

## Curriculum Design 2023 - 2025

GCSE AQA ENGINEERING (8852)							
		Term1		Term2		Term3	
		Term 1.1	Term 1.2	Term 2.1	Term 2.2	Term 3.1	Term 3.2
10	Theme	USB Desk Lamp		USB Desk Lamp		Engineering Drawing	NEA
	Concept	ENG Materials / Processes	ENG Materials / Systems	ENG Skills / Systems	ENG Skills / Processes / Systems	ENG Skills / Processes / Systems	Design Process
	Skills / Knowledge	<p><b>Theory:</b></p> <p><b>Engineering Materials:</b></p> <p>Material Properties / Young's Modulus (Stress &amp; Strain)</p> <p>Metals &amp; Alloys – Classification &amp; Properties / Changing Properties / Uses &amp; Available forms (Stock sizes)</p> <p><b>Engineering Processes:</b></p> <p>Material Removal – Cutting &amp; Drilling / Turning / Milling &amp; Etching</p> <p>Shaping &amp; Forming – Bending &amp; Shaping</p> <p>Joining &amp; Assembly – Permanent &amp; Non-permanent methods.</p> <p><b>Practical:</b></p> <p><b>Engineering Skills:</b></p> <p>Measuring &amp; Marking out – Eng Ruler, Square, Vernier, Micrometer &amp; Centre Punch</p> <p>Production Plans</p> <p>Drilling / Bending</p> <p>Punching &amp; Stamping</p> <p>CNC Lathe Turning</p>	<p><b>Theory:</b></p> <p><b>Engineering Materials:</b></p> <p>Polymers – Properties &amp; Uses / Forms of supply</p> <p>Materials Cost &amp; Supply – Numeracy (Area &amp; Costing)</p> <p><b>Engineering Processes:</b></p> <p>Surface finishing – Dip Coating, Anodising, Painting.</p> <p><b>Engineering Systems:</b></p> <p>Describing Systems – Systems Approach / Schematic Drawings / Flowcharts</p> <p>Electrical Systems – AC/DC, Input &amp; Control Devices</p> <p><b>Practical:</b></p> <p><b>Engineering Skills:</b></p> <p>Measuring &amp; Marking out – Eng Ruler, Square, Vernier, Micrometer &amp; Centre Punch</p> <p>Production Plans</p> <p>Drilling / Bending</p> <p>CNC Lathe Turning</p> <p>Dip Coating Process</p> <p>Punching &amp; Stamping</p> <p>2D Design CAD</p>	<p><b>Theory:</b></p> <p><b>Engineering Materials:</b></p> <p>Energy Production Methods – Nuclear, Renewable &amp; Non-Renewable</p> <p><b>Engineering Systems:</b></p> <p>Electronic Systems 1 – Inputs &amp; Processes</p> <p>Electronic Systems 2 – Programmable devices &amp; drivers</p> <p><b>Practical:</b></p> <p><b>Engineering Skills:</b></p> <p>Measuring &amp; Marking out – Eng Ruler, Square, Vernier, Micrometer &amp; Centre Punch</p> <p>Production Plans</p> <p>Drilling / Bending</p> <p>CNC Lathe Turning</p> <p>Dip Coating Process</p> <p>Punching &amp; Stamping</p> <p>2D Design CAD</p> <p>Circuit Wizard – Circuit Simulation</p> <p>Soldering Components</p>	<p><b>Theory:</b></p> <p><b>Engineering Materials:</b></p> <p>Factors influencing Design Solutions</p> <p><b>Engineering Systems:</b></p> <p>Electronic Systems 2 – Programmable devices &amp; drivers</p> <p>Electronic Systems 3 – Output &amp; Passive Components – Numeracy (Ohms Law)</p> <p><b>Practical:</b></p> <p><b>Engineering Skills:</b></p> <p>Measuring &amp; Marking out – Eng Ruler, Square, Vernier, Micrometer &amp; Centre Punch</p> <p>Production Plans</p> <p>Drilling / Bending</p> <p>CNC Lathe Turning</p> <p>Dip Coating Process</p> <p>Punching &amp; Stamping</p> <p>2D Design CAD</p> <p>Circuit Wizard – Circuit Simulation</p> <p>Soldering Components</p> <p>Engineering Drawings – 3D CAD – Fusion 360</p>	<p><b>Theory:</b></p> <p><b>Engineering Systems:</b></p> <p>Mechanical Systems – Linkages – Numeracy (Mechanical Advantage)</p> <p>Mechanical Systems – Types of Motion / Conversion of Motion</p> <p>Mechanical Systems – Gears, Pulleys, Bearings – Numeracy (Gear &amp; Velocity Ratio)</p> <p>Structural Systems – Monocoque / Space Frame / Loads &amp; Stresses</p> <p>Pneumatic Systems</p> <p><b>Practical:</b></p> <p><b>Engineering Skills:</b></p> <p>Measuring &amp; marking out – Eng. Ruler, Square, Vernier, Micrometer &amp; Centre Punch</p> <p>Production Plans</p> <p>Drilling / Bending</p> <p>CNC Lathe Turning</p> <p>Dip Coating Process</p> <p>Punching &amp; Stamping</p> <p>2D Design CAD</p> <p>Circuit Wizard – Circuit Simulation</p> <p>Soldering Components</p> <p>Engineering Drawings – Orthographic / Isometric / Exploded / Section View</p>	<p><b>Theory:</b></p> <p><b>Exam Preparation:</b></p> <p>Use of Knowledge Organisers</p> <p>Exam Question Technique</p> <p>Extended Writing Questions</p> <p><b>NEA Controlled Assessment:</b></p> <p>Exam Board Context – Launched 1<sup>st</sup> June of Year 10</p> <p><b>Design Process:</b></p> <p>Analysis of Brief</p> <p>Research – Existing Products, Materials, Components &amp; Systems</p> <p>Specification</p> <p>Initial Design Ideas</p>
Wider Curriculum	<p><b>Sector Focus:</b> Mechanical Engineering</p> <p>Arkwright Scholarship Launch</p>	<p><b>Sector Focus:</b> Electronic Engineering</p> <p>National Engineering Day (1<sup>st</sup> November 2023)</p>	<p><b>Sector Focus:</b> Environmental Engineering</p> <p>Arkwright Scholarship Applications / Exam</p>	<p><b>Sector Focus:</b> Systems Engineering</p>	<p><b>Sector Focus:</b> Civil Engineering</p>	<p><b>Sector Focus:</b> Design Engineering</p> <p>INWED 2024</p> <p>Diversity in Schools Week - Engineering</p>	

11	Theme	Exam Theory / NEA Design Process			Exam Ready		
	Concept	ENG Processes	Testing & Investigation	New & Emerging Technologies	Numeracy / Exam Ready	Numeracy / Exam Ready	
	Skills / Knowledge	<b>Theory:</b> <b>Engineering Processes:</b> Additive Manufacturing – 3D Printing, Stereolithography & Sintering Casting & Moulding – Sand Casting, Injection Moulding & Precision Die Casting Heat Treatment Processes – Annealing, Tempering, Quenching <b>NEA Controlled Assessment:</b> <b>Design Process:</b> Analysis of Brief Research – Existing Products, Materials, Components & Systems Specification Initial Design Ideas	<b>Theory:</b> <b>Testing &amp; Investigation:</b> Testing – Materials Testing – Destructive & Non-Destructive Testing / Hardness Testing Quality Control – Applying Quality Control Methods <b>NEA Controlled Assessment:</b> <b>Design Process:</b> Initial Design Ideas Further Research Development of Design Ideas / Modelling 2D CAD / 3D CAD – Engineering Drawings Circuit Wizard – Programming, Schematics & PCB Production Planning Engineering Skills / Circuit	<b>Theory:</b> <b>New &amp; Emerging Technologies:</b> Impact on Production, Society, Environment & Economy <b>Testing &amp; Investigation:</b> Aerodynamics. <b>NEA Controlled Assessment:</b> <b>Design Process:</b> 2D CAD / 3D CAD – Engineering Drawings Circuit Wizard – Schematics & PCB Production Planning Engineering Skills / Soldering Components Testing & Evaluation – Evaluation against specification, 3 <sup>rd</sup> Party Testing, Improvements & Modifications <b>NEA Final Submission – February HT (Year 11)</b>	<b>Numeracy Skills:</b> Area Volume Density = Mass / Volume Pythagoras Trigonometry <b>Exam Ready Content Focus:</b> Engineering Materials Engineering Processes Engineering Systems	<b>Numeracy Skills:</b> Young's Modulus (Stress & Strain) Factor of Safety Pressure = Force / Area Graphs <b>Exam Ready Content Focus:</b> Testing & Investigation Emerging & Modern Technologies Engineering Skills	
	Wider Curriculum	<b>Sector Focus:</b> CAE Engineering	<b>Sector Focus:</b> Aerospace Engineering	<b>Sector Focus:</b> New Technologies			

**Wider Curriculum Rationale:**

Exposing children to a wide range of experiences, enriching and deepening their knowledge and understanding of the curriculum and the world in which they live.

**Engineering Sector Focus** – Students to develop an understanding of how **diverse** Engineering. Each sector has been aligned to that core concept for that term. This will be supported with research into the sector, video resources, spotlight on famous engineers both past and present. Students will have access to profiles of current engineers to help them understand the different roles within engineering and the routes taken to get there.

**INWED 2024** – International Women in Engineering Day is to highlight and celebrate the women within the field of engineering, as they still only currently represent 13% of the workforce. Guest speakers to provide talks to the students either via Assembly, Class Talks or Video call. This also fits within the Diversity Week. Students to be involved in a range of activities.

**National Engineering Day 2023** – To showcase how engineering improves lives.

**Arkwright Scholarship** – Continue to support students in the application of the Arkwright Scholarship Programme. The Arkwright Scholarship is a prestigious scholarship, with only around 400 granted each year, to Year Y11 students at they begin their A level's. Successful students gain a bursary of £600 over the 2 years and have access to a mentor within industry.

**Sources of Information:**

<a href="https://www.engineeringuk.com/">https://www.engineeringuk.com/</a>	<a href="https://www.engineerjobs.co.uk/">https://www.engineerjobs.co.uk/</a>	<a href="https://raeng.org.uk/">https://raeng.org.uk/</a>
<a href="https://www.thisisengineering.org.uk/">https://www.thisisengineering.org.uk/</a>	<a href="https://www.theiet.org/">https://www.theiet.org/</a>	

