Broadway Junior School

Subject: Science | Topic: Electricity | Year: 6 | Term: Spring 1

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
Electricity Electrical circuit Circuit diagram Component Cell Battery Current Voltage Power Conductor Insulator Switch Wire Bulb Buzzer Motor Renewable energy Non-renewable energy Solar power Wind power Hydroelectric power Fossil fuels Resistance

Knowledge	Skills
• Know that electricity flows around a complete circuit. • Understand that electrical components have different functions. • Recognise the symbols used to represent components in circuit diagrams. • Understand that cells provide energy to circuits. • Know that increasing the number of cells can affect the brightness of bulbs and the power of components. • Understand that circuits will not work if there is a break or fault. • Identify common circuit problems and suggest solutions. • Know that some materials are electrical conductors and others are insulators. • Understand that renewable energy sources can generate electricity without using finite resources.	• Construct and interpret electrical circuits. • Use recognised circuit symbols to draw diagrams. • Predict whether circuits will work. • Systematically test electrical components. • Identify and correct faults in circuits. • Plan and carry out fair tests. • Measure and record observations. • Analyse results and identify patterns. • Explain findings using scientific vocabulary.

Broadway Junior School

Subject: Science | Topic: Electricity | Year: 6 | Term: Spring 1

Enrichment Opportunities
• Design and build electrical games. • Investigate electricity use around school. • Research renewable energy projects.

Learning Objectives/End Points
Pupils will be able to: • Explain how electrical circuits work. • Identify and use common electrical components. • Draw and interpret circuit diagrams using symbols. • Explain how cells affect circuit components. • Identify faults in circuits and suggest improvements. • Investigate factors affecting bulb brightness. • Explain how renewable energy sources generate electricity. • Plan, carry out and evaluate electrical investigations.

Key Questions/Learning Objectives/End Points					
How do electrical components work together in a circuit? Identify different electrical components and their functions. Explain that a complete circuit is needed for electricity to flow.	How do cells affect electrical circuits? Investigate the effect of cells on components. Explain how increasing cells can increase the energy available in a circuit.	How can we identify and fix problems in circuits? Recognise common circuit faults. Use logical thinking to repair circuits.	What affects how bright a bulb is? (TAPS Focused Assessment) Plan and carry out a fair test investigating bulb brightness. Identify variables and use evidence to explain results.	How is electricity generated from renewable sources? Explore different renewable energy sources. Compare advantages and disadvantages of renewable electricity generation.	How can conductive materials be used to create circuits? (TAPS Investigation) Design and test circuits using conductive dough. Apply understanding of circuits, conductors and components.
Electrical Components – What are the parts of a circuit? Explore different components and their functions. Build simple circuits using cells, wires, bulbs, buzzers, motors and switches. Identify the role of each component and represent circuits using symbols.	Cells – How do cells affect circuits? Investigate how the number of cells changes how components work. Build circuits with different numbers of cells and compare bulb brightness or motor speed. Record observations and identify patterns.	Spotting Errors in Circuits – Develop problem-solving skills by identifying faults. Investigate a range of faulty circuits. Predict why they do not work, identify errors and make repairs. Draw corrected circuit diagrams.	TAPS Focused Assessment – Bulb Brightness Investigation Children investigate: "What affects the brightness of a bulb?" They plan a fair test, decide what to measure, control variables, collect results, identify patterns and explain conclusions using evidence.	Renewable Electricity – How can we generate electricity sustainably? Research renewable energy sources including solar, wind and hydroelectric power. Compare methods and discuss advantages and disadvantages.	TAPS Investigation – Conductive Dough Circuits Children investigate how conductive dough can be used to create electrical circuits. They design, build and test circuits, make improvements and explain how electricity flows through their models.

Substantive Knowledge
• Electricity is a form of energy that can be transferred through circuits. • A circuit must be complete for electrical current to flow. • Electrical components have different roles within a circuit. • Common components include cells, batteries, bulbs, buzzers, motors and switches. • Circuit diagrams use standard symbols to represent electrical components. • A cell provides electrical energy to a circuit.

Broadway Junior School

Subject: Science | Topic: Electricity | Year: 6 | Term: Spring 1

- Batteries are made from more than one cell connected together.
- The number of cells in a circuit can affect how components work.
- A switch controls whether a circuit is complete or broken.
- Bulbs, buzzers and motors convert electrical energy into other forms of energy.
- Materials can be classified as conductors or insulators.
- Metals are usually good conductors of electricity.
- Plastic, rubber and wood are usually good insulators.
- Faults in circuits can occur when there are breaks, incorrect connections or unsuitable components.
- Renewable energy sources include solar, wind and hydroelectric power.
- Renewable energy sources are replenished naturally and reduce reliance on fossil fuels.
- Scientific investigations require fair testing, accurate observations and evidence-based conclusions.