



St James' Church of England Primary School

Design & Technology Overview Sheet



Year 4 – Electrical Systems: Torches



Rationale: In this topic, children apply their scientific understanding of electrical circuits to create a torch made from easily available materials and objects. They will also design and evaluate their product against set design criteria

Pre-unit task: Watch the pupil video – Electrical Products.

Attention Grabber: What is electricity? Ask the children what they think electricity is. Define electricity as a type of energy used to power electrical items. Explain that: Electricity occurs naturally in lightning. It took a long time for people to discover how to capture electricity and use it for electrical items such as hairdryers and computers. Until they discovered how to capture it, people lived without any electricity.

Learning Objectives:

- To learn about electrical items and how they work
- To analyse and evaluate electrical products
- To design a product to fit a set of specific user needs
- To make and evaluate a torch

Overview:

Lesson 1: Electrical Products -Pupils explore the difference between 'electrical' and 'electronic' and revisit how to create a simple circuit
 Lesson 2: Evaluating Torches -Pupils evaluate a range of different torches and identify the features of a torch: housing, reflector, circuit and switch.
 Lesson 3: Torch design -Pupils create a torch design, building on their understanding from and incorporating features they have identified in previous lessons.
 Lesson 4: Torch Assembly -The children build the circuit and housing for their torches, closely following their designs from the previous lesson.

Cross Curricular Links

Science - Pupils should be taught to: Identify common appliances that run on electricity-Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers-Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery-Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit-Recognise some common conductors and insulators, and associate metals with being good conductors-Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.

Resources

Have ready • Pupil video: Torch assembly • Each pupil's torch design and user profile from 'Kapow Primary, Design & Technology, Year 4 Electrical systems, Lesson 3: Torch design' • Electric circuit sets – wires, bulbs, bulb holders, batteries and battery holders buzzer and motor (one set per pupil) • Recycled materials to make the body of the torch (for example, plastic bottles, packaging, cardboard) • Reflective material (for example, foil) • Card/cardboard • Scissors • Split pins (two per pupil) • Paper clips (one per pupil) • Link: 'Kapow Primary, Design & Technology, Year 4, Electrical systems, Lesson 1: Electrical products' for additional support if needed Print • Activity: Torch circuit diagrams (see Classroom resources) – one between four pupils • Activity: Final torch evaluations (see Classroom resources) – one between two pupils

Impact/Assessment

Most Children will: Identify electrical products and explain why they are useful as well as helping to make a working switch. Identify the features of a torch and how it works, as well as describing what makes a torch successful. Create suitable designs that fit the success criteria and their own design criteria. Create a functioning torch with a switch according to their design criteria.

More Able Children will: Identify the features of electrical products, make a working switch and suggest other ways this could be made, including mentioning conductors. Explain which features are important to all torches and which are tailored to the target audience as well as generating creative suggestions for how the components could be made. Apply the outcome of the evaluation task to improve their design and add special features specifically designed for their 'client'. Create a torch with special features to suit their 'client' and discuss how these components could be used in other products.