

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

Evolution Inheritance Adaptation Variation Species Offspring Characteristics Genes Natural selection Survival Environment Habitat Adaptation trait Advantage Disadvantage Selective breeding Fossil Extinct Ancestor Evidence Mutation

Knowledge	Skills
- Know that living things change over time through evolution. - Understand that evolution occurs because individuals within a species show variation. - Know that adaptations help organisms survive in their environments. - Understand that natural selection occurs when organisms with advantageous characteristics are more likely to survive and reproduce. - Recognise that offspring inherit characteristics from their parents. - Understand that humans can influence the characteristics of plants and animals through selective breeding. - Know that fossils provide evidence for how living things have changed over time. - Understand that adaptations develop over many generations. - Recognise that scientists use evidence to explain how species have evolved.	- Observe and compare characteristics of organisms. - Use models and simulations to explain scientific concepts. - Identify patterns in data and make predictions. - Plan and carry out fair tests. - Record and analyse results. - Explain how evidence supports scientific ideas. - Evaluate investigations and suggest improvements. - Use scientific vocabulary to communicate explanations.

Enrichment Opportunities

- Investigate examples of evolution such as Darwin's finches and the peppered moth.
- Explore animal adaptations through a local habitat study.
- Create "designer species" showing adaptations for survival.

Learning Objectives/End Points

Pupils will be able to:

- Explain that evolution is a change in inherited characteristics over generations.
- Describe how natural selection leads to evolution.
- Explain how adaptations help organisms survive.
- Explain how offspring inherit characteristics from their parents.
- Describe how selective breeding is used by humans.
- Use fossils as evidence for evolution.
- Plan and evaluate investigations linked to adaptation and survival.

Key Questions/Learning Objectives/End Points

How do living things change over time? Explore how organisms evolve through natural selection. Explain that advantageous characteristics increase survival chances.	How are characteristics passed from parents to offspring? Understand that offspring inherit features from their parents. Explain how variation occurs within a species.	How do adaptations help organisms survive? Identify adaptive traits and explain their survival advantages. Link adaptations to specific environments.	How can we investigate how adaptations affect survival? (TAPS Focused Assessment) Plan and carry out a fair test using bird beaks as a model for adaptation. Use evidence to explain how different adaptations provide advantages.	What can fossils tell us about evolution? Explain how fossils provide evidence of changes in living things over time.	How can scientists investigate properties that help survival? (TAPS Investigation) Plan and evaluate a comparative investigation into egg strength and explain how structures can provide advantages.
Natural Selection – How do species change over time? Explore how environmental changes can affect survival. Peppered Moth Evolution Game: Children model natural selection by investigating how moth colour affects survival in different environments. Discuss variation, predators and survival advantages.	Mr Men Activity: Children select desirable characteristics and model how selective breeding changes populations over generations. Discuss inherited characteristics and variation. Create their own MR Men characters with inherited characteristics.	Adaptation and Adaptive Traits – Explore how adaptations help organisms survive in different environments. Investigate examples of animal adaptations. Children design an organism with adaptations suited to a particular habitat and explain how the traits provide advantages.	TAPS Focused Assessment – Bird Beak Investigation Children investigate the question: "Which bird beak is best adapted for collecting different types of food?" They model different beak shapes, collect data, identify variables, compare results and explain how adaptations help survival.	Fossil Formation and Evidence for Evolution Model fossil formation and investigate how fossils provide evidence of organisms that lived in the past. Compare fossils with modern species and discuss evolutionary change.	TAPS Investigation – Egg Strength and Adaptation Children investigate: "How does the shape or structure of an egg affect its strength?" They plan a fair test, measure results, identify patterns and evaluate how structural adaptations can provide survival advantages.

Substantive Knowledge

- Evolution is the process by which living things change over generations.
- Individual organisms within a species have variation in their characteristics.
- Some variations give organisms an advantage in their environment.

- Natural selection occurs when organisms with beneficial adaptations are more likely to survive and reproduce.
- Over many generations, advantageous characteristics become more common within a population.
- The peppered moth is an example of natural selection, where colour variations affected survival in different environments.
- Adaptations are characteristics that help organisms survive in their habitats.
- Adaptations can be structural, behavioural or functional.
- Offspring inherit characteristics from their parents through inherited information.
- Humans can use selective breeding to increase desirable characteristics in plants and animals.
- Fossils are evidence of living things that existed millions of years ago.
- Fossils show that species have changed over time and that some organisms have become extinct.
- Scientists use evidence from fossils, observations and investigations to explain evolution.
- The features of organisms can provide advantages that improve survival.

Careers

Linking Curriculum Learning to Careers

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

- Scientific Researcher
- Data Scientist
- Biological Data Analyst
- Research Technician
- Laboratory Scientist
- Statistician
- Scientific Illustrator
- Science Journalist
- Environmental Scientist
- Environmental Consultant
- Conservation Scientist
- Habitat Management Officer
- Nature Reserve Warden
- Countryside Ranger
- Biodiversity Scientist
- Sustainability Scientist
- Archaeologist
- Museum Scientist
- Museum Curator
- Biologist

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

Learning from Career and Labour Market Information

- Introduce pupils to careers that investigate how living things change and survive, including evolutionary biologists, geneticists, palaeontologists, ecologists, zoologists, conservation scientists, archaeologists and laboratory researchers.
Addressing the Needs of Each Pupil
- Provide varied opportunities through practical investigations, modelling, games, fieldwork, research, discussion and creative design. Highlight different strengths including scientific thinking, observation, problem-solving, creativity, communication, mathematical reasoning and teamwork.
- **Linking Curriculum Learning to Careers**
Connect inheritance and variation to geneticists; adaptation and natural selection to evolutionary biologists and ecologists; fossils to palaeontologists and geologists; animal adaptations to zoologists and conservationists; and selective breeding to agricultural scientists and animal breeders.
Encounters with Employers and Employees
- Where possible, invite a biologist, zoologist, ecologist, palaeontologist, conservationist, geneticist or agricultural scientist to discuss their work and how they use evidence to understand living things.
Experiences of Workplaces
- Explore museums, fossil collections, universities, laboratories, wildlife centres, nature reserves, veterinary practices and conservation organisations through visits, photographs, virtual tours or workplace videos.