Holly Park - Science Topic: Rocks

Enquiry: What are rocks and soils like? | **Year: 3** | **Strand: Chemistry**

Prior Knowledge

- Distinguish between an object and the material from which it is made. (Y1 - Everyday materials)
- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials)
- Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials)
- Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)
- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)

Scientist Study

The role of Mary Anning in palaeontology and the discovery of fossils.

What will I know by the end of the unit? Substantive Knowledge

What are the different types of rocks?  	There are three types of rocks that are formed naturally. Igneous: When molten magma cools, igneous rocks are formed. This either cools and forms rocks under the earth's surface, or flows out of erupting volcanoes as lava and may mix with other minerals. Examples include granite and basalt. This type of rock is strong, hardwearing and non-porous. Sedimentary: Sometimes, little pieces of rocks that have been weathered can be found at the bottom of lakes, seas and rivers This is called sediment. Over millions of years, layers of this sediment builds up forming sedimentary rocks. Examples include limestone and chalk. Sedimentary rocks are porous and can easily be worn down . Metamorphic: When some igneous and sedimentary rocks are heated and squeezed (pressured), they form metamorphic rocks. Examples include slate and marble. Metamorphic rocks are strong Bricks and concrete are not rocks because they are man-made
What are fossils? 	Fossils are the remains of prehistoric life. They are usually formed when a living thing (plant or animal) dies and the body is covered up or buried by sediment over tens of thousands of years. Some fossils are formed when the tough bones and teeth in animals, and the woody part of plants are preserved . Other fossils are made from imprints in surrounding sedimentary rock such as footprints or imprints from shells. Fossils tell us about the Earth and about life that existed hundreds of thousands and millions of years ago.
What is soil? 	Soil is made from pieces of rock, minerals, decaying plants and water. When rock is broken down into small grains, soil is formed. There are layers of soil: above the soil is leaf litter and recently decaying plants. As the soil becomes deeper, the rock grains become larger until bedrock is reached.

Vocabulary

igneous	rocks that are formed by volcanic action or intense heat
sediment	solid material that settles at the bottom of a liquid, especially earth and pieces of rock that have been carried along and then left somewhere by water, ice, or wind
metamorphic	rocks that have had their original structure changed by pressure and heat
volcano	a mountain from which hot melted rock, gas, steam, and ash from inside the Earth sometimes burst.
weathered	affected by the weather
soil	the substance on the surface of the earth in which plants grow
properties	the qualities or features that belong to something and make it recognisable
prehistoric	the time in history before any information was written down
porous	Something that is porous has many small holes in it, which water and air can pass through
permeable	if a substance is permeable, something such as water or gas can pass through it or soak into it.
nutrients	substances that help plants and animals to grow
mineral	something that is formed naturally in rocks and in the earth.
magma	molten rock that is formed in very hot conditions inside the earth
Leaf litter	decaying leaves
decaying	gradually being destroyed by a natural process
bedrock	the solid rock in the ground which supports all the soil above it

Names of different types of rock - marble, chalk, granite, sandstone, slate, chalk

Learning Objectives

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock.
- Recognise that soils are made from rocks and organic matter.

Possible Activities

- Explore the types of rocks you can find in the local environment. Explain why rocks are used for different purposes based on their properties.
- Research the different living things whose fossils are found.
- Explore the different kinds of soils, including those you can find in the local environment.
- Compare different types of soils by saying what is similar and what is different using scientific vocabulary.
- Investigate what happens when rocks are rubbed together.
- Investigate what happens to rocks when they are in water.
- Sort different types of rocks based on how rough or smooth they are, whether they have grains or crystals, how permeable they are, how easily they can break down, how strong they are and what they look like
- Observe rocks closely.
- Classify rocks in a range of ways, based on their appearance.
- Devise a test to investigate the hardness of a range of rocks.
- Devise a test to investigate how much water different rocks absorb.
- Observe how rocks change over time e.g. gravestones or old building.
- Research using secondary sources how fossils are formed.
- Observe soils closely.
- Classify soils in a range of ways based on their appearance.
- Devise a test to investigate the water retention of soils.
- Observe how soil can be separated through sedimentation.
- Research the work of Mary Anning.

Possible Evidence & Assessment opportunity

- Can name some types of rock and give physical features of each
- Can explain how a fossil is formed
- Can explain that soils are made from rocks and also contain living/dead matter
- Can classify rocks in a range of different ways, using appropriate vocabulary
- Can devise tests to explore the properties of rocks and use data to rank the rocks
- Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily
- Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc.
- Can identify plant/animal matter and rocks in samples of soil
- Can devise a test to explore the water retention of soils

Texts

The Pebble in My Pocket (Meredith Hooper)
Stone Girl, Bone Girl (Laurence Anholt)
The Street Beneath My Feet (Charlotte Guillain & Yuval Zommer)

Possible Misconceptions

Some children may think:

- rocks are all hard in nature
- rock-like, man-made substances such as concrete or brick are rocks
- materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural'
- certain found artefacts, like old bits of pottery or coins, are fossils
- a fossil is an actual piece of the extinct animal or plant soil and compost are the same thing.

Future Learning

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance)
- The composition of the Earth. (KS3)
- The structure of the Earth. (KS3)
- The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. (KS3)

Questions

What rock is best for a kitchen chopping board?
What might be the issues with various materials and what they have to withstand?
What types of rocks are there?
How do rocks change?
What would grow best in your soil?
Why do you think worms are important to the creation of soil?
How can we use composting to make our own soil?
Does it currently look like real soil?
How long do you think this process will take and why?
How are fossils created?
Why do fossils help us find out about historical events?
If you could fossilise an object what would it be?

Working Scientifically (Disciplinary Knowledge)

Set up simple practical enquiries, comparative and fair tests
Ask relevant questions and use different types of scientific enquiries to answer them
Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
Gather, record, classify and present data in a variety of ways to help in answering questions drawings, labelled diagrams, keys and child constructed bar charts and tables
Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
Group information according to common factors
Use research to find out a range of things
Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
Use straightforward scientific evidence to answer questions or to support findings