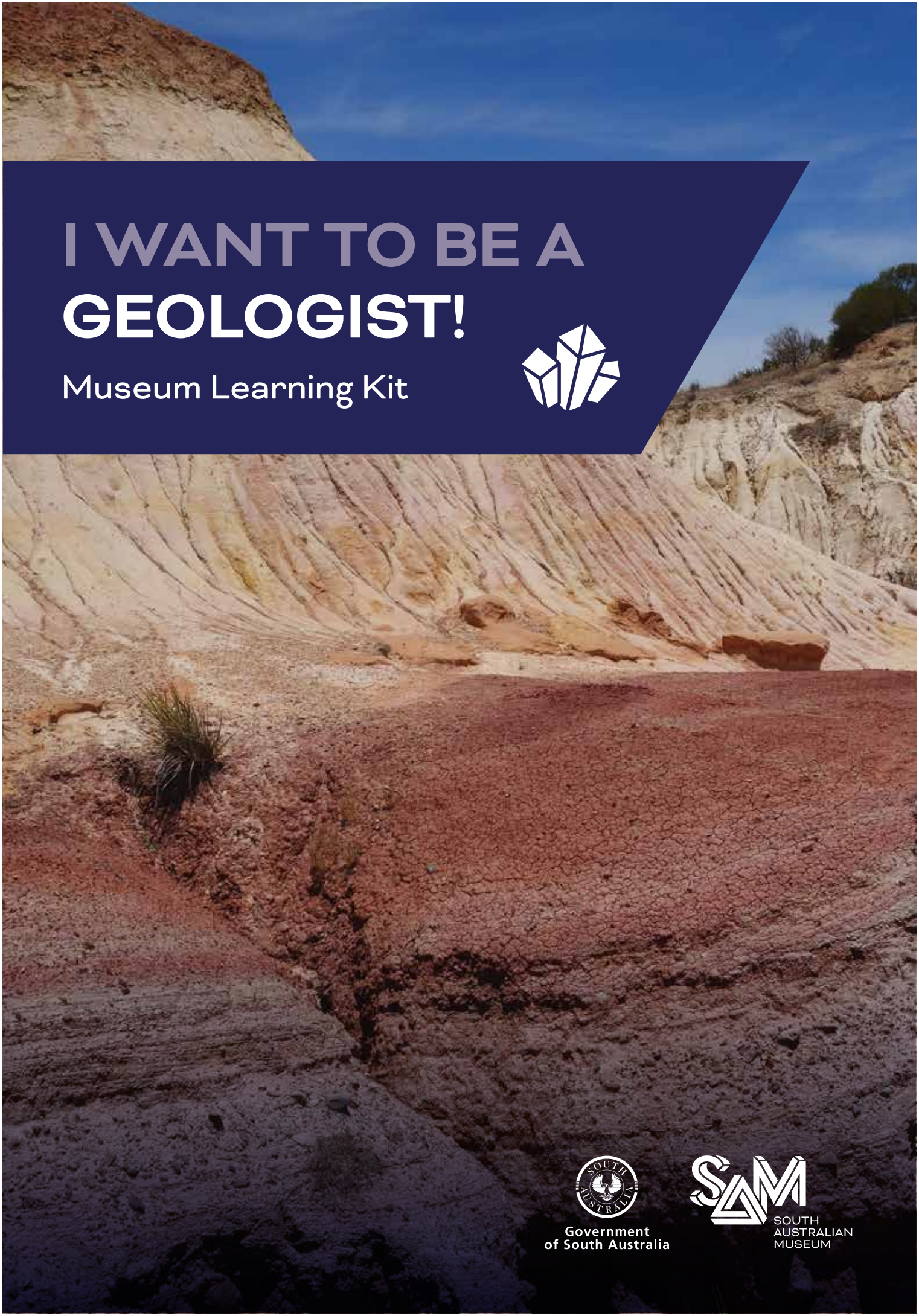


I WANT TO BE A GEOLOGIST!

Museum Learning Kit

Government of South Australia

SOUTH AUSTRALIAN MUSEUM

About this Resource

This kit is a play-based introduction to the science of geology, with a focus on minerals. The kit includes objects from the South Australian Museums education collection to inspire young students. The session comes with a comprehensive guide and suggested script to use with students, but can be adapted to meet the individual needs of your group and to your own teaching style.

This lesson can be stand-alone, but we would love to see you visit the Museum to see more exciting geological objects. You can make a booking here: School group bookings | SA Museum

Please help us care for the objects in this kit. Encourage students to handle them gently and understand that they are special items from the Museum. If any damage does occur, please let us know at education@samuseum.sa.gov.au

Aims and Outcomes

Museum learning kits aim to extend and enrich children's learning through opportunities to initiate, investigate, manipulate and experiment with a vast array of resources and materials to develop the concepts, skills and flexible mindsets that underpin STEM based learning in the early years. Aligned with the Early Years Learning Frameworks (EYLF), this kit aims to:

- include strategies to support and further develop the concepts of Belonging, Being and Becoming, as children form their own identities and understandings of the world.
- implement the principles and strategies that foster considerate, supportive and respectful relationships and partnerships, to assist all children in achieving learning outcomes.
- plan and facilitate a myriad of activities to assist children in achieving the endorsed learning outcomes:
  Outcome 1: Children have a strong sense of identity
  Outcome 2: Children are connected with and contribute to their world
  Outcome 3: Children have a strong sense of wellbeing
  Outcome 4: Children are confident and involved learners
  Outcome 5: Children are effective communicators
- deliver a range of learning experiences that are enjoyable, relevant, authentic, and meaningful, enticing active participation, igniting interest and curiosity, and developing a love of learning.
- create a play-based learning space where children can discover new or existing areas of interests, manipulate materials, test concepts, and explore ideas.
- develop science-based process skills (Observing, Comparing' Classifying, Measuring, Communicating, Inferring, Predicting).
- actively connect knowledge and ideas to tools, in order to design, invent, build, test, modify and produce a product or solution.
- practise creative and critical thinking, explore resources and materials, engage in real-life applications and solutions to connect their thinking to actions, and transfer their understanding.
- broaden problem-solving abilities, critical thinking, reasoning, and application of mathematical concepts.
- enhance the foundations of early years literacy and numeracy, language learning and communication skills.
- create opportunities to play and discover independently and/or collaboratively.
- to encourage dispositions that promote lifelong learning.

Session Format

The following is a suggested session format for delivering the content in the learning kit.

Teachers will have their own pedagogy and style of facilitating sessions. Please adopt and adapt the session or elements of this plan to suit your style and skill set. This session is not only designed to be fun, engaging, meaningful and relevant to the visiting children, but for the facilitator too!

Set up the activity stations before you start. It can be useful to cover these with a sheet or cloth, so students do not see them before the activity time starts.

Teacher led – Approximately 20 minutes

Guided Activity Stations – Approximately 30 minutes

Re-group and conclusion – 5-10 minutes

Kit Contents

Provocation Box (cardboard archive box)

- Rock and mineral samples from the South Australian Museum
- Magnifying glass
- Playdough (note that playdough contains gluten)

Activity Station 1 – Investigation Station

- Shallow archive box containing rocks and minerals from the Educational Resource Room
- Magnifying glasses

Activity Station 2 – The Rock Cycle

- Playdough – 2 sets of 3 different colours (note that playdough contains gluten)
- Igneous, Sedimentary, Metamorphic Information cards

Activity Station 3 – Scavenger Hunt

- No materials required – outdoor activity

Activity Station 4 – Inside Our Earth

- Playdough – 2 sets of 4 colours (note that playdough contains gluten)
- Layers of the Earth diagram

Session Plan

Acknowledgement of Country

"Good morning/afternoon everyone. today we would like to acknowledge Kaurna Country."*

"Here is the land, here is the sky.

Here are my friends and here am I.

We thank the Kaurna people for the land on which we play and learn.

Hands up, hands down

We're on Kaurna ground."

**Use appropriate term for the country you are learning on.*

Introduction: Provocation Box

A provocation is an open-ended resource, which evokes a response from children, stimulating curiosity and a desire to actively engage in conversations and activities, to further explore interests and ideas. Provocations can inspire creativity, initiative, imagination, understanding and future thinkings.

With students seated on the mat area, knock on the box... put your ear to the lid… build excitement and anticipation for what could be inside.

Slowly open the box (first reveal)… 5 rocks or mineral examples from the Educational Resource room that differ greatly in appearance – size, colour and shape – to pique curiosity and interest.

There is also a selection of materials that relate to the Activity Stations (torch magnifying glass, playdough and a model of the earth's layers) – but these items will be revealed later (second reveal).

Show each of the rocks and minerals to the children. Turn each one so they can see all sides, invite children to come and touch them/pass them around, ask leading questions about the way the artefacts look (shiny/colourful/sparkly), how they might feel (smooth/bumpy/scratchy), where they might be found, what they might be... creative suggestions such as a shoe/flower/dinosaur bone are welcomed as they will activate thinking and promote conversation.

Explain that these are rocks and minerals from the South Australian Museum:

"Rocks are SUPER important, because they tell us all about the history of the Earth. Rocks are made from minerals. Depending on the environment different types of minerals join together to form different types of rocks. Rocks made by minerals in volcanoes are different to rocks made on the beach, which are different to rocks made in rivers and the rocks you can climb over and the mountains you might see when you are on holiday or in your favourite storybook. All rocks can change into something new if they get buried deep, deep, deep under the ground. Some rocks even contain fossils that show us what life on Earth looked like a very long time ago!"

"Every rock has a story and a Geologist is a scientist who looks very carefully at the rocks to find their story. Geologists find out how old rocks are, where in the Earth they were formed, and how the Earth has changed over time. Some geologists are very good at finding the special rocks and minerals that we use everyday."

"There are three types of rocks. Igneous rocks are formed in volcanoes, and they can be black and shiny or have little holes in them from the gas bubbles.

Sedimentary rocks are made of layers of sand, shells, pebbles and bones.

Metamorphic rocks form deep under the ground, and they have ribbon like layers and shiny crystals."

I know a song about the three types of rocks. It is called The Rock Cycle and I'd like to sing it to you. There are some actions to do as we sing along. The actions look like this...(please demonstrate the Auslan sign for 'volcano' and explain when the actions are to be performed), so please join in. Ready...?"

Volcano

At chest height, hold one arm horizontal to the body, hand flat, palm facing inward. Hold the other hand in a fist shape below the flat hand, palm facing the body. Move fist upwards behind the flat hand, spreading fingers apart as the hand emerges above the horizontal flat hand, as though the volcano is erupting.

https://signplanet.net/sign/1540

The Rock Cycle

(Tune: "Slippery Fish")

"Volcano, volcano (Auslan sign)
Rumbling and erupting
Volcano, volcano (Auslan sign)
Whoosh, whoosh, whoosh (Move whole body from side to side)
Oh no!
The lava has made …

Igneous rocks, igneous rocks (Tap fist shaped hands one on top of the other)
Cool and hardened lava
Igneous rocks, igneous rocks (Tap fist shaped hands one on top of the other)
Whoosh, whoosh, whoosh (Move whole body from side to side)
Oh no!
The wind and rain have made …

Sedimentary rocks, sedimentary rocks (Stack flat hands one on top of the other – layering)
Made with deposits from earth's surface
Sedimentary rocks, sedimentary rocks (Stack flat hands one on top of the other – layering)
Whoosh, whoosh, whoosh (Move whole body from side to side)
Oh no!
The temperature, pressure and movement have made …

Metamorphic rocks, metamorphic rocks (Clasp hands together and rub – creating heat and pressure)
Change due to heat and pressure
Metamorphic rocks, metamorphic rocks (Clasp hands together and rub – creating heat and pressure)
Whoosh, whoosh, whoosh (Move whole body from side to side)
Oh no, not the volcano again!" (Auslan sign)

We are back to the start of the rock cycle, and the different types of rocks start to form again."

"But not all rocks are small enough for us to carry. Some rocks we can climb on, some we can climb up, some we can walk along and some we can only read about, because they are at the very bottom of the ocean. Mountains, valleys, volcanoes and trenches are made when parts of the earth's crust move rocks to make a new shape. These moving parts are called tectonic plates and they can slip, slide, spread and collide. Let's use our hands to show how these plates move."

Holding both hands in front of you, chest height –

"Slip" – Hold one hand still while the other hand moves beneath it.

"Slide" – Hands are side by side, thumbs tucked down and as one hand moves forwards the other hand moves backwards.

"Spread" – Hands start side by side before simultaneously separating and moving shoulder width apart.

"Collide" – Turn both hands so they are parallel with your chest and shoulder width apart. Move hands towards each other so fingertips touch and start to point upwards, then fingers and hands close together with fingers pointing to the sky.

"Terrific everyone. Please help me as I sing the next song by standing up and joining in with the actions, or you might just like to wiggle and dance. This song is called 'Slip, Slide, Spread and Collide'."

Slip, Slide, Spread and Collide

(Tune: "Jump Jump Star" The Fairies, 2018)

Match actions to words including the actions practised earlier.

Jump, jump, star,
Jump, jump, star
Slip, Slide, Spread and Collide
Jump, jump, star,
Jump, jump, star
Slip, Slide, Spread and Collide.

Clap your hands,
stamp your feet
In a little circle turn around
Slide to the left
Then slide to the right
Hands in the air then on the ground.

Refer back to the Provocation archive box prop – the second reveal.

"I wonder what else is in the box today?"

Slowly reveal a toy animal, a magnifying glass, a ball of playdough, and 4 innner arcs of a wooden stacking rainbow.

"Oh I know what these things are, they are some of the things you will be using during our learning activities today."

Briefly outline the activities at each Activity Station.

"Station 1 is our Investigation Station. Here you will find books about rocks and minerals, along with lots of different artefacts to investigate with magnifying glasses"

"At Station 2 you will move the kinetic sand to form mountains and valleys, and use the animals to create impressions in the sand, as part of Small World Play. Impressions give geologists clues about life from long ago."

"Use the playdough at Station 3 to show how different rocks are made in the Rock Cycle."

"Station 4 is a scavenger hunt, so we will be going outside to look for special rocks."

"At Station 5 you will make a model of our Earth using playdough. Understanding the layers of the earth helps geologists understand the stories of the rocks".

Ask for four/five volunteers to start at the Investigation Station, where they use the magnifying glasses and finger torches to investiagte the rocks and minerals on display.

Have other groups start with Small World Play, the Rock Cycle station, the Scavenger Hunt and the Inside our Earth station.

After about 30 minutes rotating though the Activity Stations, bring everyone back together and pack up the stations. Once complete, bring students back to the mat and conclude the session by leading deep breathing and yoga moves.

Conclusion

Deep Breathing – Volcano breathing

Sit comfortably with enough space around you to extend your arms above your head and out to the side.

Start with the palms of your hands together in front of your chest. As you breathe in, keep your hands together and reach straight up above your head. As you separate your hands and slowly move your arms down to your side, release your breath.

This breathing is slow and intentional.

Repeat three times.

Yoga – Rock Pose

Kneel on the mat, sit back on your heels, separate your knees so they are hip width apart and your big toes are touching. Aim to create a 'V' shape between your knees and feet.

Slowly lower your head and rest your forehead on the floor in front of you.

Rest your arms by your side or make a circle with your arms around your head holding each elbow with the opposite hand or straighten your arms in front, lengthening through to your fingertips.

Simply relax and breathe in this resting pose.

Activity Stations – Guides for Educators

Activity Station 1 - Investigation Station

Materials

- A variety of rocks and minerals from the Educational Resource Room
- Magnifying glasses

Give students time to explore the rock and mineral samples. They can use torches and magnifying glasses to take a closer look. If suitable, paper and pencil for drawing could also be included.

Activity Station 2 - The Rock Cycle

Guided by the provided images, students have fun using playdough to create the three different rock types.

Activity Station 3 - Scavenger Hunt

Take small groups of students outside to look for difernt rocks. Ask stents to describe the features of the rocks they find (size, colour, texture, weight ect.)

Activity Station 4 - Inside Our Earth

Materials

- Playdough – 4 colours
- Diagram showing the layers of the earth

Using the provided images as a guide, students use playdough to create a model of our Earth.

Roll a small, coloured ball – Inner core

Wrap the inner core in a second colour – Outer core

Wrap the outer core in a third colour – Mantle

Wrap the mantle with a fourth colour – Crust

The Rock Cycle

Igneous Sedimentary Metamorphic

Image source - https://eisforexplore.blogspot.com/2012/12/play-doh-rock-cycle.html?m=1

Inside Our Earth

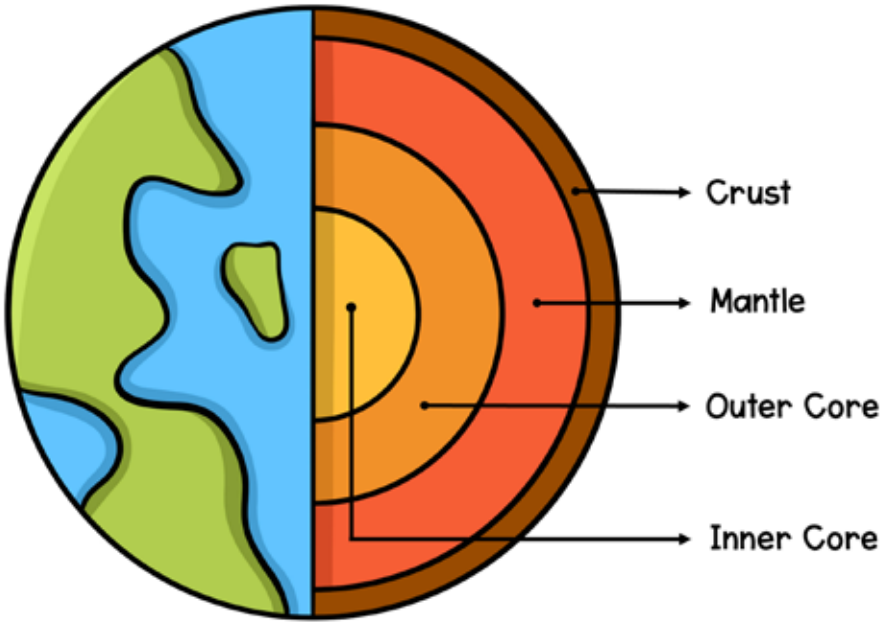


Image source - https://bit.ly/4gYak7b

Glossary

Geologist – A scientist who collects, collates and deciphers evidence about the past, by studying the rocks around us.

Geology - the study of the earth. Geo means earth, and ology means study of. Geology is one type of Earth science that studies both the liquid and solid Earth, looks at the rocks which Earth is made of, and how and why those rocks change over time.

Deposition – the accumulation of sediment in a low point in the landscape.

Erosion – the physical breakdown and removal of rock, soil, or sediment by natural forces.

Fossil – any evidence of ancient life preserved in rock. This includes bodily remains (i.e. bones, shells, etc) or trace fossils (i.e. footprints, burrows or nests).

Gemstone – a mineral of unusually high quality that can be cut and polished.

Igneous Rock – Any rock that has formed from molten rock that has cooled and solidified.

Lava – molten rock which has erupted and is exposed on the surface of the Earth, or under the ocean.

Magma – molten/liquid rock originating within the Earth.

Metamorphic Rock – A rock that has undergone a change in mineral composition and structure as a result of heat and pressure.

Mineral – A naturally occurring crystalline solid of a pure chemical.

Ore mineral – a mineral with a high concentration of an element that can be extracted. This is not always a metal.

Quartz – the most common mineral on the surface of the earth. It has the composition silicon dioxide (SiO_2)

Rock – an amalgamation of minerals

Sediment – any physical material that is transported by natural forces on the surface of the earth. Sediment may be moved by water, wind, ice, or gravity. It can be composed of boulders, pebbles, sand, silt, clay, or organic material.

Sedimentary rock – any rock formed from the accumulation of sediment on the surface of the Earth, which is buried and cemented together.

Tectonic plates – the sections of Earth's crust which can move very slowly over time. Where plates collide or separate, mountains and volcanoes occur.

Volcano – a mountain formed from the accumulation of erupted lava.

Additional Songs and Auslan Signs

Igneous Rocks

(Chant: "Jack in a Box")

Igneous rocks are in the volcano (Children bob down and wait quietly)
Until it starts to erupt
Kaboom! (Children jump up)
Repeat

Layers That Make Our Earth

(Tune: "Head and Shoulders, Knees and Toes")

Inner core, outer core, mantle and crust
Mantle and crust
Mantle and crust
Inner core, outer core, mantle and crust
Four layers that make our Earth.

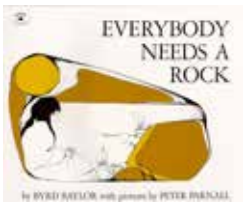
Earth

Start with flat hands, palms down, thumbs tucked under, fingers pointing forwards and pointer fingers touching. Simultaneously move hands apart and downwards in an arc, so that hands finish with palms facing upwards and pinky fingers touching.

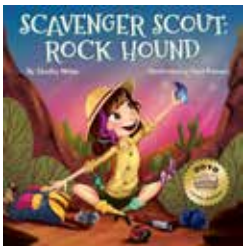
https://signplanet.net/sign/294

Suggested Reading List

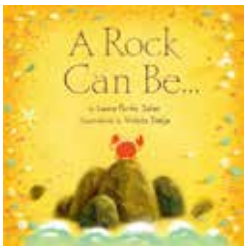
Rocks
Natalie M. Rosinsky



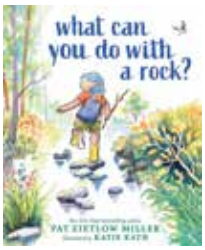
Everybody Needs a Rock
Byrd Baylor



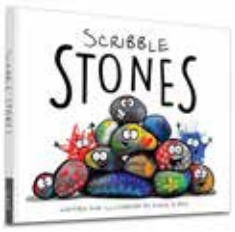
Scavenger Scout: Rock Hound
Shelby Wilde



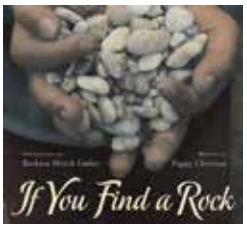
A Rock Can Be...
Laura Purdie Salas



What can you do with a rock?
Pat Zietlow Miller



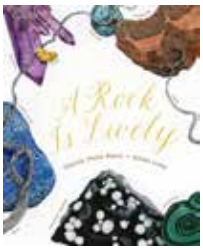
Scribble Stones
Diane Alber



If You Find a Rock
Peggy Christian

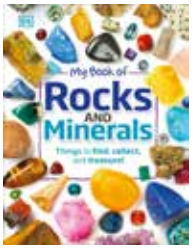
If Rocks Could Sing
Leslie McGuirk

Ricky, the rock that couldn't Roll
Mr Jay



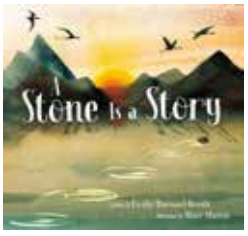
A Rock is Lively
Dianna Hutts Aston & Sylvia Long

Let's Go Rock Collecting
Roma Gans



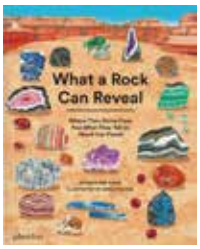
My Book of Rocks and Minerals
Devin Dennie

A Stone Sat Still
Brendan Wenzel



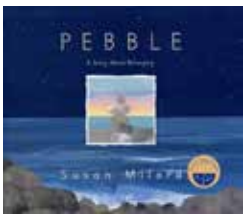
A Stone is a Story
Leslie Barnard Booth

Hidden Gem
Linda Liu

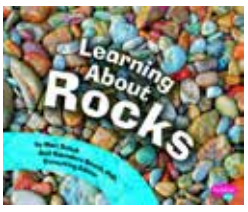


What a Rock Can Reveal
Maya Weiss-Haas

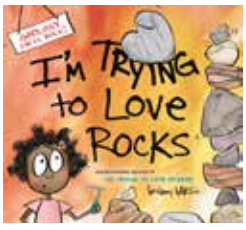
Lubna and Pebble
Wendy Meddour



Pebble, A Story about Belonging
Susan Milord



Learning About Rocks
Mari Schuh



I'm Trying to Love Rocks
Bethany Barton