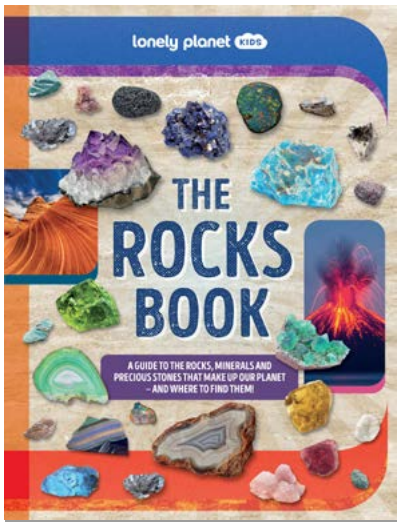
The rocks book

This is one of a series of activity sheets to use alongside the books which have been shortlisted for the Royal Society Young People's Book Prize 2025.

CENTRE *for* INDUSTRY EDUCATION COLLABORATION



Each activity sheet contains ideas for activities to do with your pupils, provides information relating to careers, and has a maths focus to help pupils understand the importance of mathematics education across the curriculum.

For the following activities, you will need a collection of common rocks for classroom investigation. These may be bought from educational suppliers, donated by local gardeners or builders, or found in the local and wider environment ensuring collection is legal and environmentally responsible.

Working with scientists

These investigations can be done as standalone activities or carried out as an in-depth sequence to develop pupils' disciplinary and substantive knowledge. The deeper learning and science capital development of your pupils could be made more memorable through collaboration with a scientist such as a geologist, geographer or palaeontologist. You could do this by applying for a Royal Society Partnership Grant of up to £3,000. For more information, visit: **royalsociety.org/grants/partnership-grants.**

Testing rocks for hardness

Some types of rocks need to be harder than others so they can hold up under pressure and last a long time without breaking. Pupils can carry out a simple harness test by using everyday items like a coin, nail or golf tee to scratch the surface of different rocks and observe which rocks can and cannot be scratched easily. As they compare results, pupils should discuss which rocks would be more suitable for building strong structures such as houses, walls, roads, bridges and tools.

Rock texture

When geologists talk about a rock's texture, they don't just mean what it feels like to touch. Rock texture has more to do with the size of the tiny parts, called grains, that make up the rock and how they are arranged. Pupils should have a close look at different rocks with and without a hand lens. Can they see the different grains? Are they big or small? Are they all the same size or are some bigger than others? What do pupils think different textured rocks could be used for?

Fine-grained rocks have tiny grains that are packed closely together. They are usually smooth and strong which means they are good for building, paving or making statues.

Coarse-grained rocks have big, visible grains which can make them easier to break apart or see the minerals inside. This makes them good for learning about rocks and decorating gardens or paths.

Image: Scientist-astronaut collects lunar rake samples © NASA

Testing rocks for magnetism

Read about Harrison Schmitt on page 85; an astronaut who travelled a very long way to find rock samples. As part of the Apollo 17 mission in 1972, he collected rock samples from the surface of the Moon to bring back to Earth. One of these rocks gave scientists evidence that the Moon may once have had an invisible magnetic force around it.

Pupils could try holding a magnet near to different rock samples. If the rock is attracted to a magnet, it's a sign that the rock contains iron, or minerals containing iron. A common example of a magnetic rock is the black or dark brown mineral called magnetite that can be found as 'black sand' on certain beaches in the UK. Pupils can read more about magnetite on page 130 of *The rocks book*.

The acid test

Some types of rocks will fizz or bubble when exposed to acid and this helps us to know what the rock is made of. Geologists use a strong acid called hydrochloric acid that requires specialist conditions to use. Pupils can replicate this test by placing a rock in a beaker or bowl and dripping a few drops of a weak acid such as lemon juice or vinegar onto the rock. Pupils may need to use a hand lens to observe any fizzing, or they could try scratching the rock to make a little powder, which can help create a stronger reaction.

Take it further

Did you know that soil is made up of tiny bits of rocks? Over a long time, rocks break down into smaller pieces after exposure to wind, rain, ice, and changes in temperature. These tiny pieces mix with dead plants and animals, water and air to make soil that plants can grow in.

CIEC's *Is There Anyone Out There* **(york.ac.uk/ciec/resources/primary/is-there-anyone-out-there/)** activity pack includes an opportunity for pupils to work like a geologist and investigate 'Martian soil' samples to decide which is most like the soil on Mars.

Career links

- **Geologists** are scientists who study the materials that make up Earth, including rocks and soils. They look closely at the appearance and physical properties of rocks and for clues about fossils, volcanoes, earthquakes and how our planet works.
- **Geographers** are scientists who study land, water and people on Earth to understand how they are all connected. They explore places, maps, and environments to learn how people live and how we can take care of our planet. Read about geographer Eman Ghoneim on page 35 of *The rocks book*.
- **Petrologists** are rock detectives who figure out how rocks were made and how they've changed over time. They explore the outdoor world, collect rock samples, and use special tools to uncover clues about volcanoes, mountains, and Earth's past. They carry out lab tests, use microscopes, do fieldwork, and help with things like finding metals, locating fuels such as oil found in rock layers, and understanding natural hazards like earthquakes and landslides.

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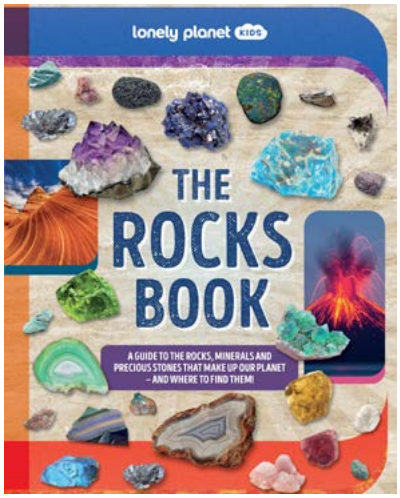


The rocks book, turns ordinary stones into extraordinary clues about Earth's history, from fiery volcanoes to crashing continents. With clear explanations, brilliant photos, and hands-on facts, it shows how rocks are made, changed, and discovered. You'll never look at the ground the same way again.

> "The more you learn about rocks and minerals, the more you'll begin to sound like a professional geologist out at work in the field!"

Rocks are everywhere

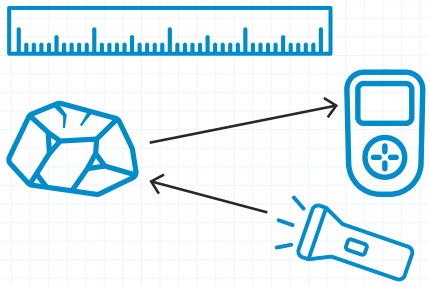
Go on a rock hunt around your local area with an adult, to see where different rocks are used in buildings, walls, pavements and statues. Take photos or make sketches of what you find, and record what each rock looks like including its colour, texture and any patterns. You could use the information about rocks at the back of the book (from page 100) to try to find out what types of rocks you have spotted. Talk about why you think each rock is suitable for its use. For example, does the object made from rock need to be hard-wearing, water-resistant or easy to shape?

Mathematics challenge

Geologists call the shininess of a rock its lustre. This can be found by measuring how much light is reflected from the surface of a rock. To investigate the lustre of rocks, ask an adult if they can download a free light sensor app to an electronic device, such as a phone or tablet.

Dim the lights and position a light meter at an agreed distance, such as 10 cm, from a rock. Place a torch either beside the meter or just behind or above it, then switch it on. The beam will illuminate the surface of the rock, and the reflected light will reach the sensor. Record the measurement of reflected light in lux, and repeat for other rocks in your collection.

Rock	Reflected light (lux)



Rock battle

Choose ten of your favourite rocks from the fact files at the end of the book (from page 100 onward). Use the information provided and other secondary sources to make your own 'rock battle' card game. Include categories such as rock name, texture, hardness, lustre and common use.

Play the 'rock battle' game in small groups or pairs by taking turns to choose a property and compare your cards. Each round, the person with the highest value for the chosen category takes the cards from the other players. The game ends when one player wins all the cards.

We need geologists!

The work of geologists is incredibly useful. Your challenge is to write a short, exciting job advert to encourage more people to become geologists. Include what a geologist does, why their job matters, location of work and what qualities and skills they would need. Make it sound so interesting that everyone will want to choose this career.

Be a rock collector

The world is full of interesting rocks. You can buy samples of polished rocks in shops, but it is more fun to collect your own!

Professional geologists have all kinds of tools to help them explore Earth's rocks, but you don't need any equipment to get started. Just keep your eyes peeled next time you are outdoors. You will see rocks of different shapes, sizes, colours and textures.

There are so many rocks out there to search and collect but always check before you take any samples home. If you see an interesting rock and you are not allowed to keep it, take a photograph of it instead. Read about *'Whose land is it?'* on page 80 of *The rocks book*.

Safety note: Only go rock hunting with an adult. You will need to know the risks and how to avoid dangerous situations. Read about responsible rock collecting on pages 80-85 of *The Rocks Book* and find out about what you can collect and where.

Scientist profile

Professor John Brodholt is a scientist who studies rocks and minerals at University College London. He has helped other scientists understand Earth and how its rocks behave when heated or squeezed under pressure. Professor Brodholt's research helps us to understand that studying rocks can be exciting, and that scientists can help people of all ages learn about rocks in the world around them. As a rock expert, he has worked with the author of *The Rocks Book* to make sure the information about rocks and minerals is accurate and interesting to read.