KS4 Curriculum Engineering

CURRICULUM INTENT?

What does Engineering help young people achieve at KS4? Why have you made these curriculum choices?

Level 1 / 2Technical Award in Engineering provides learners with a more practical alternative to GCSE study.

The qualification introduces students to the various strands available within the engineering field, providing learners with the opportunity to develop knowledge, skills and understanding through tasks set in realistic work-related contexts.

TERM BY TERM BREAKDOWN – Knowledge, acquired and skills developed:

	Year 10 Course Outline	Year 11 Course Outline	Opportunities beyond the classroom
Autumn Term	*Knowledge:* Communicate design ideas Develop creative ideas for engineered products interpret engineering drawings interpret engineering information Metals Plastics Composites Properties of materials *Key Skills:* Hand drawing skills Isometric CAD Skills Drawing Skills 3D Modelling using Solid works Orthographic Projection Isometric Drawings Assembly Drawings **Manufacturing Project:** (Manufacture an Elastic Band Car) Reading engineering drawings, charts and specifications Producing Job Sheets, Production Plans, Risk Assessments and Quality Control Points Use hand tool Using machinery Using processes Evaluating a completed artefact back to given information 3D Modelling using Solid works EBC Orthographic Projection drawing of EBC Isometric Drawings of EBC Assembly Drawings of EBC	**UNIT 1 ENGINEERING Design** **<u>Bike Light Project</u>** **Controlled Assessment TASKS** 1. **Identify** the **key features** and **functions** required from the information provided. Use this information to develop a **design specification**. 2. Suggest **three** options to meet the **design specification** which are based on successful engineered products. **Review** the suitability of each and recommend the best option. 3. Using accepted **standards** and **conventions**, draw your preferred solution. **Unit 1 Assessment Criteria** **AC1.1** Identify features that contribute to the primary function of engineered products **AC1.2** Identify features of engineered products that meet requirements of a brief **AC3.3** Produce design specifications **AC1.3** Describe how engineered products function **AC2.2** Communicate design ideas **AC3.1** Develop creative ideas for engineered products **AC3.2** Evaluate options for design solutions **AC2.1** Draw engineering design solutions	Stem Club National Solidworks Competition with Techsoft UK Visiting local engineering establishments
Spring Term	*Knowledge* Identify features that contribute to the primary function of engineered products Identify features of engineered products that meet requirements of a brief Produce design specifications Describe how engineered products function Communicate design ideas Develop creative ideas for engineered products Evaluate options for design solutions Draw engineering design solutions	**UNIT 2 PRODUCING ENGINEERING PRODUCTS** **<u>Pad Saw Handle Project</u>** **Controlled Assessment TASKS** **1. Plan how you will make the prototype.** **2. Make the prototype to the requirements of the engineering drawing.** **3. Evaluate the quality of the prototype you produced.** **Unit 2 Assessment Criteria**	

	Smart materials Electronics/electrical components Joining materials Heat Treatment Engineering Mathematics areas and volumes *Key Skills:* **Design Project:** (Re design Calculator) Analysing a design brief Investigation of existing engineered products that meet the brief Writing a design specification Sketching of design ideas Evaluating ideas to design brief/design specification Producing engineering drawings of selected idea Drawing 3D CAD models and producing engineering drawings	**AC1.1** interpret engineering drawings **AC1.2** interpret engineering information **AC2.1** identify resources required **AC2.2** sequence required activities **AC3.1** use tools in production of engineering products **AC3.2** use equipment in production of engineering products **AC4.1** use engineering processes in production of engineered products **AC4.2** evaluate quality of engineered products	
Summer Term	*Knowledge* interpret engineering drawings interpret engineering information identify resources required sequence required activities use tools in production of engineering products use equipment in production of engineering products use engineering processes in production of engineered products evaluate quality of engineered products CAD/CAM Manufacturing methods Adhesives Surface Finishes *Key Skills:* **Manufacturing Project:** (Manufacture a Marking Gauge) Reading engineering drawings, charts and specifications Producing Job Sheets, Production Plans, Risk Assessments and Quality Control Points Use hand tool Using machinery Using processes Evaluating a completed artefact back to given information	**UNIT 3 UNIT 3: SOLVING ENGINEERING PROBLEMS** **Written Exam** • 90 minute examination; • Total of 60 marks; • Three questions on each paper; • Short and extended answer questions, based on stimulus material and applied contexts; **Unit 3 Assessment Criteria Revision** **Mathematical techniques** • Use of formulae • Ohms law • Efficiency • Areas and volumes of geometric shapes • Calculation • Measuring **Properties** • Tensile strength • Hardness • Toughness • Malleability • Ductility • Conductivity • Corrosive resistance • Environmental degradation • Elasticity **Materials** • Ferrous • Non-ferrous • Thermoplastics	

		• Thermosetting plastics • Smart Materials • Composite Materials **Processes** • Marking out • Cutting • Finishing • Preparing • Shaping • Drilling • Turning • Brazing • Joining • Permanent • Temporary fixings • Filing • Soldering **Applications** • For material removal • For shaping and manipulation • For joining and assembly • For heat and chemical treatment	
Key Independent Learning Resources			**GREAT READS**
Revision Guide Past Papers Technologystudent.com Revision Wall			Solidworks 2014 Parts 1 & 2 Basic tools and advanced techniques (Paul Tram)