

GCSE Science (Physics) P4/5 Electric Circuits and Electricity in the Home – Science Faculty

Rationale and Context of Unit:	Core curriculum content:	Tier 2 & Tier 3 vocabulary explicitly taught:
<p>This is the first unit taught in year 10. It builds on KS3 knowledge of circuits and electricity. It is often viewed by students as one of the more challenging units within GCSE physics and as such is taught early on to leave plenty of opportunity for review later in their course.</p> <p>P5 builds on knowledge of energy generation and supply to the national grid developed in P3 (Energy Resources). The concept of efficiency is also revisited from P1(Conservation and Dissipation of Energy) and further developed using the concept of power also introduced in P1 (Conservation and Dissipation of Energy).</p> <p>This unit includes 3 of the Required Practical tasks which are essential to gauge student’s understanding of practical techniques and data analysis.</p> <p>This unit contains 13 content lessons for combined science and 14 lessons for separate science</p> <p>AQA GCSE Spec Ref: 4.1.1.4, 4.1.2.2, 4.2.1.1, 4.2.1.2, 4.2.1.3, 4.2.1.4, 4.2.2, 4.2.3.1, 4.2.3.2, 4.2.4.1, 4.2.4.2, 4.2.4.3, 4.2.5.1, 4.2.5.2</p>	<ul style="list-style-type: none"> • Electrical charges and fields • Current and charge • Potential difference and resistance • Resistance of a Wire Required Practical (Dimmer Switches) • Component characteristics • IV Component Characteristics Required Practical • Series circuits • Parallel circuits • Resistors in Series and Parallel Required Practical • Alternating current • Cables and plugs • Electrical power and potential difference • Electrical currents and energy transfer • Appliances and efficiency 	<ul style="list-style-type: none"> • <i>Charge</i> • <i>Attract</i> • <i>Repel</i> • <i>Neutral</i> • <i>Electricity</i> • <i>Current</i> • <i>Electron</i> • <i>Coulomb</i> • <i>Amperes</i> • <i>Resistor</i> • <i>Cell</i> • <i>Battery</i> • <i>Potential Difference</i> • <i>Volt</i> • <i>Parallel</i> • <i>Series</i> • <i>Ohmic</i> • <i>Resistance</i> • <i>Thermistor</i> • <i>Light Dependent Resistor (LDR)</i> • <i>Diode</i> • <i>Alternating Current</i> • <i>Direct Current</i> • <i>Oscilloscope</i> • <i>Fuse</i>

Challenge and Support:	World wide learning/ links to 21 st century:	Cultural capital/ Industry/ Enrichment:
<ul style="list-style-type: none"> • Lessons contain additional support slides for LPA • 2 Pre-Written Extension opportunities included within each lesson • Some practical tasks have additional support sheets for LPAs • Gradient pastel background for improved SEN accessibility • Keyword bank available for SEN • Task timings shown on Ppts for ASD • Triple science specific lessons 	<ul style="list-style-type: none"> • Practical activities have a real word context applied with opportunities for extended projects/research • Tesla Cars • LED vs Filament bulbs (L6,14) • Power and Plugs compared worldwide (L11) • Developments in household appliances for the future (L14) 	<ul style="list-style-type: none"> • Careers Spotlight - Electrical Engineering (L5) • Careers Spotlight - The national grid(L10) • Life skills – Wiring of a plug (L11) • Life skills – Choosing a fuse (L11)
Historical, Social, Moral, Spiritual, Cultural context:	Cross curricular links/ literacy/numeracy:	Common misconceptions:
<ul style="list-style-type: none"> • History of electricity (L1) • Models of Electrical Current (L2) • Telsa Vs. Edison (L11) 	<ul style="list-style-type: none"> • Cross Curricular – STEAM Links to electronics and circuitry (DT) • Numeracy: Algebra used for rearrangement of various equations, understanding of numerical prefixes/standard form, graph skills, calculating the gradient • Literacy: <i>Pixl Unlocks available/issued for keywords exploring etymology</i> 	<ul style="list-style-type: none"> • Current is the flow of charged particles • Electrons are repelled from the negative terminal and attracted to the positive terminal but conventional current flows from positive to negative • Voltage is a measure of potential difference • Resistance causes the transformation of kinetic energy (of the electrons) into heat energy dissipated to the environment • Diodes only allow current flow in one direction • Though linked by Ohms law current, potential difference and resistance are separate quantities • A battery is more than one cell connected in series • The colour of the cables used in practical investigations does not matter • It is current which kills (though high voltage is usually associated with high current)

Assessment timeline:

- Practical skills monitored by teacher when conducting experiments.
- Regular low stakes self and peer assessment
- Quick check recall tasks throughout
- PPQs on Electric Circuits
- End of topic exam to assess pupil progress
- Assessed tasks will have feedback 4 to help improve pupils understanding after they have completed the assessment.

Home learning

- HL 1
- HL 2 Past paper Qs (Whole unit)
- Produce revision resources of end of unit assessment

Feedback

- Students will have feedback 4 on their skills assessment midway through this unit - teacher assessed
- Students will self-assess their home learning ppqs
- Students will have feedback 4 on their end of topic test - teacher assessed
- Students will generate self-feedback 4 on their skills assessment at the end of this unit this unit.

Length of unit (duration indicated in lessons)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
S	C	C	C	C	C	C	C	C	C	C	C	C	C	A

Unit: P4/5 Electric Circuits and Electricity in the Home