

NC Purpose of Study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Intent	Implementation	Impact
At Broadway Junior School we believe that a high quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational 'Big Ideas', pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying process skills. The staff here ensure that all children are exposed to high quality teaching and learning experiences, which allow children to explore their outdoor environment and locality, thus developing their scientific enquiry and investigative skills. They are immersed in scientific vocabulary, which aids children's knowledge and understanding not only of the topic they are studying, but of the world around them. We intend to provide all children regardless of ethnic origin, gender, class, aptitude or disability, with a broad and balanced science curriculum.	Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following: Science will be taught in planned and arranged blocks by the class teacher, to have a subject specific approach. This is a strategy to enable the achievement of a greater depth of knowledge. Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning, so that all children keep up Teachers build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence. Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.	The impact and measure of this is to ensure children not only acquire the appropriate age related knowledge linked to the science curriculum, but also skills which equip them to progress from their starting points, and within their everyday lives. All children will have: - A wider variety of skills linked to both scientific knowledge and understanding, and scientific enquiry/investigative skills - A richer vocabulary which will enable to articulate their understanding of taught concepts - High aspirations, which will see them through to further study, work and a successful adult life.

Key Vocabulary

Rock Stone Mineral Geology Natural Man-made Appearance Texture Hardness Permeable Durable Sedimentary rock Igneous rock Metamorphic rock Fossil Fossilisation Soil Organic matter Sand Clay Silt Humus

Knowledge	Skills
- Know that rocks are natural materials made from minerals. - Identify and compare the three main types of rock: sedimentary, igneous and metamorphic. - Understand that rocks have different properties that make them suitable for different uses. - Know that fossils are formed from the remains of living things preserved in rocks. - Understand that fossils provide evidence about living things that existed millions of years ago. - Recognise that different animals and plants leave different fossil evidence. - Know that soils are made from rocks and organic matter. - Understand that soils have different compositions and properties.	- Observe and classify rocks based on their properties. - Use simple tests to compare rocks. - Record observations in tables and classification charts. - Identify patterns and similarities between rocks. - Plan and carry out comparative investigations. - Use evidence to justify decisions. - Report scientific findings using appropriate vocabulary. - Investigate soil samples and separate components.

Enrichment Opportunities

- Rock hunt around the school grounds.
- Create a fossil using clay and natural objects.
- Create a rock museum with labelled samples.

Learning Objectives/End Points

Pupils will be able to:

- Identify and describe the three main types of rock.
- Compare rocks based on their observable properties.
- Explain why different rocks are used for different purposes.
- Explain how fossils are formed.
- Describe how fossils provide evidence of past life.
- Identify different types of soil and explain their composition.
- Use scientific enquiry skills to investigate and communicate findings.

Key Questions/Learning Objectives/End Points

What are the three main types of rock and how are they different? Identify sedimentary, igneous and metamorphic rocks. Describe differences in appearance, texture and formation.	How can we classify and compare rocks? Use observations and simple tests to sort rocks by their properties. Explain why rocks can be grouped in different ways.	Which rock is best for a new paved area in our school? (TAPS Focused Assessment) Plan and carry out an investigation to compare rock suitability. Use evidence to justify a recommendation.	How are fossils formed? Explain how fossils are created from the remains of living things. Understand that fossils provide evidence of life in the past.	What can fossils tell us about animals and plants from the past? Identify how fossils provide information about extinct organisms and environments.	What is soil made from? Investigate the different components of soil. Explain how soil is formed from rock and organic matter.
Investigating the three types of rock – Explore how sedimentary, igneous and metamorphic rocks are formed and identify their features. Observe a range of rock samples using hand lenses. Compare colour, texture, layers and appearance. Sort rocks into the three main groups using evidence.	How can we sort and classify rocks? – Use observable properties to group rocks. Investigate and classify rocks using a sorting table. Test properties such as hardness, permeability and texture. Explain choices using scientific vocabulary.	Children plan and carry out an investigation to compare rocks for a practical purpose. They test properties such as durability, strength and water resistance, record results and write a scientific recommendation supported by evidence.	How are fossils formed? – Explore fossilisation and how fossils provide evidence of life in the past. Examine fossil examples and explain how they were formed.	Animals and their fossils – Investigate what fossils tell us about animals that lived in the past. Compare different animal fossils and make links between fossil evidence and extinct animals or ancient environments.	Investigating soils and soil composition – Explore what soil is made from and compare different soils. Separate soil samples to identify components such as stones, sand, clay and organic matter. Compare soils and explain how composition affects properties.

Substantive Knowledge

- Rocks are natural materials made from one or more minerals.
- Rocks can be grouped into three main types: sedimentary, igneous and metamorphic.
- Igneous rocks form when molten rock cools and solidifies.
- Sedimentary rocks form from layers of sediment that are compressed over time.
- Metamorphic rocks form when existing rocks are changed by heat and pressure.
- Rocks have different properties, including hardness, texture, permeability and durability.

- The properties of rocks determine how they are used, for example in buildings and paving.
- Fossils are the preserved remains or traces of living things from the past.
- Fossils form when layers of sediment cover the remains of plants or animals and preserve evidence over millions of years.
- Fossils can show what living things existed in the past and provide evidence about ancient environments.
- Different animals leave different types of fossil evidence depending on their body structure and how they lived.

Careers

Linking Curriculum Learning to Careers

Discuss how the skills developed in this unit are used in a range of careers, including:

- Geologist
- Palaeontologist
- Archaeologist
- Civil Engineer
- Architect
- Construction Worker
- Environmental Scientist
- Soil Scientist
- Mining Engineer
- Museum Curator

Transferable skills such as Curiosity Observation Investigation Problem solving Teamwork Communication Research Organisation Attention to detail Classification Data handling Critical thinking Decision making Creativity Resilience Responsibility Confidence Recording and Resilience

Learning from Career and Labour Market Information

- Children explore careers connected to rocks and the Earth, including geologist, archaeologist, palaeontologist, construction worker, civil engineer, architect, miner, environmental scientist and soil scientist. They learn that rocks and soils are important resources used in construction, engineering, farming and environmental work.
Addressing the Needs of Each Pupil
- Practical investigations allow all children to explore their interests and strengths. Children can take on different roles, such as investigator, observer, recorder, tester or presenter, helping them recognise that different skills are valuable in the world of work.
- **Linking Curriculum Learning to Careers**
Children learn how scientific knowledge about rocks is used in real life. Engineers and builders choose suitable materials for construction, geologists investigate rocks and minerals, archaeologists use rocks and fossils to learn about the past, and soil scientists investigate soil for farming and the environment.
Encounters with Employers and Employees
- Where possible, children could meet or hear from a geologist, builder, engineer, archaeologist or environmental scientist. Visitors could explain how they use scientific skills, observations and evidence in their jobs.
Experiences of Workplaces
- Enrichment opportunities could include visiting a museum, construction site, quarry, local geological feature or university science department. Children can see how rocks, fossils and soils are investigated and used in different workplaces.

Careers Questions

- Who works with rocks and why are their jobs important?
- How do builders and engineers choose the best materials?
- What can a geologist learn from a rock?
- How do fossils help palaeontologists learn about the past?
- Why do farmers and scientists need to understand soil?
- What skills do I use when I investigate and test materials?
- Could I use my science skills in a future job?