

Quality of Education: Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.

SUBJECT: DT - Engineering CURRICULUM PROGRESSION PATHWAYS		CL: Mr D Grimes	2022/23	
KS3 (Level 1) D&T	KS4 (Level 2) WJEC Vocational Award in Engineering	KS5 (Level 3) BTEC National	Further Education / training	Careers
<p>6-week rotations.</p> <p>Y7 Pull Along Toy Knowledge: Iterative design process, difference between hardwoods and softwoods, cams, mechanisms, types of motion. Skills: Quality control measures, cutting and shaping wood using hand tools, introduction to pillar drill and belt sander.</p> <p>Y7 Night Light Knowledge: Design process, Computer Aided Design, Electrical components, Workshop and machine health & safety. Skills: Designing for a client, soldering, CAD/CAM, finishing woods.</p> <p>Y8 Balancing Toy Knowledge: Iterative Design Process, CAD/CAM, hand tool and machine recognition, machine health and safety (lathe and pillar drill) Skills: Cutting internal and external screw threads, mechanism assembly, 2D Design, laser cutting, metal working techniques.</p> <p>Y8 Mobile Phone Stand Knowledge: Iterative Design, Designing for a brief, polymers, 2D CAD Design, Laser cutting Skills: Using 2D Design, Meeting a design brief, Isometric drawing, evaluation of designs, line bending, laser cutting</p> <p>Y9 3D Printed Lamp Knowledge: Iterative design, designing for a brief, 3D printing materials, 3D CAD modelling, machine health and safety, temporary fasteners. Skills: 3D CAD modelling using fusion 360, Meeting a design brief, following working drawings, cutting and drill manufactured boards using basic hand tools, production planning, evaluation</p> <p>Y9 Toolbox Knowledge: Metalworking tools and equipment selection, Production planning, interpreting engineering drawings, metalworking health and safety, permanent and non-permanent fasteners. Skills: Using tools and equipment safely in the workshop, operating a centre lathe to create basic turned components, creating internal and external threads in metals, folding metals accurately, deburring metals, using templates and jigs to streamline manufacture.</p>	<p>Year 10 WJEC Level ½ Vocational Award in Engineering Unit 1 - Manufacturing Engineering Products June Year 10 Certification 20 Hour Internal Assessment</p> <p>Knowledge: Planning for manufacture, interpreting engineering drawings, selection of tools, materials and equipment for engineering products, manufacturing to agreed tolerances of metal components, risks associated with typical manufacturing processes in the workshop. Skills: Using metalworking tools, equipment and machinery safely and independently, creating production plans to follow based on a design brief and engineering drawings, identifying correct order or operations based on materials and design features, creating risk assessments of common workshop manufacturing processes.</p> <p>Year 11 WJEC Level ½ Vocational Award in Engineering Unit 2 - Designing Engineering Products January Year 11 10 Hour Internal Assessment</p> <p>Knowledge: Iterative design process to develop products in an structured and appropriate manner for the given engineering product, redesigning engineering products, interpreting design brief, understanding engineering drawings, research methods for existing products, justification and methods for determining suitable design ideas, selection of drawing methods. Skills: Identifying design problems based on a design brief, writing design specifications, presenting design ideas, technical drawing methods, creating accurate engineering drawings that enable third party manufacture, using 2D and 3D CAD design solutions, researching existing products, justifying design changes to solve engineering problems</p> <p>Unit 3 - Solving Engineering Problems June Year 11 1 Hr 30 External Exam</p> <p>Knowledge: common engineering tools, materials and equipment, machining methods, additive and subtractive manufacturing processes, scales of production, forming methods, material properties and characteristics, structural design, mechanical design, electronic design, how engineering affects everyday life, environmental impact of materials, technologies that influence engineering, risk assessments, solving engineering problems using physics and mathematics, basic formulae, understand details in engineering drawings, common fixing methods used in the workshop. Skills: Understand and interpret command words used in exam questions, produce and interpret a range of engineering drawings, structuring extended writing tasks to produce a concise and detailed response, time management during exams, effective revision and recall techniques.</p>	<p>Year 12 BTEC National Level 3 Extended Certificate in Engineering</p> <p>Unit 2: Delivery of Engineering processes safely as a team. Knowledge: Manufacturing systems and processes. Material properties. Skills: Manufacture of a reading lamp using a range of tools and machines accurately and safely.</p> <p>Unit 1 Exam: Engineering Principles Knowledge: Materials and Engineering Science. Applied Maths. Skills: Application of knowledge (exam) Jan - June</p> <p>Year 13 BTEC National Level 3 Extended Certificate in Engineering</p> <p>Unit 10: Computer aided design for manufacture Knowledge: 2D / 3D CAD Commands. Drawing conventions. Skills: 2D, 3D Solid and 3D Shell drawing techniques.</p> <p>Unit 3 Exam: Product Design and Manufacture Knowledge: Research and design Skills: Iterative design, application of material knowledge.</p>	<p>Engineering Undergraduate & Postgraduate Degree</p> <p>Apprenticeships in:</p> <p>Aerospace automotive Broadcast civil engineering communication construction electrical energy hydraulics marine mechanic mining process engineering renewables systems engineering telecommunications transport.</p> <p>Levels intermediate advanced higher degree Post Graduates</p>	<p>Engineering Sectors</p> <p>Aerospace</p> <p>Agricultural</p> <p>Architecture</p> <p>Automotive</p> <p>Biomedical</p> <p>Chemical</p> <p>Civil</p> <p>A.I. /Robotics</p> <p>Drafting and Design</p> <p>Structural</p> <p>Systems</p> <p>Electrical</p> <p>Energy</p> <p>Renewables Technology</p>