

⚡ YR 3 D.T: ELECTRICAL SYSTEMS KNOWLEDGE ORGANISER ⚡

Overview

Simple Circuits

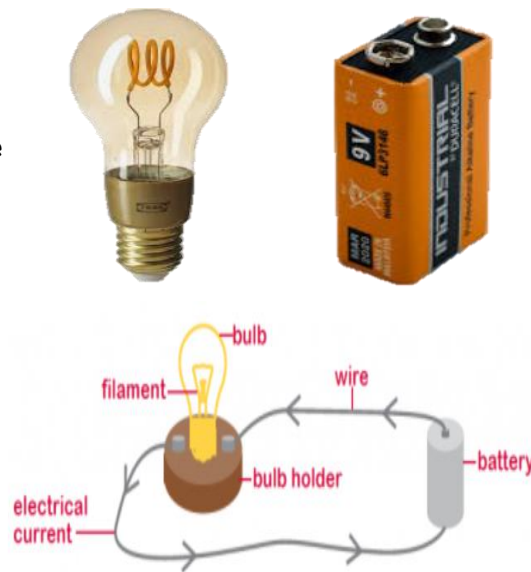
Electricity is a type of energy. It is used to power lots of things

-Electricity can flow through wires and cables. It can also be stored in batteries or cells.

-Electricity can flow through circuits. A circuit is the path the electric current follows. It must have no breaks in it (a closed circuit) for electricity to flow.

The electricity flowing through a circuit is known as the current. The current can be deliberately allowed to flow or broken using a switch.

-Some materials conduct electricity (conductors), whilst others do not (insulators).



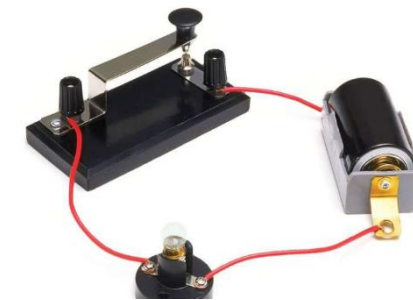
Designing

-You need to think about who your product is for – what is its purpose and who is going to use it?.

-Consider the materials that you will use – what type of input device (e.g. battery/cell), conductor (e.g. wires) and output device (e.g. bulb) are best for your purpose and audience?

-Consider whether to create a homemade switch or use a bought switch. Different switches work in different ways (see below) – think about which will be the most accessible/ appealing to your user.

As a part of the design process, you should be able to sketch and annotate different ideas. You should also be able to plan the main stages of making, using either a checklist, a storyboard, or a flowchart.



Key Vocabulary

Simple Circuit

Switch

Current

Short Circuit

Battery/ Cell

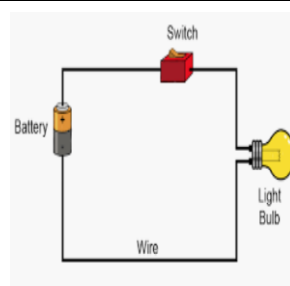
Switch

Input/ Output Device

Conductor

Insulator

Example of Battery-Powered Products



Simple Circuit

-A simple circuit is a closed loop of a conductor material, e.g. wire, in which electricity can travel in a current. In order for it to be a closed circuit, a power source e.g. battery/cell is needed (input device), and something that is powered by the electricity, e.g. light bulb (output device). A switch can be used to break the circuit (turning the output device off).



Torch

-A torch is one of the simplest forms of a battery-powered product. Torches are useful when the source of light needs to be portable, or when it needs to be operated by children. When the switch is pressed, a conductor material is positioned into a circuit, making it a closed circuit, thus powering the light bulb.



Handheld Fan

-Handheld fans are another example of a simple battery-powered electrical system in action. Once again, it is the perfect option for someone who needs to keep cool where there is no safe/ practical mains option available. Rather than powering a bulb, the closed circuit powers the propeller, which blows air.

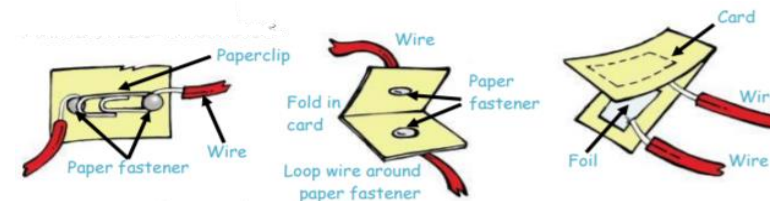
Making & Evaluating

Making Electrical Systems

- In order to ensure that your circuit is closed, it is hugely important that your connections are secure.
- Connecting blocks and bulb holders are useful pieces of equipment for ensuring this.
- Twisting strands of wire and taping wire are also useful strategies for creating a secure connection.

Switches

-Homemade switches can be made using this equipment:



-A range of bought switches can also be used. Reed switches operate by magnets, whereas toggle switches use a lever. Push-to-break switches are turned off by pressing them. Push-to-make switches are turned on by pressing them.

Evaluating

-How well does your electrical system work? Does it work as planned?
-Does it meet its purpose?

-What would your audience think about your product? What would they like about it? What would they not like?

-What type of switch did you choose to use? Why? What are the pros and cons of this type of switch?

What problems did you encounter? How did you fix them?

What could you still improve about your product? How would you do things differently next time?



Health and Safety

-Remove any jewellery and tie back long hair. Wear an apron.

-Do not put fingers or objects in outlets.

-Never use anything with a plug, wire or cord around water.

Keep metal objects away from electrical heat sources – e.g. knife away from toaster.

Never pull a plug out by its cord.

Follow electrical signs and guidance carefully.

Return all equipment to the correct zoned areas of the classroom/ workshop.

Remember that electricity can cause burns, shocks, serious injury & even death.