KS3 Physics – Electric Circuits – Learning Objectives

	Beginning	Developing	Secure	Embedding	Extending	Excelling
Electrical Components	Describe the difference between electrical conductors and insulators, and give examples of each.	Recall and use commonly used circuit symbols, and describe the function of each component.	Recall that an electric current is a flow of charged particles (electrons) in a circuit, carrying electrical energy to the components; it is measured with an ammeter, in amperes.		-	-
Resistance	Recall that electrical resistance is a property of a material that prevents a current from flowing.	Describe conductors and insulators in terms of electrical resistance. Describe how the length and thickness of a wire affect its resistance.	Explain that as resistance increases, current decreases. With the aid of an equation, calculate resistance using current and voltage (readings taken from an ammeter and voltmeter). Perform an experiment to investigate how the length / thickness of a wire affect its resistance.		Perform an experiment using Ohm's Law to determine the resistance of a resistor.	Describe and explain how the resistance of some non-ohmic components varies.
Types Of Circuit	Describe the differences between series and parallel circuits.	Describe how the brightness of lamps varies as they are added to series and parallel circuits, and how the placement of switches affects series and parallel circuits.	Construct series and parallel circuits from a circuit diagram, unaided. Explain the term 'short circuit' and explain the associated hazards. Discuss the advantages, disadvantages and uses of series and parallel circuits.		Explain how the brightness of lamps varies as they are added to series and parallel circuits, in terms of resistance.	-
Voltage and Current	-	Define 'voltage', and recall that it is measured in volts, using a voltmeter.	Use an ammeter and a voltmeter correctly to take measurements in series and parallel circuits.	Describe how current and voltage are distributed to the components of series and parallel circuits (this should include the use of an analogy).	Specifically, explain the term 'potential difference'. Solve complex problems to predict meter readings and calculate current and voltage values at different points in series and parallel circuits.	
Power and Electric Bills	-	Define 'electrical power' and recall the unit (watts); be able to use the electrical power equation. Calculate the amount of electrical energy used by an appliance (in kWh), and the cost of the energy. Suggest ways in which our electricity bills may be reduced.		Describe how domestic meter readings are used to calculate electricity bills. Solve complex calculations involving electrical power and electricity bills (including change of units and rearranging equations).		-
Static Electricity	In simple terms, describe situations where an electrostatic charge has built up.	Explain why only insulators are able to gain static charges.	Explain, in terms of electrons, how a surface may become electrostatically charged (both negative and positive). Discuss, in terms of electrons, how various 'tricks' using static electricity work. Describe some of the hazards associated with static electricity (sparks, shocks, etc). Describe some of the practical applications of static electricity (eg. photocopiers, paint sprayers).			-

** Objectives covering more than one grade are assessed based on the level of scientific detail and language used by the learner.*