



Year 6 - Electricity Reading Booklet

1. Simple Series Circuits
2. Voltage
3. Switches
4. Planning an Investigation
5. Investigation
6. Assessment

Name: _____

Class: _____

Lesson 1 - Simple Series Circuits

Electricity is a form of energy, which can be converted to heat and light energy in our homes, schools, and places of work. Electric current is the flow of electrical charge through a conductor.

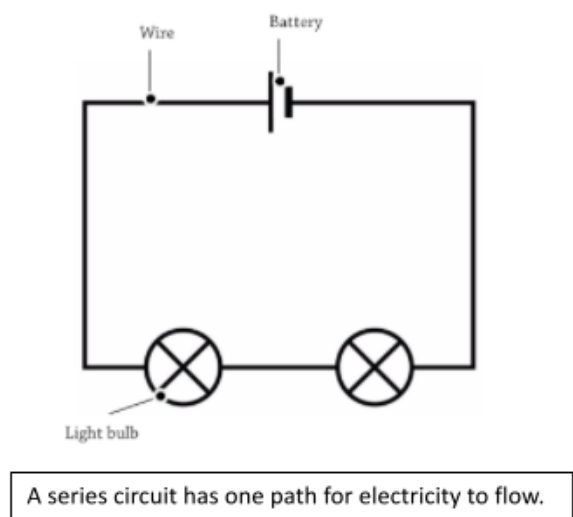
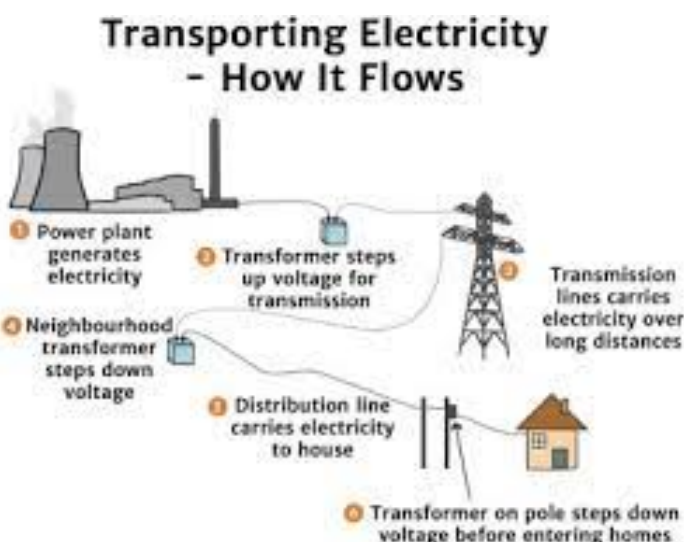
Read this

Electrical appliances convert electrical energy to create heat energy, light energy, and make motors work. We can store energy to provide electricity in a battery, or we can access electricity through the 'mains' by plugging into a large circuit that carries electricity around the place where we live.

Electricity is extremely useful, it powers our fridges, computers, lights, and televisions. However, electricity can be very dangerous if it is not controlled adequately and used correctly. Electricity can flow from one place to another, we call this flow electrical current.

We can control electrical current by causing it to flow within a closed loop called an electrical circuit. When an electrical circuit is created, electricity can be transported. Electricity plants generate electricity, which is then transported, via large circuits, to homes across the country. In order for electricity to flow, the circuit must be a complete loop, not broken in any place. Within a circuit, you will find an energy source, such as a battery, wires, and then a device that either stores or transforms energy into a different form, for example; a light. Often a circuit will contain a switch, which allows the flow of electrical current to be controlled by opening and closing the circuit.

Useful links: <https://www.bbc.co.uk/bitesize/topics/z2882hv/articles/zcwnv9q>
<https://www.bbc.co.uk/bitesize/clips/z8kc87h>



Lesson 2 - Voltage

A battery has what scientists call voltage. This is the amount of pressure contained in the battery that pushes electricity around a circuit. Volts are named after an Italian Physicist and Chemist called Alessandro Volta, who invented the battery. Scientists use the word 'cell' to mean a storage of electricity. 'Electrical Engineers' are a type of scientist that work with electricity, studying how electricity works and what it can help us do. Voltage is measured in volts and we use a 'V' sign to show how many volts there are. E.g. An AA battery is 1.5 volts and a car battery is 12 volts.



The brightness of a lamp or the volume of a buzzer depends on the number and voltage of cells used in a circuit. Voltage is the pressure that pushes electricity around a circuit. You can think of it like water pressure that forces water through a hose.

Single cell batteries like AA or AAA all have a voltage of 1.5 volts. Larger batteries do not necessarily contain a higher voltage, they just have more electrical current and can often last longer than smaller batteries.

The electricity we have at home and at school is 240 volts and this is very dangerous, we must always follow safety rules to protect ourselves. Batteries have a positive and negative terminal, when we connect a battery to a circuit with a lamp or buzzer, we can complete a circuit and connect the battery via the positive and negative terminals to the circuit. Some batteries have many cells, like many smaller batteries inside connected together, these batteries are larger than AA or AAA. The voltage, or the number of batteries within a circuit can make lamps brighter and buzzers louder.

Useful link: <https://www.dkfindout.com/uk/science/electricity/circuits/>

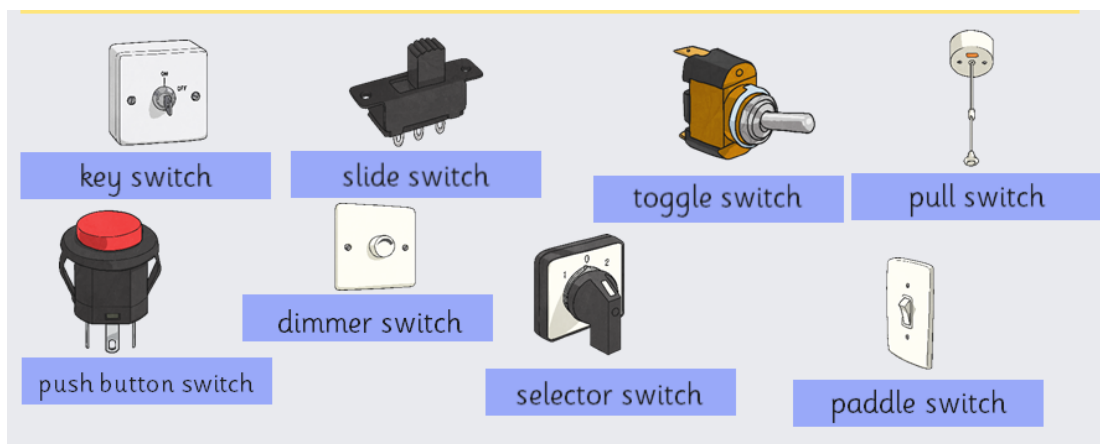
<u>AA Battery</u>	<u>Car Battery</u>
<u>1.5 V (Volts)</u>	<u>12 V (Volts)</u>
	

Lesson 3 - Switches

A switch is a simple electrical component that allows us to break a circuit and turn off components easily. We have switches all over our classroom, light switches, switches by the plug sockets, they all help us to control the flow of electricity. Switches can be manually operated, but they can also be designed to operate when movement, light or pressure is detected. Lights can be designed to switch on when someone is in the room but turn off when there is no movement.

These systems would have a sensor attached. A 'kill switch' is a switch designed to turn off a system completely in the event of an emergency. Running machines sometimes have a strap that you fix to your wrist, if you fall off the machine, your wrist tugs the strap and the 'kill switch' turns off the machine. Kill switches are safety mechanisms.

Escalators have a button that can be pressed in an emergency to shut down the circuit and prevent the escalator from moving. In the same way that switches prevent electricity from flowing, electricity can also be prevented from flowing by insulators. Electrons inside insulators are not free to move, so they cannot carry the flow of electricity.





KEY VOCABULARY

electricity

electricity is a **form of energy**; we can control it and use it

electrical current

the **flow of electricity**

electric shock

when **electricity flows through the human body causing a shock**; exposure to electrical energy can be dangerous, resulting in damage or death

circuit

a **path** which electricity flows around

battery

a **store of energy**, also known as a cell

light bulb

a component that **converts electrical energy to light energy**

switch

a component that **can make or break an electrical circuit**

wire

a **thin piece of metal covered in plastic** that conducts electricity

conductor

materials that **allow electricity to pass through** them are called conductors

insulator

materials that **do not allow electricity to pass through** are called insulators

battery



bulb



wire

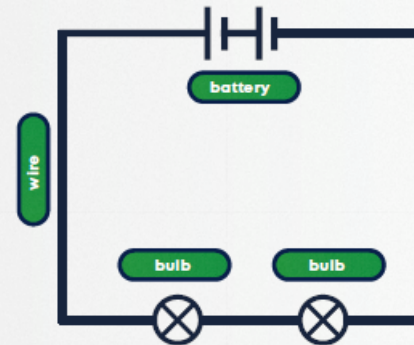


switch



electrical symbols

series circuit



a series circuit has one path for electricity to flow

AA battery

1.5 V (volts)



car battery

12 V (volts)



Granville T Woods (1856-1910)

an inventor and electrical engineer who worked on many inventions that made electrical railways safer and more efficient



