



Electrical Systems

Simple Switches and Circuits

Y4

In this unit, we will design, make and evaluate a night light

Knowing More Remembering More:

Remembering previous learning

(In science learning)

What is electricity? Electricity is a way of moving energy to power appliances.

What is a circuit? A circuit is a closed path that energy can flow through. It can include bulbs, wires, switches, buzzers and cells connected in one loop. It must have a cell or battery.

How does a switch affect the circuit? A switch controls a circuit by opening and closing.

What is a conductor? A material that allows energy to flow through it, such as metals.

What is an insulator? A material that does not allow energy to flow through it, such as rubber, plastic or wood.

Skills

I will be able to:

Design:

- 4.1 Record ideas by drawing using annotated sketches
- 4.4 Propose realistic suggestions as to how I can achieve my design ideas.
- 4.5 Order the main stages of making

Make:

- 4.7 Explain their choice of materials according to functional properties and aesthetic qualities.
- 4.8 Select and use appropriate tools to measure, mark, cut and assemble with some accuracy.
- 4.9 Use a range of finishing techniques with some accuracy

Evaluate:

- 4.12 Research key individuals in D&T
- 4.13 Talk about my designs as they develop and identify what I like and do not like and say why.
- 4.14 Discuss how well the finished product meets the design criteria

Techniques:

Making secure connections

Connecting block



Bulb holder
Bend wire around screw in direction of turning when tightening



Twist strands of wire together



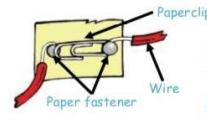
Wrap ends around



Insulating tape

Tape over

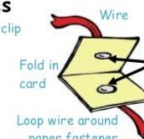
Handmade switches



Paperclip

Wire

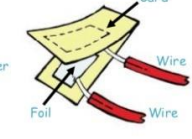
Paper fastener



Wire

Fold in card

Loop wire around paper fastener



Card

Wire

Foil

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.

Vocabulary

Technical vocabulary

Series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip, control, program, system, input device, output device

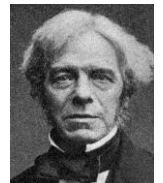
Process vocabulary

User, purpose, function, prototype, design criteria, innovative, appealing, design brief. Names of tools, equipment and materials used

Inspiring Individuals



Alessandro Volta



Michael Faraday

Knowing More Remembering More:

Knowing more in Y4

What is a Push-to-break switch? A push-to-break switch is turned off by pressing it.

What is a push-to-make switch? A push-to-make switch is a switch turned on by pressing it.

What is a toggle switch? A toggle switch is a switch operated when a lever is pressed.