



# Vocational Faculty: DT Curriculum Overview (Yr 7-9)

	Year 7	Year 8	Year 9
<b>DT</b>	<p><b>Enquiry Question:</b> Understanding of basic electronics and different types of timber. Development of safe working practices and skills with hand tools and power tools.</p> <p><b>End Point:</b> Students will produce a wooden box and solder components to a PCB to develop a musical organ. They will have an understanding of different types of timber and be able to assemble and test a product. They will design and make a music related backdrop</p> <p><b>Area of knowledge:</b></p> <ul style="list-style-type: none"> <li>Understanding of Health &amp; Safety within the workshop</li> <li>Understand and be aware of safe working practices in the use of a Tennon Saw, a Dovetail (Gentleman's) Saw, Engineers square, steel rule, ball and pein hammer, nails, sanding machine, drilling machine.</li> <li>Understand and be aware of safe working practices in the use of Soldering irons, PCB boards</li> <li>Identifying and solving their own design problems.</li> <li>Develop specifications to inform the design of innovative, functional appealing products.</li> <li>Develop assembling and testing techniques.</li> </ul> <p><b>Builds on:</b> For the majority of students, this will be their first visit to a school workshop, using industrial equipment and soldering.</p> <p><b>New Skills:</b></p> <ul style="list-style-type: none"> <li>Applying Health &amp; Safety rules</li> <li>Manufacturing safely using the following tools / equipment                             <ul style="list-style-type: none"> <li>Tenon Saw</li> <li>Dovetail saw</li> </ul> </li> </ul>	<p><b>Enquiry:</b> Understand the importance of triangulation within structures and how biomimicry is used by designers to develop responses to both structural, forces and movement projects.</p> <p><b>End Point:</b> Students will understand structures by creating a structure of their own which they will test using masses. They will also design and develop a moving toy, after considering how moments, linkages and cams impact on their designs.</p> <p><b>Area of knowledge:</b></p> <ul style="list-style-type: none"> <li>Understanding both manmade and natural structures – solid, frame and shell</li> <li>Develop understanding of the use of triangulation to stabilise and strengthen structures</li> <li>Consideration of buildings or products that have been influenced by natural forms (Biomimicry)</li> <li>Examine different forms of bridges – understand the names of the different types of structures.</li> <li>Consider a budget for manufacture – (Part of a PDS). How can the structure be built with minimal cost. (Build this into practical where students have to 'buy' their materials from the budget.</li> <li>Name the four different types of movement</li> <li>Understand how each type of motion moves in different mechanisms</li> <li>Recognise the role levers play in mechanisms to make work easier</li> <li>Understand how an input motion can be changed by a linkage in a mechanism</li> <li>Understand the different types of cams</li> <li>Evaluation of the product – what could be improved.</li> </ul>	<p><b>Enquiry:</b> Understand the commands required to use CAD software and to develop both 2D and 3D models utilising a range of CAD software.</p> <p><b>End Point:</b> Students will produce a range of 2D and 3D shapes utilising a large range of commands. They will finish with the completion of a bike multi spanner which could be used as part of their final assessment in BTEC Engineering in Year 10 if they wish to proceed with this option</p> <p><b>Area of knowledge:</b> <b>2D Design:</b> Understanding of the following commands and their use:</p> <ul style="list-style-type: none"> <li>Setup and Layout</li> <li>User defined</li> <li>Co-ordinates x and y</li> <li>Paper sizes eg ISO A4</li> <li>Circle tool</li> <li>Delete functions</li> <li>Rectangle tool</li> <li>Line tool</li> <li>Hatch / Fill tool</li> <li>Fonts</li> <li>Grid lock and step lock function</li> <li>Dimension line tool</li> <li>Radius and diameter</li> <li>Transform</li> <li>Move / Copy</li> </ul> <p><b>Pro-desktop</b> Understanding of the following commands and their use:</p> <ul style="list-style-type: none"> <li>Rectangle tool</li> <li>Dimension tool to manipulate dimensions</li> <li>Delete line segment tool</li> <li>Line tool and circle tool</li> </ul>

	<ul style="list-style-type: none"> <li>○ Engineers Square</li> <li>○ Steel rule</li> <li>○ Ball and pein hammer</li> <li>○ Sanding machine</li> <li>○ Drilling machine</li> <li>○ Soldering iron</li> <li>○ Soldering stand.</li> <li>○ Coping saw</li> </ul> <ul style="list-style-type: none"> <li>● Applying testing principles</li> <li>● Applying assembly principles.</li> </ul> <p><b>Recalled Skills:</b> For the majority of students, these will generally be new skills as DT equipment is not available in many primary schools. The use of soldering irons will be new for the vast majority of students unless it has done under supervision at home.</p> <p><b>Links to:</b> National Curriculum</p> <ul style="list-style-type: none"> <li>● Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture</li> <li>● Select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties</li> <li>● Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups</li> <li>● Understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs] (only partly)</li> <li>● Identify and solve their own design problems and understand how to reformulate problems given to them</li> <li>● Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations</li> </ul> <p>Risk assessment Health &amp; Safety</p>	<ul style="list-style-type: none"> <li>● Extension – manufacture pieces using 2D Design and the Laser Cutter.</li> </ul> <p><b>Builds on:</b></p> <ul style="list-style-type: none"> <li>● Understanding and awareness of safe working practices in the use of a glue gun.</li> <li>● Understanding and awareness and be aware of safe working practices in the use of a Tennon Saw, a Dovetail (Gentleman’s) Saw, Engineers square, steel rule, ball and pein hammer, nails, sanding machine, drilling machine.</li> <li>● Forces and moments learnt in science</li> </ul> <p><b>New Skills:</b></p> <ul style="list-style-type: none"> <li>● Evaluating using quantitative data</li> <li>● Manufacturing a structure</li> <li>● Testing with the application of Health &amp; Safety in mind</li> <li>● Recording of results.</li> <li>● Forces and moments in science</li> </ul> <p><b>Recalled Skills:</b></p> <ul style="list-style-type: none"> <li>● Use of paper straws as a method of modelling</li> </ul> <p><b>Links to:</b> National Curriculum</p> <ul style="list-style-type: none"> <li>● Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations</li> <li>● Use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses</li> <li>● Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture</li> <li>● Select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties</li> <li>● Analyse the work of past and present professionals and others to develop and broaden their understanding</li> <li>● Investigate new and emerging technologies</li> <li>● Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups</li> </ul>	<ul style="list-style-type: none"> <li>● Feature menu</li> <li>● Extrusion</li> <li>● Round edges / chamfer tool</li> <li>● Assembly tool</li> <li>● Modify tool</li> <li>● Faces / edges</li> </ul> <p>The ability to design and present ideas following a design brief and specification. Manufacturing using the laser cutter (or 3D printer if available)</p> <p><b>Builds on:</b> This is all new learning in terms of CAD. There is a number of links to maths in terms of co-ordinates, dimensioning, radius and diameter. Learning also builds on some basic skills acquired in year 9 in terms of perspective drawing.</p> <p><b>New Skills:</b></p> <ul style="list-style-type: none"> <li>● Ability to apply the commands that have been taught within the unit to produce full 2D and 3D drawings.</li> <li>● Application of isometric drawing</li> <li>● Application of dimensioning</li> <li>● Application of assembly</li> </ul> <p><b>Recalled Skills:</b> For most students, this will be the first time that students have used CAD. However they will recall skills such as:</p> <ul style="list-style-type: none"> <li>● Dimensioning</li> <li>● Co-ordinates</li> <li>● Isometric</li> <li>● Faces</li> <li>● Proportion</li> <li>● Perspective</li> </ul> <p><b>Links to:</b> National Curriculum</p> <ul style="list-style-type: none"> <li>● Develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools</li> <li>● Understand developments in design and technology, its impact on individuals, society and the</li> </ul>
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	<p>Science – properties of material, electronic circuits, electronic components.                  Maths – measurement. Values, Units of measurement.                  SMSC- The Social and moral implications of design.                  Know that products have a life cycle and understand why we should use sustainable timbers                  CEIAG – Electronics Engineer (Sectors of Engineering), Design Engineer, Surveying people.  <b>Assessed by:</b>                  Formative assessment of :</p> <ul style="list-style-type: none"> <li>• Accuracy of work</li> <li>• Ability to work in a safe manner in the workshop</li> <li>• Correct and safe use of equipment</li> <li>• Ability to produce a quality product</li> <li>• Ability to produce neat and secure solder joints</li> <li>• Understand what some electronic components are.</li> <li>• Evaluate a product and identify improvements.</li> </ul> <p><b>Tier 3 Vocabulary:</b>                  Tenon, dovetail, coping, soldering iron, solder, timber, plywood, pine, softwood, hardwood, Printed Circuit Board (PCB), assembly, testing, evaluate, engineers square, rule, properties, health, safety, risk assessment, electronic, components, circuit, specification, user-centred design, parameter, constraint</p>	<ul style="list-style-type: none"> <li>• Understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists</li> <li>• Understand and use the properties of materials and the performance of structural elements to achieve functioning solutions</li> <li>• Understand how more advanced mechanical systems used in their products enable changes in movement and force:</li> </ul> <p>Risk assessment                  Health &amp; Safety                  Science – forces, moments and levers.                  Maths –Values,                  SMSC- The Social and moral implications of design.                  Working to a budget, understanding the needs of users, Product Design Specification to consider market.                  CEIAG – Structural Engineer, Manufacturing, Design Engineer  <b>Assessed by:</b>                  Formative assessment of :</p> <ul style="list-style-type: none"> <li>• Accuracy of work</li> <li>• Ability to work in a safe manner in the workshop</li> <li>• Correct and safe use of equipment</li> <li>• Ability to produce a structure that takes into account triangulation</li> <li>• The design of the moving toy and complexity of movement</li> <li>• The smoothness of operation and accuracy of the moving toy.</li> <li>• Completion of assessment sheets (completed for homework)</li> <li>• Evaluate and identify improvements.</li> </ul> <p><b>Tier 3 Vocabulary:</b>                  Structure, frame, shell. Sections, rigid, triangulation, natural, form, emulate, biomimicry, truss, suspension, cantilever, strut, tie, linear, rotary, reciprocation, oscillating, lever, load, fulcrum, effort, lever, linkage, direction of force, motion, magnitude, parallel, bell crank, slider, cam, dynamic, static</p>	<p>environment, and the responsibilities of designers, engineers and technologists</p> <ul style="list-style-type: none"> <li>• Identify and solve their own design problems and understand how to reformulate problems given to them</li> <li>• Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture</li> <li>• Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups</li> <li>• Understand and use the properties of materials and the performance of structural elements to achieve functioning solutions</li> <li>• Use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses</li> </ul> <p>Maths – dimensioning, shapes, faces, isometric, co-ordinates                  ICT – Computer Control                  CEIAG – Current roles within the engineering sector; ability to design and draw standard drawings.                  SMSC – The use of ICT rather than human beings to produce products.                  Engineering – Ties up directly with BTEC Tech Award in Engineering Component 1 Learning Aim B.  <b>Assessed by:</b>                  Formative assessment of :</p> <ul style="list-style-type: none"> <li>• Accuracy of work</li> <li>• Correct use of commands and programs</li> <li>• Ability to produce a quality product</li> <li>• Understand what some electronic components are.</li> <li>• Evaluate a product and identify improvements.</li> </ul> <p><b>Tier 3 Vocabulary:</b>                  Setup, layout, user defined, co-ordinates, function, hatch, grid lock, step lock, transform, manipulate. Feature, extrusion, revolve, assembly, perspective, orthographic, isometric, prototype, model, manufacture, assembly, properties, ferrous, thermosetting, thermoforming.</p>
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