

What I have already learnt

Properties of Materials (Year 3 & 4): Knowledge of different materials (wood, metal, plastic) and their properties (hardness, flexibility, transparency). Understanding of basic properties of rocks and soils, including their formation.

Types of Rocks (Year 4): Types of rocks (igneous, sedimentary, metamorphic) and their formation processes. Introduction to the rock cycle and basic fossil knowledge.

Scientific Investigation (Year 4): Skills in observing, classifying, and conducting simple experiments to investigate rock properties.

What I will have learnt by the end of this unit

- I will have a comprehensive understanding of the rock cycle and how rocks transform from one type to another.
- I will be able to describe the different types of rocks and their characteristics, including how they are formed and used.
- I will understand the processes involved in fossilization and how fossils provide evidence of past life and environments.
- I will know the formation and properties of different types of soil and how soil supports life and affects the environment.
- I will be able to conduct experiments to test rock properties such as hardness and permeability, and apply my findings to real-world scenarios.

What I will have learnt by the end of my Key Stage

- I will have an in-depth knowledge of the Earth's materials, including rocks, soils, and fossils.
- I will understand how geological processes shape the Earth's surface and how rocks and soils interact within ecosystems.
- I will be able to explain the rock cycle in detail and how different types of rocks are interconnected through geological processes.
- I will have developed skills to investigate and analyse the properties of rocks and soils, linking scientific inquiry with practical applications.

Subject Knowledge Organiser

Science - Rocks

Year 5

Key Knowledge

Rock Cycle: Understanding of the continuous process that transforms rocks from one type to another, including the processes of melting, cooling, erosion, and sedimentation.

Igneous Rocks: Formed from cooled magma or lava. Includes intrusive (e.g., granite) and extrusive (e.g., basalt) rocks.

Sedimentary Rocks: Created from layers of sediment. Includes clastic (e.g., sandstone), chemical (e.g., limestone), and organic (e.g., coal) rocks.

Metamorphic Rocks: Formed under heat and pressure from pre-existing rocks. Includes foliated (e.g., schist) and non-foliated (e.g., marble) rocks.

Fossils: How fossils are formed, including the processes of fossilization and the types of fossils (e.g., body fossils, trace fossils). Understanding their role in studying Earth's history.

Soil Formation: Detailed understanding of how soil is formed from the weathering of rocks and the addition of organic matter. Different soil types (clay, sand, loam) and their properties.

Rock Properties: Investigation of various rock properties including hardness (using Mohs scale), permeability (how easily water passes through), and texture.

Wider opportunities

Diversity and Cultural Capital

Geological Exploration: Opportunities to visit quarries, geological sites, or natural history museums to see rocks and fossils up close.

Cultural Uses of Rocks: Learning about the use of rocks in historical and contemporary cultures for construction, art, and tools (e.g., Incan stonework, ancient Egyptian pyramids).

Environmental Impact: Understanding the role of rocks and soils in agriculture, construction, and conservation, and their impact on the environment.

Scientific Careers: Introduction to careers in geology, palaeontology, environmental science, and archaeology.

My Skills and Knowledge that I may use from other subjects

Maths:

- Measuring and comparing the physical properties of rocks and soils (e.g., using scales for hardness, measuring permeability rates).
- Recording and analysing data in charts, graphs, and tables.

Geography:

- Understanding how rock formations influence landscapes and natural features like mountains, valleys, and rivers.
- Learning about the impact of weathering and erosion on landforms.

History:

- Exploring the historical use of rocks in construction and tools, and how ancient civilizations have impacted and utilized geological resources.

Art and Design:

- Creating artistic representations of rock formations, fossils, and geological features.
- Designing projects that use rock and soil textures for artistic or practical purposes.

English:

- Writing detailed reports and explanations about rock and soil investigations.
- Using scientific vocabulary accurately in written and verbal communications.

Computing:

- Researching rocks, fossils, and soil types using digital resources.
- Creating digital presentations or reports based on scientific investigations and findings.

Key Skills I will learn/use

Scientific Inquiry: Designing and conducting experiments to investigate rock properties, such as hardness and permeability.

Observation and Classification: Detailed observation and classification of rocks and soils based on their physical and chemical properties.

Data Analysis: Recording, analysing, and interpreting data from experiments and field observations.

Communication: Presenting findings and explaining scientific concepts clearly using appropriate terminology.

Critical Thinking: Evaluating evidence and drawing conclusions about the formation and use of rocks and soils.

Recall and Remember

What are the three main types of rocks in the rock cycle?

Igneous, sedimentary, metamorphic.

How do igneous rocks form, and what are some examples?

Formed from cooled magma or lava; examples include granite and basalt.

What processes are involved in the formation of sedimentary rocks?

Deposition, compression, and cementation of sediment layers.

How are metamorphic rocks formed, and what are some examples?

Formed from existing rocks subjected to heat and pressure; examples include marble and schist.

What are fossils, and how do they form?

Remains or traces of ancient organisms preserved in rock through fossilization.

What is the Mohs scale used for?

Measuring the hardness of minerals and rocks.

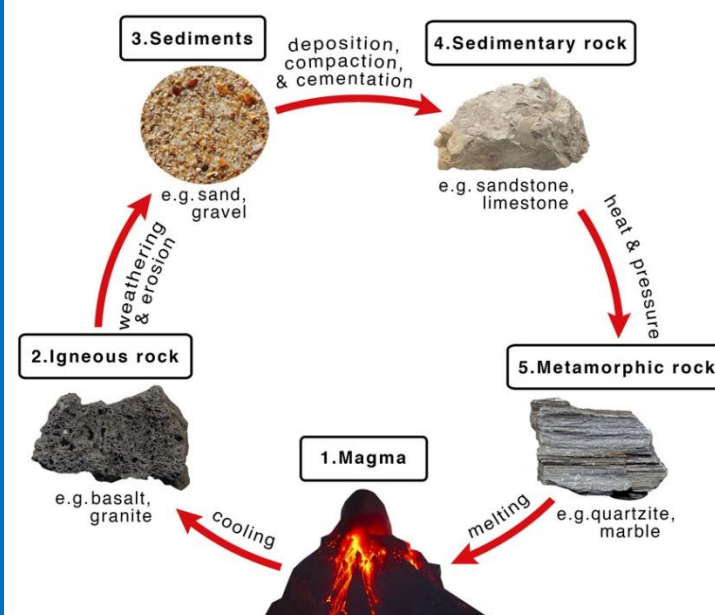
How is soil formed, and what are its main components?

Formed from weathered rock and organic matter; components include rock particles, organic matter, air, and water.

What does permeability refer to in the context of rocks and soils?

The ability of a material to allow fluids to pass through it.

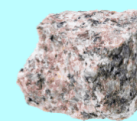
Steps of the Rock Cycle



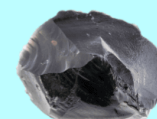
Types of Rocks

Igneous

- Forms from magma or lava solidification
- Hard, no layers



Intrusive
slow magma cooling



Extrusive
rapid lava cooling

Sedimentary

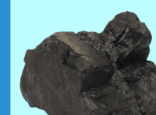
- Forms from sediment compaction
- Crumbly, layered



Clastic
compacted broken rocks



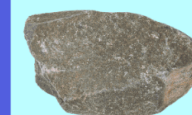
Chemical
compacted dissolved minerals



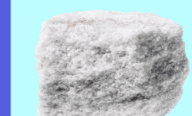
Organic
compacted biogenic matter

Metamorphic

- Forms by transformation of other rocks
- Relatively hard, may or may not have layers



Foliated
has layers

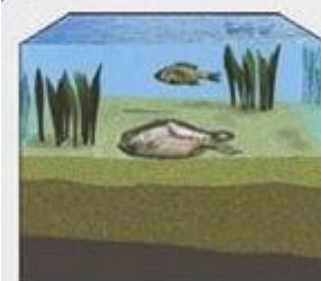


Non-Foliated
no layers

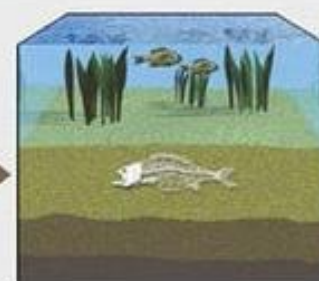
Body fossils show us what a plant or animal looked like. They are the fossilised remains of an animal or plant, like bones, shells and leaves.



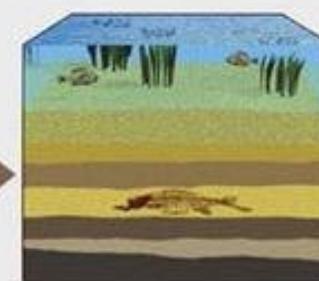
FOSSIL FORMATION



The fish dies and sinks to the sea floor. Other animals eat the flesh, leaving only the skeleton.



A layer of mud, silt and sand cover the skeleton. This helps to preserve the skeleton. It doesn't decay as quickly because it is not getting as much oxygen.



Over thousands of years, the mud is compressed into sedimentary rock. The skeleton dissolves, leaving a mould. This mould is filled by minerals which form a new stony substance.



Millions of years later, the fossil is brought to the surface by the movement of the Earth's crust. Now it can be discovered!

Key Scientific Concepts

Biology

Chemistry

Physics

Scientific enquiry

Science for the future

Key Vocabulary

Rock Cycle: The process of transformation of rocks through geological processes.

Igneous Rock: Rock formed from cooled magma or lava.

Sedimentary Rock: Rock formed from compressed layers of sediment.

Metamorphic Rock: Rock formed from pre-existing rocks subjected to heat and pressure.

Fossil: Remains or traces of ancient life preserved in rock.

Permeability: Ability of a material to allow fluids to pass through it.

Hardness: Resistance of a material to being scratched, measured on Mohs scale.

Soil Horizons: Layers of soil, including topsoil, subsoil, and bedrock.

Sedimentation: The process of depositing sediment in layers.

Weathering: The breakdown of rocks into smaller pieces.