

Knowledge Organiser
Subject: Science Unit: Electricity

Overview:																				
<p>During this sequence of learning, pupils will associate the brightness of a lamp or the volume of a buzzer with the voltage of cells used in a circuit, compare and give reasons for variations in how components function and use recognised symbols when representing a simple circuit in a diagram.</p>																				
What should I already know?	Vocabulary:																			
<ul style="list-style-type: none"> • An object is made from/of a material. • Electrical energy is a form of energy. • Energy comes in different forms and can neither be created nor destroyed, only changed from one form to another. • Current electricity is the flow of charged particles, called electrons, around a circuit. • Electrical current flows well through some materials, called electrical conductors, and poorly through other materials, called electrical insulators. • Conductors have free electrons, and when electrical current flows through a conductor, the electrons move like people in a queue. • Electrical conductivity (how well a material conducts electricity) is an example of a property. • Metals are good electrical conductors. • A chemical reaction inside a cell produces the charged particles that can flow around a circuit. • More than one cell lined up to work together is called a battery. • Electrical current can flow if there is a complete circuit. • Wires - which contain a conductor inside them, usually made of metal - can allow electrical current to flow around a circuit. • When electrical current flows through a circuit, components within that circuit - such as buzzers which make a noise and bulbs which emit light - begin to work. • A switch functions by completing or breaking a complete circuit. • A simple circuit can be constructed using components. • Exposure to high levels of electrical current can be dangerous. 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="padding: 5px;">circuit (revision)</td> <td style="padding: 5px;">Complete and closed path around which an electric current can flow.</td> </tr> <tr> <td style="padding: 5px;">conductor (revision)</td> <td style="padding: 5px;">A material that allows heat or electricity to pass through it.</td> </tr> <tr> <td style="padding: 5px;">insulator (revision)</td> <td style="padding: 5px;">A material that does not allow heat or electricity to pass through it.</td> </tr> <tr> <td style="padding: 5px;">current (revision)</td> <td style="padding: 5px;">Flow of electricity which results from the movement of electrically charged particles.</td> </tr> <tr> <td style="padding: 5px;">switch (revision)</td> <td style="padding: 5px;">Device for making or breaking the connection in a circuit.</td> </tr> <tr> <td style="padding: 5px;">parallel circuit</td> <td style="padding: 5px;">A parallel circuit is a closed circuit in which the current divides into two or more paths before recombining to complete the circuit.</td> </tr> <tr> <td style="padding: 5px;">resistance</td> <td style="padding: 5px;">A measure of how the flow of electric current is opposed or "resisted".</td> </tr> <tr> <td style="padding: 5px;">series circuit</td> <td style="padding: 5px;">A series circuit is a closed circuit in which the current follows one path.</td> </tr> <tr> <td style="padding: 5px;">voltage</td> <td style="padding: 5px;">An electrical force that makes electricity move through a wire, measured in volts.</td> </tr> </tbody> </table>		circuit (revision)	Complete and closed path around which an electric current can flow.	conductor (revision)	A material that allows heat or electricity to pass through it.	insulator (revision)	A material that does not allow heat or electricity to pass through it.	current (revision)	Flow of electricity which results from the movement of electrically charged particles.	switch (revision)	Device for making or breaking the connection in a circuit.	parallel circuit	A parallel circuit is a closed circuit in which the current divides into two or more paths before recombining to complete the circuit.	resistance	A measure of how the flow of electric current is opposed or "resisted".	series circuit	A series circuit is a closed circuit in which the current follows one path.	voltage	An electrical force that makes electricity move through a wire, measured in volts.
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What will I know by the end of the unit?

- Voltage is a measure of the power of a cell to produce electricity; it is a measure of the 'push' of electric current, not the size of the electric current.
- As the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase.
- If the voltage gets too high this can 'blow' the bulb or the buzzer.
- How to draw circuit diagrams.
- The recognised symbols for a battery, bulb, motor, buzzer and wire.



Cell



Wire



Bulb



Buzzer



Motor

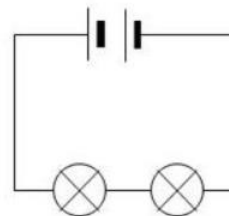


Switch (off)

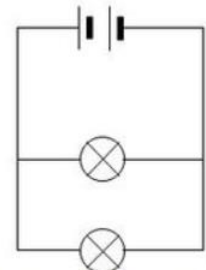


Switch (on)

- How to predict whether components will function in a given circuit, depending on whether or not the circuit is complete; whether or not a switch is in an on or off position; and whether or not there is a cell to provide electrical current to the circuit.
- That two bulbs in a circuit can be wired up to create a series circuit or a parallel circuit; if one bulb blows in a series circuit, the other will not shine as the circuit has been broken; in contrast, if one bulb blows in a parallel circuit, there will still be a complete circuit for the other bulb so it will continue to shine.
- Parallel circuits are preferred within households as they ensure that all the components receive the same voltage. They also allow one component to be switched on or off in isolation from the others whereas a series circuit has to have all the components on at once.



A series circuit



A parallel circuit