



Subject: DT
 Year group: 4
 Term: Spring
 Unit name: Electrical Systems – Simple circuits and switches

Prior Knowledge -

- Children can design a structure using a cube or cuboid shaped shell and can explain the user and purpose.
- Children can draw an annotated sketch of a shell structure and can label it with materials and strengthening solutions.
- Children can make a prototype of a shell structure using paper to practise joining techniques and strengthening solutions (laminating, ribbing, corrugating)
- Children can select from PVA glue, glue sticks and scissors to cut and join materials (card and cardboard). They can use card or paper straws to strengthen their structure.
- Children can state if their structure is suitable for the intended user and purpose. They can offer a way to improve their structure.
- Children can strengthen a structure using ribbing, corrugating or laminating and explain what this means.

Key Vocabulary series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, insulator, conductor, crocodile clip

Assessment for learning

Recapping prior knowledge- beginning of unit- what do children already know?
 Beginning of each lesson- focus on recall of previous learning (quick quizzes)

Respect

Do for other people the same things you want them to do for you.

Matthew 7:12

Integrity

An honest witness tells the truth.
 But a dishonest witness tells lies.

Proverbs 12:17

National curriculum:

- Investigate and analyse a range of existing products.
- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.
- To generate, develop, model and communicate their ideas through discussion, annotated sketches and cross-sectional.
- Select from and use a wider range of materials and components according to their functional properties and aesthetic qualities.
- To understand and use electrical systems in their products.
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.

Design Process

Investigative and Evaluative Activities (IEAs)

Focused Tasks (FTs)

Design, Make and Evaluate Assignment (DMEA)

<u>Key Learning (what pupils MUST know and remember)</u>	<u>Possible Outcomes</u>
<p>To name products that use electrical circuits – lights, torches, children’s toys.</p> <p>To design and draw an annotated sketch of an electrical circuit for a product, labelled with materials and components. (For example: a torch)</p> <p>To select from batteries, switches, foil, paper clips, buzzers, bulbs to create their product.</p> <p>To state if their electrical circuit and final product is suitable for the intended user and purpose. They can offer a way to improve their product.</p>	<ul style="list-style-type: none"> • siren for a toy vehicle • reading light • noise-making toy • illuminated sign • torches • table lamp • lighting for display • hands-free head lamp • buzzer for school office

Making secure connections

Connecting strips

Twist strands of wire together

Wrap wire around

Bulk holder – Bend wire around screw in direction of turning when tightening

Wrap over with insulating tape

Handmade switches

Paper fastener

Wire

Paper fastener

Loop wire around paper fastener

Wire

Foil on inside surface

Wire

Commercial switches

Push-to-break switch
The switch is off while the button is pushed, but returns to its 'on' position when button is released.

Push-to-make switch
When you push, the electricity flows through the circuit, but when you release it the circuit is broken and the switch is off.

Reed switch
Activated by a magnet – this closes the contacts and completes the circuit.

Toggle switch
Simple on/off switch

Standalone control box

When children are familiar with using electrical circuits they should be introduced to a simple standalone control box or an interface box. The box will replace their switches and battery, and children can program their product to work automatically.