

Department: Technology and Art: **Design Technology**

What is the <b>intent statement</b> for you subject? What does the <b>discipline offer</b> young people? What is the subject's <b>purpose</b> ? This should be a short, snappy statement.	
	Design and Technology is a creative hands-on course that prepares students for the modern world by focusing on innovating solutions to a wide range of problems and scenarios. Through research, sketching, computer modelling and simulation; students will develop design ideas. Using metals, plastics woods, programming and electronics students will then produce their own prototypes. The course in Key Stage 3 works on a carousel to ensure students experience a foundation of knowledge across a wide variety of material areas. The course is designed to empower students with a tool kit to problem solve. Students develop their skills using both hand tools and modern technology.
What are the <b>core aims</b> of the curriculum? What <b>key knowledge</b> do you want students to have at the end of their learning journey?	
<b>Core Aims:</b>	
<ul style="list-style-type: none"> <li>• Understand safe working practices within the Technology environment using substances, materials, tools and equipment.</li> <li>• Introducing basic electronic principles and key component function.</li> <li>• Develop presentation, drawing and communication skills through sketching, using drawing equipment and computer aided design.</li> <li>• Introducing an understanding of mechanical systems and motion through linkages, gears and cams.</li> <li>• Introducing practical skills in wood working using hand tools and machinery.</li> <li>• Working with care and precision to accurately cut, measure and materials.</li> <li>• Using Maths to calculate area; dimension and draw accurately; cost their products</li> </ul>	
<b>Key knowledge:</b>	
<b>Key skills:</b>	
Year 7	<ul style="list-style-type: none"> <li>• 3D sketching and rendering skills – isometric, oblique and 2-point perspective.</li> <li>• Health and safety using machinery and PPE</li> <li>• Mechanisms- linkages, Cams.</li> <li>• Tool names and functions.</li> <li>• Writing specifications to target user groups.</li> <li>• Electricity- Function of passive components, outputs, inputs.</li> <li>• Sustainability: material choices and the effect on the environment.</li> <li>• Product life cycles</li> </ul>
	<ul style="list-style-type: none"> <li>• Cutting, marking measuring accurately – Marking out tools, templates and CAD for efficiency.</li> <li>• Soldering circuits</li> <li>• Computer Aided Drawing in 2D and 3D.</li> <li>• Cutting, smoothing and drilling wood using hand tools, power tools, routers, scroll saws and belt sanders to manufacture products in wood.</li> <li>• Developing communication skills through drawing and annotating ideas using technical language.</li> </ul>

Year 8	<b>Core aims:</b>	
	<ul style="list-style-type: none"> <li>• Developing an understanding of material properties in wood, metal and plastic through modelling and experimenting.</li> <li>• Developing communication skills through 3D drawing and computer aided design.</li> <li>• Programming to control electronic inputs and outputs.</li> <li>• Communication skills: Working as a team and presenting to their peers</li> <li>• Sustainability, environmental impact, life cycle of plastic and metal.</li> <li>• Sustainable energy. Advantages and disadvantages</li> <li>• Developing accuracy through use of templates and CAD to produce high quality products.</li> </ul>	
	<b>Key knowledge:</b>	<b>Key skills:</b>
	<ul style="list-style-type: none"> <li>• Sustainable energy and finite resources – advantages and disadvantages.</li> <li>• Life cycle of plastics and aluminium- effect on the environment.</li> <li>• Developing an understanding of the properties of Thermoplastics and alloys.</li> <li>• Developing evaluative skills to make considered choices.</li> <li>• Understanding the effect of friction- use of bearings and pulleys.</li> <li>• Using electrical generator.</li> <li>• Designing for function</li> <li>• Developing their own technical specifications to meet the needs of a user.</li> <li>• Dietary needs, Seasonality and food miles.</li> </ul>	<ul style="list-style-type: none"> <li>• Cutting screw threads.</li> <li>• Forming: -Heat forming thermoplastics and bending alloys.</li> <li>• CAD using Autodesk Fusion.</li> <li>• Programming using the BBC Micro bit</li> <li>• Communication skills- working as a team; development of drawing skills; 3D modelling ideas;</li> <li>• Dough, batter and cake making consistency;</li> <li>• Kneading, proving and shaping.</li> <li>• Planning and time management.</li> <li>• Developing practical cooking skills.</li> <li>•</li> <li>• Metal working: Using Lathes, drills, heat treatment, taps and dies to engineer products.</li> </ul>

Year 9	<b>Core aims:</b>	
	<ul style="list-style-type: none"> <li>• Develop practical skills to create complex dishes.</li> <li>• To understand and apply time plans to meet a brief and specification.</li> <li>• To be able to use wood working tools with care and accuracy: - measuring tools, templates.</li> <li>• Developing an understanding of material properties in timber, ferrous and non-ferrous materials.</li> <li>• Further develop CAD drawing skills to create 3D and 2D images which can be manufactured through laser cutting.</li> <li>• Develop an understanding of wood finishes.</li> <li>• Sustainability in Timber- FSC.</li> <li>• Scales of Production.</li> <li>• Metal processes- Heat Treatment, wasting using the lathe,</li> <li>• Creating a thread through tapping a hole.</li> </ul>	
	<b>Key knowledge:</b>	<b>Key skills:</b>
<ul style="list-style-type: none"> <li>• Food Safety: - Apply it to making plans.</li> <li>• Food quality, temperature control; Contingency plans for change and adaptation.</li> <li>• Softwoods, Hardwood, manufactured boards – properties and sustainability-FSC</li> <li>• Wood finishes.</li> <li>• Processes: - lathe, heat treatment, metal properties.</li> <li>• Scales of manufacture.</li> <li>• Specifications- How to write accurately and create a brief.</li> </ul>	<ul style="list-style-type: none"> <li>•</li> <li>• Using chisels safely and accurately.</li> <li>• Developing CAD skills in 2D design and Auto Desk.</li> <li>• Understanding how to use the lathe correctly to parallel turn, knurl, taper turn, facing and drilling.</li> <li>• Heat treatment- hardening and tempering.</li> <li>• Casting using moulds.</li> <li>• Cutting a screw thread with a die.</li> <li>• Spot welding.</li> <li>• Quality testing- seasoning and using temperature probes.</li> <li>• Quality control checking.</li> <li>• Independence when looking at contingencies.</li> </ul>	

Year 10	<b>Core aims:</b>	
	<ul style="list-style-type: none"> <li>• Developing practical skills across a range of materials through specialist design and make projects in timber, metal and plastic that ensures that students use a wide range of tools, equipment and machinery. Understanding the working properties of materials is a key focus.</li> <li>• Skills focus ensuring students can communicate design ideas through a range of drawing and computer aided design skills.</li> <li>• Development of theory knowledge through practice exam questions.</li> <li>• Development of specifications- Writing them and designing products that meet user needs.</li> <li>• Responsible designing through understanding sustainability and life cycle.</li> <li>• Use of computer aided manufacturing- 3D printing, laser cutting. CAM routing.</li> <li>• New Technology – Production – JIT/ Scales of Production.</li> <li>• Modern Materials- Composites and smart materials.</li> <li>• Developing numeracy through area calculations, costings, percentages.</li> </ul>	
	<b>Key knowledge:</b>	<b>Key skills:</b>
	<ul style="list-style-type: none"> <li>• New Technology – Production – JIT/ Scales of Production.</li> <li>• Modern Materials- Composites and smart materials.</li> <li>• Understanding materials properties through practical investigation.</li> <li>• Understanding how to use tools safely.</li> <li>• Understanding sustainability issues – 5 x R's; life cycle analysis.</li> <li>• Stock forms and components.</li> <li>• Finishing materials</li> <li>• Quality management systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Developing Wood working skills through manufacturing joints using hand tools and machinery.</li> <li>• Developing electronic skills through soldering prefabricated PCB's</li> <li>• Communication skills in designing, modelling by drawing in a range of mediums.</li> <li>• Developing analytical skills in order to design for others and problem solve independently.</li> <li>• Working with care and accuracy when marking out cutting and joining a range of materials.</li> <li>• Use computer aided manufacturing- 3D printing, laser cutting. CAM routing.</li> </ul>

Year 11	<b>Core aims:</b>	
	<ul style="list-style-type: none"> <li>• Prepare the NEA: Coursework Design and Make project from June of Year 10 to March of Year 11.</li> <li>• Exam practice: To complete a wide range of exam questions – to understand how to answer a question and apply their knowledge.</li> <li>• Through a structured approach -Develop skills in working to deadlines to ensure completion.</li> <li>• Planning for Production considering total quality management, health and safety.</li> <li>• Developing analytical skills in order to evaluate and make changes where needed</li> </ul>	
	<b>Key knowledge:</b>	<b>Key skills:</b>
	<ul style="list-style-type: none"> <li>• Understand and apply the NEA mark scheme.</li> <li>• Design Strategies;</li> <li>• Materials and their properties;</li> <li>• Tools and their Processes;</li> <li>• Emerging Technologies.</li> <li>• Properties of materials- using technical language to describe.</li> <li>• Quality Management- Tolerances, jigs and templates.</li> </ul>	<ul style="list-style-type: none"> <li>• Apply the Design Process through analysing, designing, modifying and evaluating.</li> <li>• Design and Manufacture a product with high levels of accuracy using a wide range of tools and machinery.</li> <li>• Planning for manufacture considering quality management systems and safe working practices.</li> <li>• Time Management skills: Organise their time effectively.</li> </ul>

Year 12	<b>Core aims:</b>	
	<p>Prepare students for their NEA by completing a series of skills-based projects:          Lighting base project which features:          Developing technical specifications          Sketching based focus to develop designing and communication skills          Design strategies focus to ensure students can complete a wide variety of ideas.          CAD focus to ensure that students have high level CAD skills in 2D and 3D drawing to include exploded views, technical drawings.          Manufacturing a high-quality project within a time scale to ensure that students are working to high levels of accuracy and safety.          Comprehensive theory focus which covers the syllabus.          Exam techniques; practice questions.          Applying KS4 Mathematic principles which focus on area calculations; using trigonometry; ratios, percentages, statistics.</p>	
	<b>Key knowledge:</b>	<b>Key skills:</b>
	<ul style="list-style-type: none"> <li>• Designing and innovation: - Principles of designing and problem-solving considering detail designing, ergonomics and anthropometrics.</li> <li>• Materials and Components. Working characteristics, materials properties, modern materials and safe practices.</li> <li>• Processes: - Hand, Machine, combining forming materials, CAM.</li> <li>• Industrial and Commercial Practices: -Manufacturing systems, stages of production, Safe working practices.</li> <li>• Product Analysis and Systems; intellectual property, form and functions, trends and influences, control systems.</li> <li>• Human responsibility: - Risk Assessment, Forms of energy, responsibility when designing.</li> <li>• Public Inter Comprehensive theory focus which covers the syllabus.</li> <li>• Exam techniques; practice questions.</li> <li>• Applying KS4 Mathematic principles which focus on area calculations;</li> </ul>	<p>Communication skills in designing and using CAD technology.          CAM based skills – To use a range of CAM based machinery.          Processing skills to be able to manufacture using a wide range of tools and machinery with care and accuracy.          Analytical skills to be able to evaluate their project as it progresses and modify where needed.</p>

	using trigonometry; ratios, percentages, statistics, market and client needs, marketability, evaluating products. <ul style="list-style-type: none"> <li>• Calculating area and percentages</li> </ul>	
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Year 13	<b>Core aims:</b>	
	A sustained design and make project, based on a brief developed by the candidate, assessing the candidate's ability to: <ul style="list-style-type: none"> <li>• Identify, investigate and outline design possibilities</li> <li>• Design and make prototypes</li> <li>• Analyse and evaluate design decisions and outcomes, including for prototypes made by themselves and others.</li> </ul> <ul style="list-style-type: none"> <li>• Comprehensive theory focus which covers the syllabus.</li> <li>• Exam techniques; practice questions.</li> <li>• Applying KS4 Mathematic principles which focus on area calculations; using trigonometry; ratios, percentages, statistics.</li> </ul>	
	<b>Key knowledge:</b>	<b>Key skills:</b>
	<ul style="list-style-type: none"> <li>• Designing and innovation: - Principles of designing and problem-solving considering detail designing, ergonomics and anthropometrics.</li> <li>• Materials and Components. Working characteristics, materials properties, modern materials and safe practices.</li> <li>• Processes: - Hand, Machine, combining forming materials, CAM.</li> <li>• Industrial and Commercial Practices: -Manufacturing systems, stages of production, Safe working practices.</li> <li>• Product Analysis and Systems; intellectual property, form and functions, trends and influences, control systems.</li> <li>• Human responsibility: - Risk Assessment, Forms of energy, responsibility when designing.</li> <li>• Public Inter Comprehensive theory focus which covers the syllabus.</li> <li>• Exam techniques; practice questions.</li> <li>• Applying KS4 Mathematic principles which focus on area calculations;</li> </ul>	<ul style="list-style-type: none"> <li>• Communication skills in designing and using CAD technology.</li> <li>• CAM based skills – To use a range of CAM based machinery.</li> <li>• Processing skills to be able to manufacture using a wide range of tools and machinery with care and accuracy.</li> <li>• Quality management: To plan for high quality production.</li> <li>• Analytical skills to be able to evaluate their project as it progresses and modify where needed.</li> <li>• Use maths to be able to cost their product and organise their materials efficiently.</li> </ul>

	<p>using trigonometry; ratios, percentages, statistics, market and client needs, marketability, evaluating products.</p> <ul style="list-style-type: none"><li>• Calculating area and percentages.</li></ul>	
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