

# Curriculum Map for Design and Technology: Product Design 2023-2024

In years 7 and 8 students have one lesson a week in Design and Technology. Half the year is spend in Product Design and half the year in Food Technology.  
The following curriculum map is for Design and Technology: Product Design

## Year 7

Working with timbers is a strong focus in year 7 as it is the specialist material we choose at GCSE. The practical skills students gain in year 7 are transferrable to other materials.  
Students are introduced to design processes which are covered in more depth during year 8.

### 1. Timbers properties and processes

#### Description

Students are taught how to use coping saws to cut curves in a stand-alone lesson before embarking on their birdfeeder. Students then use their practical skills from the first project to complete their birdfeeder.

A metal skewer is designed and made by manipulating aluminium.

Practical work is supported by theory work. Students complete work on soft and hard woods, finishing techniques and develop their isometric drawing skills.

#### Skills covered in this unit:

Knowledge and understanding of material properties and tools and processes of working with wood.

- ✓ How to work with hand tools
- ✓ How to use power tools
- ✓ How to work with resistance materials
- ✓ How to read a manufacturing drawing
- ✓ Isometric drawing
- ✓ Iterative design
- ✓ How to achieve a good quality of finish
- ✓ How to work with metals
- ✓ Hard and soft woods

### 2. Design and development unit: Toys to teach

#### Description

Students will be given a design problem and brief on the topic of educational toys.

Students will analyse existing educational toys. By analysing/research existing products. This will help students' identify problems and develop new products.

Developing their ideas through modelling with paper and card.

#### Skills covered in this unit:

New skills and knowledge

- Design problem and brief
- Specification
- Product analysis
- Design ideas
- Developing ideas through modelling

**Assessment** Questioning and verbal feedback throughout the project.

Formative feedback of practical after each skill is completed and marking of the whole project at the end.

Formative feedback of design work including student response.

Feedback of materials written work.

Questioning and verbal feedback throughout the project.

Formative feedback of design work including student response.

Formative assessment of final design idea.

**Why do we study this?**

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

Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality products.

Select from and use specialist tools, techniques, processes, equipment and machinery precisely.

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

Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world.

use research to identify and solve their own design problems.

Use a variety of approaches, to generate creative ideas.

Develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling.

**Year 8**

After a focus on practical skills in year 7, our year 8 focus is design. Products are designed from contexts and developed in to models which are then evaluated. This reflects the GCSE and professional design environment reading students for the future work. Students are introduced to computer aided design and manufacture through 2D design for laser cutting and 3D design for 3D printing as an extension. Multiple projects give students the chance to develop their skills and explore varying contexts. We are excited to be working with a local design consultancy to give students feedback from professional designers.

**1. User centred design, in collaboration with a local design consultancy**  
1 lesson a week, 8 weeks

**Description**

We have worked with a local design consultancy to create a unique scheme of work tailored to St Bede's students. The company has produced a video for St Bede's to introduce the challenge and visit school to view an exhibition of the top work.

The challenge changes year on year and in the past included designing for people with one hand, those attending therapy, and wheelchair users. Students explore contexts, carry out research, create, model and evaluate designs.

Students produce initial ideas which are evaluated in a group, modelled and iterated to a final design.

Students work to create a final design page using design communication techniques taught through the unit of work.

The top work of each class is put into an exhibition where a winner is chosen by our industry partners.

**Skills covered in this unit:**

New skills and knowledge

- ✓ Iterative design
- ✓ User centred design
- ✓ Primary research
- ✓ Modelling using papers and boards

Skills developed from year 7

- ✓ How to develop a brief and specification
- ✓ Design presentation skills

Cross-curricular skills

- ✓ Design presentation from art and design

**1. CAD, systems and electronics**

**Description**

Students learn about common electronic inputs, outputs and processes applying them to theoretical examples.

Students with knowledge of coding can give brief 'if...then...' statements for these processes to link the inputs and outputs. Our focus, however, is the practical application and hardware.

Students analyse design movements from the 20<sup>th</sup> century selecting their favourite to create a symmetrical, graphic design. After learning how to use our Computer Aided Design software students then draw their design on the computers.

Alongside the design and CAD work students solder the electronic components of an LED light.

A base for the light is cut by hand using students' prior knowledge of hand tools and techniques from year 7

**Skills covered in this unit:**

New skills and knowledge

- ✓ Inputs, processes and outputs
- ✓ Developments of design in the 20<sup>th</sup> century
- ✓ Computer Aided Design skills
- ✓ Soldering

Skills developed from year 7

- ✓ Hand tools and techniques in timber
- ✓ Design presentation skills

Cross-curricular skills

- ✓ Electronic components also taught in science
- ✓ Inputs, processes and outputs later used in computer science

**Assessment**

Questioning and verbal feedback throughout the project.  
Formative assessment on primary and secondary research work.  
Formative assessment of final design page.  
Winners chosen by industry judges at an exhibition

Questioning and verbal feedback throughout the project.  
Peer assessment of systems work  
Formative assessment of CAD design  
Assessment of soldering skill and independence  
Assessment of finished light including additional CAD and base

**Why do we study this?**

Many industries have identified presentation skills, problem solving skills, empathy and team work as essential workplace skills. This skills are central to Design and Technology too. In GCSE students complete a research, design and make portfolio that reflects real work design practice.

This projects gives all students the chance to work as real designs and present ideas to industry experts.

Electronics are a central part of many products. It is important that students understand how these products work and how they are made so they can correctly design them.

This knowledge also helps students understand the products they use in daily life.

**Year 9 – two lessons per week**  
***New year 9 curriculum for 2023-24***

The GCSE course uses the AQA Design and Technology specification, with timbers being the specialist material. The course is taught through various topics which may have a practical, design or theory focus. Each topic has a mixture of theory and project work with the aim of completing all theory work by the end of the year 10 when the Non-examined assessment (coursework) starts. Often students will have one practical or project focussed lesson a week and one theory focussed lesson a week. The theory work is not taught in order of the specification but rather is divided into topics.

	<b>Autumn 1 (Michaelmas)</b>	<b>Autumn 2 (Advent)</b>	<b>Spring 1 (Epiphany)</b>	<b>Spring 2 (Lent)</b>	<b>Summer 1(Easter)</b>	<b>Summer 2(Trinity)</b>
	<p><b>Topic title:</b> Working with timbers</p> <p><b>Theory focus:</b> timbers processing and properties</p> <p><b>Project focus:</b> developing workshop skills by making a bench hook</p> <ul style="list-style-type: none"> <li>- Hand tools</li> <li>- Machines</li> <li>- Finishing skills</li> <li>- Measuring and marking out accurately</li> <li>- Joints and screws</li> </ul>	<p><b>Topic title:</b> Design Ventura challenge</p> <p><b>Theory focus:</b> none</p> <p><b>Project focus:</b> to complete the London Design Museum’s Design Ventura challenge. As per the challenge rules, one project will be entered from the school. As a group students respond to a design brief set by London’s Design Museum. They design and prototype a solution and present their ideas to judges. <a href="https://ventura.designmuseum.org/">https://ventura.designmuseum.org/</a></p>	<p><b>Topic title:</b> Modelling and prototyping</p> <p><b>Theory focus:</b> core materials and properties (plastics, papers, textiles, metals). The selection of materials The use of modelling and prototyping in design</p> <p><b>Project focus:</b> designing, modelling and completing a rubber stamp with ergonomic handle</p>	<p><i>In 2024 this term is only 4 weeks long</i></p> <p><b>Topic title:</b> Specialist technical principles – timbers</p> <p><b>Theory focus:</b> completing theory work on timbers and material properties. Mid-year assessment and exam skills</p> <p><b>Project focus:</b> none</p>	<p><b>Topic title:</b> The design process</p> <p><b>Theory focus:</b> making principles</p> <p><b>Project focus:</b> completing a guided NEA style project, ‘Home lighting’ including electronics, modelling, development</p>	<p><b>Topic title:</b> The design process 2</p> <p><b>Theory focus:</b> design communication, types of drawing skills and end of year assessment</p> <p><b>Project focus:</b> finishing the guided NEA project including making and evaluating</p>
<b>Assessment</b>	Teacher assessment of project work against assessment grid Short written assessment of theory work	Teacher assessment of project work against assessment grid	Teacher assessment of project work against assessment grid Short written assessment of theory work	Exam style assessment	Teacher assessment against GCSE NEA grade descriptors, appropriately levelled for year 9 Design drawing assessment using exam style questions	
<b>Prior knowledge and cross curricular</b>	Prior knowledge: Year 7 topic 1	Prior knowledge: year 7 topic 2, year 1 topic 1 Cross curricular: English – oracy and presentation skills	Prior knowledge: year 8 topic 1	Prior knowledge: year 7 topic 1 and year 9 autumn 1	Prior knowledge: year 9 autumn 2	Prior knowledge: none Cross curricular: maths – isometric drawing.
<b>Why do we study this?</b>	In the GCSE exam students have a choice of materials to study. We study timbers and have a workshop dedicated to working with timbers. In year 7 students learnt how to use most tools safely and accurately. This topic builds on the year 7 skills and knowledge with more detail in the theory work and more independence and additional skills in the practical work. It is important that students have a good understanding of the techniques and materials so they can make informed design decisions.	The Non-Examined Assessment (NEA) is a research, design and make project that students complete independently in year 11. This project starts to develop these skills increasing students’ independent decision making and problem solving.  Group work, independence and problem solving skills are essential in most careers especially in design and engineering. This project gives students a taste of real-world design projects.	During the development stage of the NEA students are expected to model their ideas to create a final prototype. This is also expected in design and engineering careers.  This project gives students the practical skills develop prototypes. The theoretical knowledge enables students to make correct, informed decisions about material use.	During the autumn term and spring 1 we have covered theory that directly links to the projects. This enables students to immediately see the relevance of the theory work but means we have to go back and complete parts of the specification that did not fit with the project. This is a more efficient way of completing the theory work and gives a better opportunity for theory assessment.	Giving students creative design choices is something that makes Design and Technology different, and special. This old GCSE NEA project allows students to practise the knowledge and skills they have gained in year 9 in their own way. News soldering and electronic skills are learnt.  The theory focus is helps students complete the project more professionally considering tolerance, quality control and finishing processes.	Evaluation is an essential part of any design process, in school or in industry. This part of the lighting project has a large emphasis on evaluation.  There are many types of design communication that can be used in project work and also in the exam.

<p style="text-align: center;"><b>Year 10</b></p> <p style="text-align: center;"><i>In 2023-2024 this year 10 curriculum does not follow the 23-24 year 9 curriculum. There is some overlap. The year 9 curriculum is new and a new year 10 curriculum will follow in 24-25</i></p> <p>Year 10 is focussed on preparing for coursework, both ensuring that theory work is covered and that students have the necessary skills for the portfolio Topics are divided up in the same way as year 9 with a theory and project focus. Design and making work is completed with more independence Students will often have one practical or project lesson a week and one theory lesson. A mock exam is completed in the summer</p>						
	Autumn 1 (Michaelmas)	Autumn 2 (Advent)	Spring 1 (Epiphany)	Spring 2 (Lent)	Summer 1(Easter)	Summer 2(Trinity)
	<p><b>Topic title:</b> mechanical devices and forces</p> <p><b>Theory focus:</b> types of mechanical movement (levers, gears and pulley) forces, material properties</p> <p><b>Project focus:</b> focussed making task – making a trebuchet. This is competed in pairs with limited teacher guidance as an assessment of independence and practical ability</p>	<p><b>Topic title:</b> specialist technical principles, timbers</p> <p><b>Theory focus:</b> completing all theory work on timbers started in year 9 projects last year. Exam skills and assessment</p> <p><b>Project focus:</b> none</p>	<p><b>Topic title:</b> design principles</p> <p><b>Theory focus:</b> the design process, work of others, design communication and strategies</p> <p><b>Project focus:</b> mock NEA project. Completing an NEA project with limited teach guidance as preparation for the real NEA</p>	Continuing work from spring 1	<p><b>Topic title:</b> new and emerging technologies</p> <p><b>Theory focus:</b> how new and emerging technologies impact users, design and manufacturing. Revision and full mock exam</p> <p><b>Project focus:</b> none</p>	<p><b>Topic title:</b> The Non-Examined Assessment (NEA = coursework)</p> <p><b>Theory focus:</b> none, although theory is applied throughout the NEA</p> <p><b>Project focus:</b> starting the NEA with the context released by the exam board 1<sup>st</sup> June.</p>
<b>Assessment</b>	Teacher assessment of project work against assessment grid Short written assessment of theory work	Exam style assessment	Teacher assessment against GCSE NEA grade descriptors		Exam style mock exam assessment	Ongoing assessment against NEA mark scheme.
<b>Prior knowledge and cross curricular</b>	Prior knowledge: none from D&T Cross curricular: physics	Prior knowledge: some known from year 9 projects and theory Cross curricular: chemistry	Prior knowledge: KS3 and year 9 projects Cross curricular: none		Prior knowledge: some covered in year 9 topics Cross curricular: science energy generation. Computing	Prior knowledge: students apply prior knowledge and experience of all theory and projects completed so far in D&T
<b>Why do we study this?</b>	Design and technology is a useful subject for students who go on to engineering careers. A lot of products have moving parts and it is important that students can analyse movement and forces, and design moving parts.	The 2023-24 year 10 groups completed a lot of practical based projects in year 9. There is theory work that was not relevant alongside these projects. This unit of work allows us to complete all theory work and embed exam skills.  This unit also allows for formal assessment of theory work.	Students need to be prepared for the NEA starting in June. During the real NEA there is limited support that staff can give. Completing a mock NEA gives students a chance to apply the skills and techniques with guidance from teachers.  Detailed feedback is given during the mock NEA that students can use to improve skills before the real NEA.		In November of year 11 students complete mock exams. In D&T students are also in the middle of their coursework and no other theory is taught after summer in year 10. It is useful to have an additional mock paper in year 10 as it is more reflective of students abilities.	The titles for the NEA are released over June half term. Once the mock exam and feedback has been given, students are given the brief and start work on the NEA.  Section A: research and Section B: Brief and specification should be completed by summer holidays.

**Year 11**

The majority of year 11 is spent on the coursework. This is 50% of the GCSE grade.  
After the coursework deadline, time is spent on revision.

There is limited feedback that can be given by the teachers but students are supported throughout.  
Coursework continues over the mock exam period as students completed the exam work and sat a full mock paper in summer year 10.  
Students have a day off timetable for longer making tasks in January

	<b>Autumn 1 (Michaelmas)</b>	<b>Autumn 2 (Advent)</b>	<b>Spring 1 (Epiphany)</b>	<b>Spring 2 (Lent)</b>	<b>Summer 1(Easter)</b>	<b>Summer 2(Trinity)</b>
	NEA- 50% GCSE practical portfolio Design and development	NEA- 50% GCSE practical portfolio – development Mock exams	NEA- 50% GCSE practical portfolio – manufacturing and evaluation Students have a day off timetable to complete longer manufacturing tasks	Revision	Revision+ exam	<b>Students are on study leave completing exams</b>