

ROCK DETECTIVES

INTRODUCTION

In this module children will work as 'Rock Detectives' establishing core knowledge and understanding of rocks, their relationship to soils and how fossils have formed over time.

In learning about rocks children will identify and name rocks, describing and comparing their observable properties and sorting them using a key. They will identify ways in which rocks are used in the local environment and suggest why the properties of certain rocks make them suitable for particular purposes. They will consider how rocks are affected by weathering over time and work scientifically to carry out tests to establish the hardness and permeability of different kinds of rocks.

In learning about soils children will explore a variety of soils first hand, making the link between soils of different types and the rocks from which they are partly made. They will learn about what happens to cause rocks to break down and become soil particles and about the organic matter that is an essential part of a healthy soil. They will test a variety of soils, including local soils, to discover whether soils of different types let water through at the same rate. They will work scientifically to make comparisons and draw conclusions based on their observations.

In learning about fossils children will discover what a fossil is and how they came to be formed from animal and plant remains. They will learn the names of a variety of common fossils, and about the stages of the fossilisation process. They will also find out about where and how fossils can be found and safely collected.

Key vocabulary

sandstone, granite, chalk, limestone, marble, pumice, rough, smooth, hard, soft, rock, stone, pebble, texture, particle, crystal, granule, properties, soil, clay, sandy, loam, peat, organic material, weather, weathering, frost, beach, cliff, trilobite, starfish, sea urchin, ammonite, fossil, fossilise, remains

FACT FILE

Rocks

Children should be given experience of a variety of common rocks. Key facts about some of these are listed below.

Limestone is a grey/white rock that was formed from the bones of tiny sea creatures that dropped down to the bottom of the sea when they died. It is used as a building stone, and to make concrete.

Chalk is a softer, white rock and is a type of limestone.

Granite is harder and tough, usually grey to pink in colour and often used for buildings. Granites are made up of crystals, which can often be seen clearly on the surface.

Slate is fine-grained and when expertly cut it will form smooth flat sheets of stone, which have long been used for roofing, floor tiles and other purposes. Slate is frequently grey in colour, especially when seen covering roofs, but can be found in other colours.

Marble is made of limestone that has experienced extreme heat and changed to form a hard rock that is used in buildings and to create sculptures. It can be white but varies in colour, depending on where it comes from.

Most **sandstone** is composed of quartz and feldspar because these are the most common minerals found in the Earth's crust. Like sand, sandstone may be any colour, but the most commonly occurring are tan, brown, yellow, red, grey, pink, white and black.

Soils

There are six main soil types: clay, sandy, silty, peaty, chalky, loamy.

Clay soil feels lumpy and sticky when very wet. It is rock-hard when dry. It does not let through water easily and has few air spaces. It is very hard to dig.

Sandy soil feels gritty to the touch and lets water through easily. It is easy to dig and dries out rapidly.

Silty soil is smooth and soapy to the touch. It retains moisture but allows water to drain away easily. It is richer in organic matter than sandy soil, easier to dig than clay soil and heavier than chalky soil.

Peaty soil contains a lot of organic matter (peat) but very few nutrients. It is very dark in colour and is easy to dig.

Chalky soil is alkaline, with a pH of 7.5 or more. It is usually stony, sometimes chalky-white in colour and allows water to drain easily. It contains very few nutrients.

Loamy soil has a good structure. It drains well, retains moisture and is full of nutrients. It is easy to dig and doesn't dry out too much in hot weather. It is the ideal soil for growing plants.

Fossils

Most of the creatures that fossils were formed from would have lived in the sea, died or been killed and dropped to the ocean floor, where layers of sediment built up on top of them over many centuries. The pressure of the rock building up in layers over time caused the body of the creature to change and the remains became fossilised and mineralised by the surrounding material.

Types of fossils

Ammonites were marine creatures with a spiral-shaped shell. The fossilised remains of their shells are common and often found on beaches. They are around 65 million years old. One of the largest ever collected was over 2 metres in diameter.

Trilobites lived in large groups, so where one fossil is found, there may well be more. There are lots of different trilobites, with different shaped heads or tails. Trilobite fossils are some of the oldest, living about 540 million years ago.

Clams and oysters look very similar to those seen today. They are sometimes found with two shells still joined together, or as single shells. Most clams and oysters live in the sea. If they are found inland, then the location must have been under the sea many millions of years ago.

Corals look like plants, but are actually made up of tiny animals that live together in colonies. They grow in warm, shallow seas and form big reefs. Some coral fossils are more than 400 million years old.

Living **sea urchins** have a round shell covered in spines. Fossilised sea urchins usually show evidence of the body only, as the spines fall off after it dies. **Starfish** fossils are rare, because they are very fragile and break easily.

Fossil remains of different kinds of **dinosaurs**, such as bones, teeth, footprints and faeces, can reveal a lot about where and how they lived. They were living around the same time as ammonites, about 65 million years ago.

Common misconceptions:

Rocks

Children are not required to learn the terms sedimentary, igneous and metamorphic in the context of how rocks are formed.

Children may not recognise:

- that 'stones' and 'pebbles' are small pieces of rock
- that the word 'stone' is sometimes used instead of 'rock'
- that rock sits below everything on the Earth and is always there below the observable surface – even though it cannot be seen.

Encourage children to use the term 'absorb' rather than 'soak up' or 'take in' in the context of permeability activity.

Big Cat book links

Top Dinosaurs Maoliosa Kelly 978-0-00-718571-9 Band 4 Blue	All the top dinosaur facts, from how to say their name, to their size and special features.
Living Dinosaurs Jonathan and Angela Scott 978-0-00-718673-0 Band 8 Purple	Ever wondered why the dinosaurs didn't survive?
Animal Ancestors John Hughes 978-0-00-718625-9 Band 9 Gold	Can you imagine a world with giant earth moles and whales that could walk?
China's Terracotta Army Juliet Kerrigan 978-0-00-746203-2 Band 9 Gold	Learn about the army of over 6,00 terracotta warriors in the tomb of the first Emperor of China.
Fossils Dr Andrew Ross 978-0-00-733619-7 Band 10 White	Explore the extraordinary world of fossils; find out how they are formed where to find them and how to identify them.
What happened to the Dinosaurs? Jon Hughes 978-0-00-723084-6 Band 13 Topaz	The mystery of why the dinosaurs disappeared from earth is still to be solved.