

Scheme of Learning: Electric circuits

Topic Sequence:

1	2	3	4	5	6	7	8	9	10	11
Organisation	Electric Circuits	Chemical Changes	Mains Electricity	Quantitative Chemistry	Using Resources	Electro-Magnetism	Homeostasis & Response	Energy Changes	Ecology	Waves

Topic Overview:

Electric charge is a fundamental property of matter everywhere. Understanding the difference in the microstructure of conductors, semiconductors and insulators makes it possible to design components and build electric circuits. Many circuits are powered with mains electricity, but portable electrical devices must use batteries of some kind. Electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing and control.

Lesson Sequence:

The topic begins with the conventions of circuit diagrams including some symbols covered at KS3, but widening the range to include some more specific examples of the components used.

The main focus of the next few lessons is to cover the key concepts of charge, current, potential difference and resistance including the rules applied to series and parallel circuits.

This is then applied to two different required practicals – one looking at the resistance of a length of wire and the other plotting the current/potential difference graphs for three different components; a bulb, a resistor and a diode.

The final section of the topic looks at how the resistance of both LDRs and thermistors can vary and how this can be applied to control lighting or heating circuits.

Sequence of Lessons:

Resources:

1	Charge and symbols	1	Worksheet – circuit symbols.
2	Current	2	Worksheet – $Q=It$. Yellow kit cells, bulbs, leads and ammeters
3	Potential difference	3	Worksheet – $E=QV$. Yellow kit cells, bulbs, leads and voltmeters
4	Resistance	4	Worksheet – calculating resistance, resistance cartoon
5	Resistance of a wire RP <i>Mid-topic assessment & Required Practical</i>	5	RP instruction sheet, variable power supplies, banjo wires, ammeters, voltmeters, crocodile clips, leads. Mid-topic assessment sheet
6	Series and parallel	6	Worksheet – series and parallel rules. Yellow kit cells, bulbs, leads, ammeters and voltmeters
7	Resistors in series and parallel RP	7	RP instruction sheet, variable power supplies, $10\ \Omega$ resistors, ammeters, voltmeters, croc clips, leads. Worksheet – circuit rules
8	Ohmic and non-ohmic conductors	8	Worksheet – gradient and tangent practise
9	Ohmic and non-ohmic components <i>Mid-topic assessment & Required Practical</i>	9	RP instruction sheet, variable power supplies, ray boxes, resistors, diodes, ammeters, voltmeters, multimeters, croc clips, leads. Mid-topic assessment sheet
10	Thermistors and LDRs	10	Thermistors, multimeters, kettles, thermometers, LDRs, light source, metre rulers
11	Revision	11	Revision resources
12	Test	12	Test

Supportive Reading:

Comprehension activity	TBC
------------------------	-----

Assessment:

Knowledge:	Multiple choice and short answer questions.
Application of Knowledge:	Exam questions based on the skill of calculate