CP9 Electricity and Circuits

CP9a Electrical circuits
Describe the basic structure of an atom.
Recognise the circuit symbols for a range of common electrical components.
Draw diagrams for circuits containing common electrical components.
Describe and explain the difference between the brightness of identical lamps in series and parallel circuits.
Describe and explain the effects of different numbers of identical lamps, cells and switches in series and parallel circuits.
CP9b Current and potential difference
Describe how to measure voltage.
Define the term ‘potential difference’.
Describe how to measure current.
Describe the conditions needed to produce an electric current.
Describe the behaviour of current at a junction.
CP9c Current, charge and energy
Explain the link between the potential difference (voltage) across a battery or a component, the charge passing through it and the amount of energy transferred.
Recall that the unit of potential difference is the volt and explain it in terms of units of energy and charge (a potential difference of one joule per coulomb).
Recall and use the equation $E = Q \times V$
Explain the link between electric current and electric charge.
Explain electric current in metals in terms of electrons.
Recall and use the equation $Q = I \times t$
CP9d Resistance
Explain the link between resistance and current in a circuit.
Define the resistance of a component or circuit ($R = V/I$).
Recall and use the equation $V = I \times R$
Explain the difference in resistance when two resistors are connected in series or in parallel.
Calculate the currents, potential differences and resistances in series circuits.
Explain the design and construction of series circuits for testing and measuring.
CP9e More about Resistance
Explain how current changes with p.d. in fixed resistors.
Explain how current and resistance change with p.d. in filament lamps.
Explain how current and resistance change with p.d. in diodes, including LEDs.

Describe how the resistance of an LDR varies with changing light intensity.
Describe how the resistance of a thermistor varies with changing temperature. (negative temperature coefficient only)
Describe the uses of diodes, LDRs and thermistors.
CP9f Transferring energy
Describe the energy transfer that occurs when a current passes through a resistor.
Use the electron and ion model and the idea of electrical work to explain the energy transfer in a resistor and the resulting dissipation of energy in the surroundings.
H Explain how unwanted energy transfers in wires can be avoided.
Recall the advantages of the heating effect of an electric current.
Recall the disadvantages of the heating effect of an electric current.
Use the equation $E = I \times V \times t$
CP9g Power
Define power and the units used to measure it.
Recall and use the equation $P = E/t$
Explain how power transfer depends on the potential difference across a device and the current through it.
Recall and use the equation $P = I \times V$
Recall and use the equation $P = I^2 \times R$
CP9h Transferring energy by electricity
Describe energy transfers from d.c. batteries and the a.c. mains supply to motors and heaters.
Explain the difference between direct and alternating voltage.
Compare alternating and direct current (in terms of movement of charge).
Recall the frequency and voltage of the UK domestic supply.
Describe the power ratings of some domestic electrical appliances and changes in stored energy when they are in use.
CP9i Electrical safety
Explain the difference between the functions of the live and the neutral wires.
Explain how circuit breakers make circuits safer.
Explain how the earth wire and the fuse make circuits safer.
Explain why switches and fuses are connected in the live wire.
Recall the potential differences between the live, neutral and earth wires.
Explain the danger of a connection between the live wire and earth.