

Meden School Curriculum Planning							
Subject	Physics	Year Group	7	Sequence No.	4	Topic	Simple Circuits

Retrieval	Core Knowledge	Student Thinking
What do teachers need retrieve from students before they start teaching new content ?	What specific ambitious knowledge do teachers need teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to development of our students thinking, encouraging them to see the inequalities around them and 'do something about them!'
<p>KS2 Electricity</p> <p>L2 Electricity is either mains or battery supplies. Batteries provide portable electricity.</p> <p>L3 Electrical circuits must be complete. Wires must be connected properly for circuits to work. Electrical components have symbols and circuit diagrams are used to represent systems.</p> <p>Switches are used to control circuits</p>	<p>L1: All substances are made up atoms, atoms contain positive and negatives charges. The negative charges are due to sub-atomic particles called electrons; the positive charges are due to sub-atomic particles called protons. Electrons are on the outside of atoms, protons are in the middle of an atom, the middle is called the nucleus. Substances are usually neutral because they have the same number of positives and negatives. Friction causes the transfer of electrons between materials that are insulators or insulated. The positive charges cannot move. A build-up of charge is called Static Electricity. Conductors allow electrons to flow through them, insulators do not allow electrons to flow through them.</p> <p>L2: Materials that lose electrons become positively charged, materials that gain electrons become negatively charged. Like charges repel each other, opposite charges attract each other.</p> <p>L3: Electricity is an energy transfer mechanism. Electricity is a flow of electrons carry energy, unlike static electricity where the electrons are not moving. The flow of electrons is called the electrical current. Before we know about electrons scientists said that electricity flows from the positive terminal to the negative terminal in a circuit. This is called Conventional Current, and we still use this today as many of the rules that explain the nature of electricity are based on the concept of conventional current. We now know that electricity if the flow of electrons and this must flow from negative to positive, as electrons carry a negative charge and will only flow towards a positive charge. An increase in electron flow causes a bigger current. Current in measured in Amps (symbol is a capital A as it is named after a person, Andre-Marie Ampere). An ammeter measures the strength of a current.</p> <p>L4 The flow of electrons needs a complete pathway joining the negative terminal to the positive. This pathway is called an electrical circuit. For a current to flow there needs to be an energy source and a complete circuit. Circuit diagrams are an international way to represent electrical circuit. All components are presented by a symbol and connecting wires by straight lines. Circuit diagrams are regular shapes drawn with rulers to make them easier to follow.</p> <p>L5: A series circuit has only one pathway from the power supply, all components are linked together in a single pathway. Current is never used up in an electrical circuit because the number of electrons stays</p>	

<p>L5 More batteries in a circuit make bulbs brighter, or stronger batteries with a higher voltage make bulbs brighter Adding more bulbs makes bulbs dimmer.</p> <p>L8 Electrical safety includes never sticking fingers, pens or other objects into plug sockets. Not touching switches and plug sockets with wet hands. Never using mains appliances near water.</p>	<p>the same. The size of the current is the same anywhere in a series circuit. Adding bulbs to a circuit reduces the size of the current as the electrons slow down and so bulbs get dimmer. Adding more cells to a series circuit increases the current because more cells, means more energy for the electrons and so they move more quickly. If one bulb breaks in a series circuit the circuit is not complete and all bulbs go out.</p> <p>L6 Parallel circuits have more than one pathway for the electricity to flow through, the current divides between the different pathways but always added up to the initial current leaving the power supply. Adding another pathway to a circuit increases the current leaving the battery so the current goes up, this means the brightness of the bulbs stays the same. If a bulb breaks in one pathway only that pathway is incomplete and so all other bulbs stay on, parallel circuits are used for lights in houses, fairy lights and car lights for this reason.</p> <p>L7 Assessment task</p> <p>L8 Mains electricity has a voltage of 230V and is high enough to kill. An electric shock can cause electrical burns, muscle spasms, paralysis or may stop the heart beating. Mains electrical wires are insulated to prevent electric shock, they contain three separately coated wires, live wire is coated in brown insulation, the neutral wire is coated in blue insulation and the earth wire is coated in yellow/green stripped insulation. Plugs have three pins, live connected to the brown live wire, neutral connected to blue wires and earth connected to a yellow/green wire. Plugs also have a fuse which is designed to melt and cut off the current if the current is too high. The earth wire is a safety feature and is connected to the casing of metal appliances. If the live wire touches the metal casing it becomes “live” with electricity and would cause an electric shock if touched. The earth wire detects the current in the metal casing and turns off the electricity supply. A short circuit occurs when a parallel branch is created accidentally with no components in, electricity will follow through this branch instead of the correct part of the circuit due to its very low resistance. Short circuits often get very hot and are a major cause of electrical fires.</p> <p>L9 In 1791, Luigi Galvani was dissecting a frog when his scalpel touched a nerve and caused the leg to twitch. He thought that this meant electricity was made inside living things. Mary Shelley based her idea of Frankenstein reanimating his “monster” using electricity from lightning on the work of Galvani. Volts disproved Galvani but building the first batteries. They required two different metals and an acid. The first battery was called a Voltaic Pile. Fruit batteries are based on the same idea, Two different metals inserted in a lemon and connect in a circuit will produce a current.</p>	
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