



# Design Technology Engineering

## Subject Intent

At the Bishops' Blue Coat, in the Design Technology Engineering Department we aim to inspire pupils to develop their curiosity and understanding of how things work and are made. We recognise the importance for pupils to develop traditional design and making skills, alongside the use of new technologies which empowers students to experience the latest CAD/ CAM developments within a diverse curriculum. In KS3 pupils are taught through a series of projects which link together throughout the KS3 journey each year revisiting and building on the last.

## Core Principles

- **Dignity**

We enable pupils to feel a sense of achievement and self-worth within the Design Technology Engineering Department. During KS3, pupils will follow a Scheme of Learning designed to build on key skills and subject knowledge. Through a range of different projects learning is structures and accessible allowing us to build positive, supportive relationships in the classroom to develop collaboration.

- **Respect**

We seek to develop pupils' respect for the environment through promoting sustainability alongside the need for pupils to respect themselves and peers through creating a learning environment where all feel safe to contribute and express their opinions. This is achieved through analysis of client and user requirements to deepen pupils' understanding of the society that they live in.

- **Wisdom**

We promote the transfer of skills between all subjects throughout the promotion of STEM. We seek to develop pupils' curiosity within Design and Technology Engineering to search out initiative solutions to the challenges they face. Pupils are encouraged to discuss and feedback on all aspects of their work and make changes if needed.

- **Knowledge**

We encourage and enable pupils to question to deepen their understanding of subject specific terminology. We teach them the skills to develop their learning building skills and knowledge throughout KS3. We believe a solid grasp of the design and making skills alongside an understanding of subject terminology is key to successfully embed our teaching values during their 7-year journey.

- **Skills**

Each project is designed to deliver a set of skills which can be used, transferred and improved as they work their way through KS3. Students are given the opportunity to develop a wide range of designing and practical skills which can be transferred to many different subjects and real-world situations.

- **Aspirations**

We encourage pupils to stretch and challenge themselves. We believe that Design and Technology Engineering is vital for later life and seek to share the benefits of studying them through our curriculum. Creating opportunities for pupils to explore different materials and manufacturing techniques gives them a solid understanding with the subject and helps to prepare them for the future. As teachers we share our experiences and passion for Design and Technology within our teaching.

- **Hope**

Through our lessons and Scheme of Learning we support pupils to seek out solutions to a wide range of problems and deal new skills and techniques. Searching for a solution, whilst enabling them to communicate and realise their ideas. We encourage our pupils to approach their learning with positivity and curiosity.

Key Stage 3 Programmes of Study						
Project	Year 7	Map	Year 8	Map	Year 9	Map
<b>1</b>	<p>Introduction to 3D drawing and CAD/CAM.</p> <p>Introduction of isometric drawing and sketching. Including Rendering Techniques.</p> <p>Introduction the 3D Computer modelling on Creo leading to 3D Printing of deigns.</p>	K S A	<p>Edison Robots.</p> <p>Applying previous knowledge of scratch into practical programming of the Edison robots to complete a series of challenges.</p>	K S A W	<p>Key Holder.</p> <p>Introduction to Engineering principles. Focusing on the use of Engineering Drawings and practical techniques.</p> <p>Promoting the use of Recycled products and sustainability.</p>	R D W A
<b>2</b>	<p>Pewter Casting.</p> <p>Introduction to basic hand and fixed tools and machines to create an accurate mold for Pewter casting. Focusing on the design and finishing techniques</p>	D R W S A	<p>Fragrance Packaging</p> <p>Develop their knowledge, purpose and function of packaging. Exploring these areas, reduce, reuse and recycle when considering their packaging. Pupils will develop understanding of net development and will use this to create a unique piece of packaging for a new fragrance. Pupils will develop their knowledge, purpose and function of packaging.</p>		<p>LED Light</p> <p>Putting skills into context – students design and manufacture a mood light including electronics with elements that are produced using computer control, balanced with traditional workshop skills.</p>	D R S K A
<b>3</b>	<p>LED Torch.</p> <p>Continuing to develop knowledge and understanding of tools, equipment and Materials. Focusing in Polymer and electronic components and basic circuits.</p>	K S W R A	<p>Passive Speaker</p> <p>Building on SKU with a focus on developing ideas.</p> <p>Using sustainable materials to realise a concept.</p> <p>Biomimicry introduced via use of Laser Engraving.</p>	D R S K A	<p>Phone storage/holder</p> <p>The pupils learn about natural and manufactured wood and their uses.</p> <p>Designing a smart-phone holder, developing and modelling design ideas.</p> <p>The pupils draw a variety of design ideas, adding annotations and written information to them.</p>	

## Key Stage 4 Programmes of Study- Engineering

Terms	Year 10		Map	Year 11		Map
<b>1</b>	Unit R107: Developing and presenting engineering designs. <ul style="list-style-type: none"> <li>Hand-drawing techniques to design and present ideas and concepts, i.e. o freehand sketching in 2D and 3D rendering using shade, tone and texture.</li> <li>Annotation and labelling techniques that demonstrate design ideas (e.g. show key features, functions, dimensions, materials, construction/manufacture methods, access to components, areas for further investigation)</li> </ul>	Theory work to be taught alongside other units throughout year 10 and 11		Unit R108: 3D design realisation <ul style="list-style-type: none"> <li>Key considerations when making a prototype</li> <li>Identification and consideration of risks in production plans</li> <li>Production and use of risk assessments for production activities</li> <li>How to assess hazards and take precautions when using tools and machines</li> <li>Safe use of hand tools and machines</li> <li>Use of personal protective equipment (PPE) during production processes</li> <li>Safe working procedures when using materials, chemicals, finishes and solvents</li> <li>Selection and use of appropriate materials to produce a prototype</li> <li>Use of tools and processes to cut and shape materials</li> <li>Use of preparation and assembly methods (</li> </ul>	Wider influences on new products, <ul style="list-style-type: none"> <li>market pull / technological push</li> <li>cultural and fashion trends</li> <li>legislative design requirements</li> <li>Life Cycle Analysis (LCA)</li> <li>sustainable design</li> <li>new and emerging technologies and materials – environmental pressures (e.g. ethical and socially responsible design)</li> </ul>	
<b>2</b>	<ul style="list-style-type: none"> <li>The use of ICT software to produce, modify and enrich design proposals techniques to produce technical drawings, 3D engineering drawings</li> </ul>	Unit R105: (Examined unit) Design briefs, design specifications and user Requirements. <ul style="list-style-type: none"> <li>Identification of design needs. Information which may inform the design brief</li> </ul>			PPEs	
<b>3</b>	<ul style="list-style-type: none"> <li>2D engineering drawings</li> <li>CAD applications to produce and communicate design proposals</li> <li>Techniques used to communicate design proposals</li> </ul>	<ul style="list-style-type: none"> <li>Requirements of a design specification,</li> <li>Product requirements</li> <li>Considerations,</li> </ul>			Revision and Exam Technique	
<b>4</b>	Unit R106: Product analysis and research	Design for manufacturing assembly Design for disassembly Manufacturing processes - one off			PPEs	

	<ul style="list-style-type: none"> <li>• Commercial production methods that impact on product /component design,</li> <li>• Impact of manufacturing processes on product design, i.e.</li> <li>• Considerations for product end of life,</li> </ul>	<ul style="list-style-type: none"> <li>– batch</li> <li>– mass production</li> <li>- durability and reliability</li> <li>- tolerances</li> <li>- product safety</li> <li>- sustainability</li> <li>- maintenance registered designs</li> <li>- trademarks</li> <li>- British Standards</li> <li>- European Conformity (EC)</li> </ul>		<ul style="list-style-type: none"> <li>• Methods of recording key stages of making the prototype</li> <li>• How to evaluate a prototype,</li> <li>• How to evaluate own performance</li> </ul>		
5	<ul style="list-style-type: none"> <li>• Importance of conformity to legislation, quality and safety standards, i.e.</li> <li>• Research methods used to inform product analysis, i.e.</li> </ul>			Final Exam Revision and Preparation		
6	<ul style="list-style-type: none"> <li>• Strengths and weaknesses of existing products</li> <li>• methods used to summarise research outcomes i.e.</li> <li>• disassembly procedures using appropriate tools and instruments safely</li> <li>• analyse an existing product through disassembly</li> </ul>					