Module map

GCSE Science	Module story	Science ideas and explanations	*GCSE Additional Science*
Electrons and other charged sub-atomic particles are introduced in P2 *Radiation and life* and P3 *Radioactive materials*.	**Static electricity**	Objects can be charged by rubbing. Electrons are transferred from one object to the other. Like charges repel; unlike charges attract.	Electrostatic forces between ions and properties of ionic compounds: C4 *Chemical patterns* and C5 *Chemicals of the natural environment*. Ideas about atomic structure: P7 *Observing the Universe*.
	An electric current	An electric current is a flow of charges round a closed conducting loop. Charges are present in the wires, and are all pushed round together by the battery. In metal wires, the moving charges are electrons. In a simple single-loop circuit, the current is the same size everywhere. Where there are branches, the currents divide or add as you would expect.	Conduction by electrolytes is explained in terms of ions in C5 *Chemicals of the natural environment*. Electrical signals in and between nerve cells are discussed in C6 *Brain and mind*.
	The size of the current	In a simple electric circuit: • the bigger the battery voltage, the bigger the current • the bigger the resistance, the smaller the current	C5 *Chemicals of the natural environment* discusses the link between atomic/molecular structure and electrical conduction/insulation.
	Combinations of resistors	The resistance of several resistors in series is simply their sum. The resistance of resistors in parallel is smaller than each on its own, as there are now more paths for charges to move around.	
	Potential difference	A battery raises charges up to a higher potential. As they go round the circuit, they drop back to their starting potential. A voltmeter measures the potential difference between two points.	
	Electrical power	The power of an electric circuit (energy transferred per second) is: current × voltage. The running cost of an electrical appliance depends on its power rating and the time for which it is switched on.	
C1 *Air quality* and P3 *Radioactive materials* outline the process of electricity generation, and compare the efficiency of different methods.	**How electricity is generated**	Generators use the principle of electromagnetic induction. A rotating magnet induces a voltage across the ends of a nearby coil. This produces an alternating current in the external circuit connected to the generator coil.	
	How electricity is distributed	Transformers are used to step-up the voltage, for more efficient transmission – and to step it down again for use. Power stations are connected through the National Grid to factories, offices, and homes.	

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