

# Design Technology @ Caedmon

## **National curriculum for Technology: Purpose of study**

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Students learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

## **Aims of the National curriculum: Technology**

The national curriculum for design and technology aims to ensure that all students:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

## **Aims of our Caedmon curriculum for Design Technology**

The aim of the design technology curriculum at Caedmon College is to create an inclusive, positive and busy learning environment; to ensure all students have the same learning opportunities to develop sound knowledge and understanding, skills and experiences to equip them for independent living in the future. We aim to instil innovation, creativity and enterprise by allowing students to apply their learning to problem solving when designing and making products, using a variety of materials, including food, plastics and wood, to meet the needs of others within local and wider contexts. We endeavour to promote responsibility and respect for each other when working independently and as part of a team in a safe and positive environment.

## Year 7 Design Technology @ Caedmon

Our aim in Year 7 is to enable students to review and develop their understanding of a variety of materials and manufacturing processes through a series of design and make projects. They will design, manufacture and evaluate their work and will become proficient in working safely with a wide range of tools, equipment and machinery, including CAD/CAM.

	Topics, themes and skills covered	Assessment
<b>Autumn 1</b>	<p><b>Designing:</b> To generate a range of annotated ideas/sketches for a toy wooden animal.</p> <p><b>Making:</b> To use a range of hands tools and equipment in the manufacture of a wooden toy.</p> <p><b>Evaluating:</b> To test and refine work throughout the process of manufacture</p>	<p>Baseline test.</p> <p>Teacher assessment of health and safety and knowledge in the workshop.</p> <p>Self-assessment in project portfolio.</p>
<b>Autumn 2</b>	<p><b>Designing:</b> To identify and solve their own design problems upon development of a final design for a wooden animal.</p> <p><b>Making:</b> To use a range of hands tools and equipment in the manufacture of a wooden toy.</p> <p><b>Evaluating:</b> To evaluate their final outcomes in accordance to the design brief, peer and self-assessment.</p>	<p>Teacher assessment of health and safety and knowledge in the workshop.</p> <p>Self-assessment in project portfolio.</p> <p>Teacher assessment of final outcome.</p> <p>Student evaluation of task.</p> <p>End of unit test.</p>
<b>Spring 1</b>	<p><b>Designing:</b> To generate a range of annotated ideas/sketches based upon their chosen target market.</p> <p><b>Making:</b> To use hands tools and equipment in the manufacture of the box to house their circuits. To develop their understanding of CAD software through a range of tutorials.</p> <p><b>Evaluating:</b> Investigation of new and emerging technologies (CAD/CAM). To test and refine work throughout the process of manufacture.</p>	<p>Teacher assessment of students' understanding of CAD, CAM and circuits.</p> <p>Self-assessment in project portfolio.</p>
<b>Spring 2</b>	<p><b>Designing:</b> To develop their drawn designs using CAD software and identify and solve their own design problems.</p> <p><b>Making:</b> To use CAD software in the manufacture of their acrylic light topper. To manufacture a simple circuit using the process of soldering.</p> <p><b>Evaluating:</b> To evaluate their final outcomes in accordance to the design brief, target market and self-assessment.</p>	<p>Teacher assessment of students' understanding of CAD, CAM and circuits.</p> <p>Self-assessment in project portfolio.</p> <p>Teacher assessment of final outcome.</p> <p>Student evaluation of task.</p> <p>End of unit test.</p>
<b>Summer 1</b>	<p><b>Designing:</b> Develop drawing techniques Design internal parts of amplifier.</p> <p><b>Making:</b> Make amplifier from drawings and their internal design solution.</p> <p><b>Evaluating:</b> Evaluate throughout making</p> <p><b>Evaluating:</b> To test and refine work throughout the process of manufacture.</p>	<p>Teacher assessment of students' knowledge and application of drawing skills to the task.</p> <p>Self-assessment in project portfolio.</p>
<b>Summer 2</b>	<p><b>Designing:</b> Design the front panel. Use CAD to develop final idea. Produce final drawing in isometric.</p> <p><b>Making:</b> CAD/CAM, assemble and finish.</p> <p><b>Evaluating:</b> To evaluate their final outcomes in accordance to the design brief, peer and self-assessment.</p>	<p>Teacher assessment of students' knowledge and application of drawing skills to the task.</p> <p>Self-assessment in project portfolio.</p> <p>Teacher assessment of final outcome.</p> <p>Student evaluation of task.</p> <p>End of unit test.</p>

## Year 8 Design Technology @ Caedmon

Our aim in Year 8 is to enhance students previous learning in Year 7 by developing their understanding of a variety of materials and manufacturing processes through a series of design and make projects. They will design, manufacture and evaluate their work and will become proficient in working safely with a wide range of tools, equipment and machinery, including 3D CAD/CAM.

	Topics, themes and skills covered	Assessment
<b>Autumn 1</b>	<p><b>Designing:</b> To generate a range of annotated ideas/sketches for a clock inspired by one or more design movements studied.</p> <p><b>Making:</b> To use a range of hands tools with accuracy to manufacture their outer clock design.</p> <p><b>Evaluating:</b> To test and refine work throughout the process of manufacture.</p>	<p>Teacher assessment of students' knowledge and understanding of 20th century design movements and its application in their work.</p> <p>Self-assessment in project portfolio</p>
<b>Autumn 2</b>	<p><b>Designing:</b> To identify and solve their own design problems upon development of ideas through CAD software and final assembly.</p> <p><b>Making:</b> To develop their knowledge and understanding of CAD software to manufacture the inner section of their clock.</p> <p><b>Evaluating:</b> To refine work and evaluate their final outcomes in accordance to the design brief, peer and self-assessment.</p>	<p>Self-assessment in project portfolio.</p> <p>Teacher assessment of final outcome.</p> <p>Student evaluation of task.</p> <p>End of unit test.</p>
<b>Spring 1</b>	<p><b>Designing:</b> To develop a range of ideas for a 3D printed character pen holder inspired by the work of alessi (recall and recap knowledge from clock project). To demonstrate knowledge of 3D CAD designing software (Autodesk fusion 360) through a range of tutorials.</p> <p><b>Making:</b> To demonstrate their knowledge of 3D CAD software, through the manufacture of a pen topper or holder.</p> <p><b>Evaluating:</b> To modify, refine and problem solve their work throughout the manufacturing stages. To evaluate their final outcome in accordance to accuracy, peer and self-assessment</p>	<p>Teacher assessment of students' knowledge and understanding of 3D CAM and its application in their work.</p> <p>Self-assessment in project portfolio.</p> <p>Teacher assessment of final outcome.</p> <p>Student evaluation of task.</p> <p>End of unit test</p>
<b>Spring 2</b>	<p><b>Designing:</b> To generate a range of annotated ideas/sketches for a set of key tags inspired by biomimicry/art nouveau.</p> <p><b>Making:</b> To use hands tools and plastic forming processes (thermoforming), with accuracy to manufacture their keytags.</p> <p><b>Evaluating:</b> To evaluate and assess a product's sustainability based on a life cycle assessment. To test and refine work throughout the process of manufacture.</p>	<p>Teacher assessment of students' knowledge and understanding of polymers and woods and its application in their work.</p> <p>Self-assessment in project portfolio.</p>
<b>Summer 1</b>	<p><b>Designing:</b> To design packaging solutions to promote their product. To also identify and solve their own design problems upon development of key tag ideas.</p> <p><b>Making:</b> To demonstrate their knowledge of vacuum forming and strip heating in the creation of their packaging design. To use hand tools with accuracy to create their wooden key tag and assemble their final outcome.</p> <p><b>Evaluating:</b> To perform a life cycle assessment of their final outcome to determine the sustainability of their product. To evaluate their final outcome in accuracy, peer and self-assessment.</p>	<p>Self-assessment in project portfolio.</p> <p>Teacher assessment of final outcome.</p> <p>Student evaluation of task.</p> <p>End of unit test.</p>
<b>Summer 2</b>	<p><b>Designing:</b> To demonstrate knowledge of mindstorm education software through exploration of features and parts.</p> <p><b>Making:</b> To work as part of a small group to manufacture and power a Lego buggy and use programmable software to provide input controls.</p> <p><b>Evaluating:</b> To self and peer assess throughout the coding process to evaluate the performance of the Lego mindstorm buggy.</p>	<p>Self-assessment in project portfolio.</p> <p>Teacher assessment of final outcome.</p> <p>End of unit test.</p>

## Year 9 Design Technology @ Caedmon

Our aim in Year 9 is to enhance students' previous learning in Y8 by developing their knowledge and understanding of the iterative design process to give them a taste of GCSE product design. As the course allows for further study of GCSE product design or Engineering in KS4, they will study both of subjects and develop their knowledge of: Materials and finishes, working to tolerances, engineering drawing, accuracy, environmental/human factors as well as creatively solving design problems.

	Topics, themes and skills covered	Assessment
<b>Autumn 1</b>	<p><b>Designing:</b> To develop ideas for a bottle opener handle design based on the study of anthropometrics and ergonomics. Development of work through modelling techniques and problem solving.</p> <p><b>Making:</b> To interpret engineering drawings. To use hand tools and finishing skills accurately by applying close tolerances to manufacture their bottle opener.</p> <p><b>Evaluating:</b> To test and refine work throughout the modelling and manufacturing processes. To evaluate their final outcome in accordance to ergonomics, peer and self-assessment.</p>	Self-assessment in project portfolio. Teacher assessment of final outcome to engineering drawings. End of unit test
<b>Autumn 2</b>	<p><b>Designing:</b> To extend their knowledge of drawing techniques with further accuracy and conversion between the two.</p> <p><b>Making:</b> The use of CAD software (2D and 3D) to produce technical and accurate drawings. To be able to demonstrate their knowledge of a range of skills/techniques to evoke creativity and problem solving.</p> <p><b>Evaluating:</b> To refine drawings and ideas throughout with greater emphasis on accuracy.</p>	Teacher and self-assessment of drawing skills. Design outcomes from problem solving tasks. End of unit test.
<b>Spring 1</b>	<p><b>Designing:</b> To generate a range of annotated ideas/sketches for their pendants inspired by the work of art nouveau and/or art deco designers.</p> <p><b>Making:</b> To use more extensive workshop tools and processes to make their copper and aluminium pendants.</p>	Self and peer assessment in project portfolio throughout the design and manufacture of their outcomes. End of unit test
<b>Spring 2</b>	<p><b>Designing:</b> To use CAD/CAM software to design and manufacture their 3D and 2D pewter cast moulds.</p> <p><b>Making:</b> To demonstrate their knowledge of the pewter cast process in the manufacture of their 2D and 3D pendants. To ensure all work is to a high-quality finish.</p> <p><b>Evaluating:</b> To evaluate their final solutions towards their client, specification and design brief.</p>	Self-assessment in project portfolio. Teacher and peer assessment of final outcome. Student evaluation of task. End of unit test.
<b>Summer 1</b>	<p><b>Designing:</b> To research and generate ideas based on their intended client or target market for a wire tidy. To use primary/secondary sources to aid their solutions.</p> <p><b>Making:</b> To develop a series of models to inform a final working prototype which solves the given design problem.</p> <p><b>Evaluating:</b> To evaluate throughout the design process to inform next steps. To complete a final evaluation of their prototype, against their design specification and clients needs/wants.</p>	Self-assessment in project portfolio throughout the iterative design process. Teacher and peer assessment of final outcome. Student evaluation of task.
<b>Summer 2</b>	<p><b>Designing:</b> To work from engineering drawings to develop a design using CAD/CAM software to create a phone grip.</p> <p><b>Making:</b> To manufacture the main phone stand using workshop tools and processes (sheet metal bending, drilling, cutting/shaping) with high accuracy. Students work to close tolerances and stick to time planning sheets created.</p> <p><b>Evaluating:</b> To refine and test work throughout the manufacturing process. To evaluate overall product based on accuracy and quality of finish.</p>	Self-assessment in project portfolio to inform their next steps. Teacher and peer assessment of final outcome. Student evaluation of task. End of unit test.

## Year 10 Design Technology @ Caedmon

Our aim in Y10 is to ensure that students are equipped with the skills of creativity and technical knowledge to help them perform a certain practical based task to help them progress in the world of work. For instance, design employment sectors which are prevalent in the local community, nationally and worldwide. Their learning will also give students the opportunity to develop transferable skills that will be beneficial now and, in their futures, such as creativity, problem solving, planning, communication and practical skills.

	Topics, themes and skills covered	Assessment
<b>Autumn 1</b>	<p><b>Theory topic 1: Systems:</b> Circuits, electronic components, soldering and CAD/CAM</p> <p><b>Lighting Project inspired by a design movement (Trial NEA):</b> Students will generate an online portfolio of work, demonstrating the iterative design phases to manufacture a lamp based on one of the design movements that they have looked at.</p>	<p>On-going teacher assessment and feedback. Self-assessment in project portfolio. Teacher assessment of final outcome. Student evaluation of task. Unit test on theory.</p>
<b>Autumn 2</b>	<p><b>Theory 2: Energy systems and storage</b> Study of renewable and non-renewable sources. Examine sources of stored, pneumatic and hydraulic energy types.</p> <p><b>Theory 3: Mechanical devices</b> Examining theory relating to linkages, levers, gears and movements.</p> <p><b>Focused practical task to review learning-</b> Students to demonstrate their knowledge of both theory topics to generate a hydraulic powered linkage movement. <u>links to problem solving</u></p>	
<b>Spring 1</b>	<p><b>Theory 4: Materials, properties, smart, modern and composite</b> Review more extensive learning of materials and properties. <b>Introducing new learning:</b> Smart, modern and composite materials.</p> <p><b>Focused practical task to review learning-</b> 'Skills stick' - A strip of timber which demonstrates different joining, manufacturing, finishes and techniques of materials.</p>	
<b>Spring 2</b>	<p><b>Theory 5: Industry, enterprise, sustainability and customers design decisions</b> <b>Trial NEA (contextual challenge- Children's learning and play or needs of the elderly - .</b> Students will be given a more open concept (to pick one of the two contextual challenges), in preparation for the NEA. They will demonstrate their understanding of the iterative design process in greater depth with less guidance.</p>	
<b>Summer 1</b>	<p><b>Theory 6: Manufacturing in industry, production aids:</b> Examining theory relating to: Batch, mass and on off production. Industrial manufacturing techniques: injection moulding, blow moulding, CAD/CAM.</p> <p><b>Focused practical task to review learning-</b> Production aids project, to demonstrate understanding of production techniques (batch produced item).</p>	
<b>Summer 2</b>	<p><b>Final NEA</b> Students will start their end of course assessment project based on contextual challenges set by the exam board on 1st June. Students will analyse the brief to clarify the design problem of their chosen task and start relevant research.</p>	

## Year 11 Design Technology @ Caedmon

Our aim in Y11 is to develop, then consolidate students' previous learning and equip them with the skills to allow them to complete final assessments successfully and confidently. Students will be prepared for the written exam in June through revision of theory based topics and practical tasks. They will also use their time effectively to complete their controlled assessment. Throughout Y11, we will encourage students to continue applying the transferable skills such as creativity and technical knowledge, developed in their Y10 learning to optimise their future success in education and employment.

	Topics, themes and skills covered	Assessment
<b>Autumn 1</b>	<p><b>Final NEA</b> Completion of research section of contextual design. Students will carry out product analysis, then produce a client and design specification.</p>	<p>Limited feedback is allowed during the final assessment. Students will be assessed in preparation for their written exam through regular practice of exam questions.</p>
<b>Autumn 2</b>	<p><b>Final NEA</b> Students to produce their design ideas and developments through a series of CAD/CAM and physical modelling. Students will start to develop and manufacture their final outcome. They will document the analysis of their design work through to the final outcome.</p>	
<b>Spring 1</b>	<p><b>Completion of NEA</b> Final development and manufacture of final outcome using hand tools and CAD/CAM. They will document the analysis of their design work through to the final outcome. Testing and client feedback of their final prototype. NEA to be completed by half term.</p>	
<b>Spring 2</b>	<p><b>Exam preparation</b> <b>Key areas:</b> Core technical principles. Specialist technical principles. Designing and making principles.</p>	<p>Knowledge and understanding assessed by teacher, through a variety of techniques including practice questions and papers, quizzes and group activities.</p>
<b>Summer 1</b>	<p><b>Exam Preparation</b> <b>Key areas:</b> Core technical principles. Specialist technical principles. Designing and making principles.</p>	
<b>Summer 2</b>	<p><b>Exam Preparation</b> <b>Key areas:</b> Core technical principles. Specialist technical principles. Designing and making principles.</p>	
<b>Summer 2</b>	<p><b>Exam Preparation</b> <b>Key areas:</b> Core technical principles. Specialist technical principles. Designing and making principles.</p>	