

Scheme of Learning: Mains electricity

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. Electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing and control. The fundamentals of electromagnetism were worked out by scientists of the 19th century. However, power stations, like all machines, have a limited lifetime. If we all continue to demand more electricity this means building new power stations in every generation – but what mix of power stations can promise a sustainable future?

Lesson Sequence:

The topic begins with a look at the 'War of the Currents' addressing the part that Edison and Tesla played in the development of our current mains electricity system. This includes the concepts of alternating and direct current.

We then move onto the dangers of allowing mains electricity into our home and the safety precautions taken in order to lower the risks associated with this idea. This includes the UK 3-pin plug and the purpose of the individual components within it. A practical involving correctly wiring a 3-pin plug is included at this point. A comparison of fuses and circuit breakers is also covered at this point.

Next we move into the mathematical areas of power and energy including 4 formulae that need to be committed to memory, with lots of calculation practise covered here.

This is then all linked together by looking at the transportation of electricity around the country in the National Grid.

Separate scientists then move onto the final section of static electricity, considering how it is generated, how it can be reduced and how it is useful to us.

Sequence of Lessons:

Resources:

1	A.C./D.C.	1	Worksheets – Edison vs Tesla, lesson summary worksheet
2	3-pin plug	2	Plug wiring kits, plug diagram, plug worksheet
3	Plug safety	3	Worksheet – GCSE question practise; fuse wire demonstration
4	Power <i>mid-topic assessment</i>	4	Worksheets – $P=IV$, $P=I^2R$, mid-topic assessment
5	Work done	5	Worksheets – $E=Pt$, all power formula practise
6	The National Grid	6	Worksheet – the National Grid; card sort - NG
7	Static charge <i>separate physics only</i>	7	Balloon, pepper, rods and cloths
8	Electric fields <i>separate physics only</i>	8	Van der Graaff or force levitator
9	Revision	9	n/a
10	Test	10	n/a

Supportive Reading:

Comprehension activity	TBC
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Assessment:

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