

Year 10 Engineering



GCSE Engineering is an academic style engineering course perfect for students who may wish to study an engineering course Post 16 and on to university. GCSE Engineering introduces students to a host of new technologies, helping them to gain practical skills and understanding to inspire a lifelong interest in engineering. It will particularly appeal to those who enjoy being creative, with an affinity for drawing, design, maths and problem-solving. Students will learn about how to create design briefs, how businesses convert design briefs to design specifications, production planning and the application of technology to manufacturing. The engineering industry is vast and varied and there are many different businesses students could potentially work for within it.

Methods of deepening and securing knowledge:

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| Retrieval practice | Theory and practical sessions are used as opportunities to revisit prior learning. Before students embark on any new project, they are reminded of the links to the key theory covered in the course. Students will frequently revisit theory and skills they have used in previous tasks, building knowledge through questioning and further application of tasks. The practical work itself allows students to apply their prior learning in real-life contexts, which helps to secure students' understanding. |
| Elaboration | Through exciting new projects students are able to elaborate on new making methods and techniques to extend skills further. |
| Concrete examples | Demonstrations are used to consolidate understanding of processes and techniques. |
| Knowledge organisers | Knowledge organisers are used to inform students of the skills and techniques used throughout the project and develop research skills needed in the tasks. |

| | Autumn term 1 | Autumn term 2 | Spring term 1 |
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| Topic(s) | 3D printed Key ring/ Cast Keyring Engineering Materials 1.1 Materials and their properties 1.2 Material costs and supply 1.3 Factors influencing design solutions Engineering Manufacturing Processes 2.1 Additive manufacturing 2.2 Material removal 2.3 Shaping, forming and manipulation | Bike light/ alarm system Systems 3.1 Describing systems 3.2 Mechanical systems 3.3 Electrical systems 3.4 Electronic systems 3.5 Structural systems 3.6 Pneumatic systems Testing and Investigation 4.1 Modelling and calculating | Engineering drawings/Mock exam prep. Students will use this short term to carry out revision tasks and to consolidate learning in order to prepare for their forthcoming mock exam. Students will use the theory booklets already given and completed to form the basis of their revision. |

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| | 2.4 Casting and moulding 2.5 Joining and Assembly 2.6 Heat and chemical treatment 2.7 Surface finishing | 4.2 Testing 4.3 Aerodynamics | |
| Assessment | Assessment by end of unit test and ongoing assessment. | Assessment by end of unit test and ongoing assessment. | Assessment by end of unit test and ongoing assessment. |
| CEIAG <i>(Careers that are linked to that topic)</i> | Looking at structural engineering and the role of the designer. | Looking at the electronics industry and associated roles. | Designers and world-wide recognised technical language of drawing, BS8888. |

| | Spring term 2 | Summer term 1 | Summer term 2 |
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| Topic(s) | <p>CNC Coaster Engineering CAD/CAM.</p> <p>The impact of Modern Technologies</p> <p>5.1 The impact of modern Technologies</p> <p>Practical Engineering Skills</p> <p>6.1 Problem solving</p> <p>6.2 Engineering drawings and schematics</p> <p>6.3 CAD, CAM and CNC</p> <p>6.4 Testing materials</p> <p>6.5 production plans</p> <p>6.6 Predict performance using calculations and modelling</p> <p>6.7 Select and use materials, parts, components, tools and equipment</p> | <p>NEA Prep/Engineering maths</p> <p>Students will complete a maths booklet packed with maths based engineering questions. They will also analyse NEA's from the past to research what makes up a good quality portfolio and what a poor one looks like.</p> | <p>NEA introduction</p> <p>Non-Examination Assessment</p> <p>A design and make task completed by the students based on a theme given by the exam board.</p> <p>This task is worth 40% of their overall GCSE Grade.</p> <p>It will be presented in approximately 20 Pages of A3 written or digital.</p> <p>Students will make a single design and make activity which will arise from investigating a brief set by AQA (the examining board).</p> <p>Students will receive 3 Contextual themes. These change every year. Students will do some research on all 3 before picking one.</p> <p>Students should complete half of the research tasks before the end of the summer term.</p> |

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| Assessment | Assessment by end of unit test and ongoing assessment. | Assessment by end of unit test, product and ongoing assessment. | Assessment will be ongoing based on their NEA progress.. |
| CEIAG <i>(Careers that are linked to that topic)</i> | Looking at the effects of CAD/CAM on industry and jobs. | Realisation of calculations and algorithms used in engineering situations. | Realisation of a brief based on a real life problem/situation. |

Independent Study

Students in Year 10 have access to the course materials through Google Classroom. Independent study is accessible through this platform and is given either each week or once a fortnight. Independent study is generally used to secure prior learning through practice to develop confidence and memory.