxes (Rhoms)	The Fizzer: It bubbles like soda if you touch it with a drop of vinegar or HCl. It is easy to scratch with steel		Calcite
Silvery	Thin, flat sheets	The Window: It peels into very shiny clear, flexible sheets you can almost see through. Was used as windows before glass was invented.		Muscovite Mica

Mineral Hunt



Take a hand lens and go hunting in the rock garden for these minerals. As you find them tick them off.

☐

Olivine

Green colour but forms a rust brown/ orange colour when exposed to weathering

☐

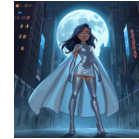
Pyroxene

Green- Dark Green. Can appear black.
Stubby rectangles

☐

Calcite

White - light yellow, tan
The fizzer

☐

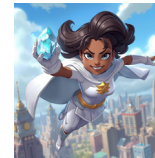
Muscovite Mica

Silvery. Thin sheets

☐

Feldspar

Cream or greenish, sometimes grey
or pink

☐

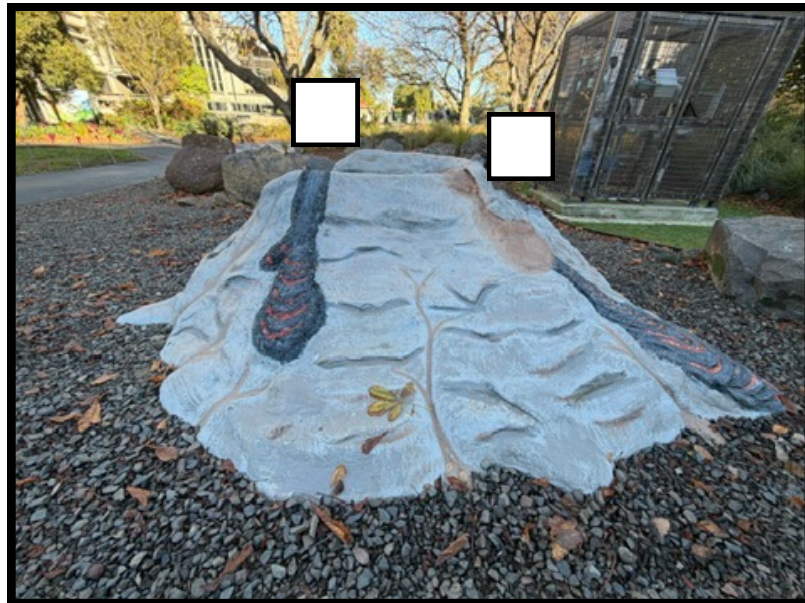
Quartz

White-clear-grey.
Square



There's a volcano at the University!

Name the different parts of the volcano



- A** Lava domes - Short round lava sticky flows that don't flow far
- B** Pahoehoe lava flows - Runny lava flows that have ropey flow textures
- C** Aa lava flows - Thicker lava flows with rubbly spiky flow tops
- D** Dykes - Vertical sheets of magma that feed eruptions
- E** Ash layers - Flat layers of ash that help build the volcano.
- F** Volcanic Mud flows (lahars) - Mixtures of ash and water that mix together to form a flow of mud that runs down the outside of the volcano.

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make tour bookings on our website



Acknowledgements:

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UC  EARTH AND ENVIRONMENT
Te Kura Aronukurangi

