



Year 10 Core Theory D&T GCSE

Learning about this topic is important because:

Understanding new and emerging technologies helps students appreciate how design and technology respond to the needs of people, society and the environment. Students will develop knowledge of how products are designed, manufactured and evaluated in a rapidly changing world. This unit provides the essential knowledge required for success in the GCSE Design & Technology written examination, particularly the Core Technical Principles section.

This builds on:

Knowledge and skills developed at **KS3 Design & Technology**, including product analysis, materials, manufacturing processes and sustainability.

This leads to:

Students being well prepared to undertake the GCSE written examination by developing a broad understanding of technological developments, environmental issues and modern manufacturing systems. Students will also be able to apply this knowledge when designing and evaluating products.

We will learn:

- New and emerging technologies.
- The influence of people, culture and society on design.
- Environmental issues and sustainability.
- Energy generation, storage and the use of fossil fuels.
- Modern production techniques and manufacturing systems.
- How to evaluate the impact of new and emerging technologies on individuals, society and the environment.

We will develop/practise skills including:

- Demonstrating and applying knowledge of core technical principles.
- Explaining how technological developments influence product design.
- Analysing the environmental, social and economic impacts of design decisions.
- Understanding modern manufacturing methods and production systems.
- Using subject-specific Design & Technology terminology accurately.
- Developing confidence in answering GCSE-style multiple-choice and extended exam questions.

Some of the vocabulary that we will use includes:

- technology push
- market pull
- planned obsolescence
- sustainability
- carbon footprint
- renewable energy
- non-renewable energy
- fossil fuels
- hydroelectric power
- wind energy
- solar energy

You could learn more about this topic by:



- Introduction to New and Emerging Technologies (GCSE Design & Technology Revision – YouTube)
- Technology Push and Market Pull Innovation (GCSE Design & Technology Revision – YouTube)
- How Culture Changes Design? (GCSE Design & Technology Revision – YouTube)
- What Are Fossil Fuels? How Are Fossil Fuels Formed? (AQA Design & Technology GCSE Core Content – YouTube)
- What Is Computer Aided Manufacturing (CAM)? (GCSE Design & Technology Revision – YouTube)
- BBC Bitesize GCSE Design & Technology revision resources.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots

Looking at your classwork, questioning, discussion, retrieval activities, homework and providing regular feedback. Students' knowledge and understanding will be assessed through GCSE-style quizzes, multiple-choice questions, short-answer exam question



Year 10 Core Theory D&T GCSE

Learning about this topic is important because:

Understanding energy storage, modern materials and systems helps students appreciate how advances in science and technology have transformed product design and manufacturing. Students will learn how innovative materials and systems improve the performance, sustainability and functionality of products. This knowledge forms an important part of the GCSE Design & Technology Core Technical Principles and supports successful performance in the written examination.

This builds on:

Knowledge from **KS3 Design & Technology**, including materials, properties, basic electronics, product design and manufacturing processes.

This leads to:

Students being well prepared to undertake the GCSE written examination by developing an understanding of modern materials, energy storage technologies and systems used in contemporary product design. Students will also be able to apply this knowledge when analysing, designing and evaluating products.

We will learn:

Energy storage methods and battery technologies.
Modern materials and their applications.
Smart materials and how they respond to changes in their environment.
Composite materials and technical textiles.
The systems approach to designing, including inputs, processes, outputs and feedback.

We will develop/practise skills including:

Demonstrating and applying knowledge of modern materials and systems.
Explaining why designers select particular materials for specific applications.
Comparing the advantages and disadvantages of different energy storage methods.
Understanding how systems work and how components interact.
Using appropriate Design & Technology terminology accurately.
Developing confidence in answering GCSE-style multiple-choice, short-answer and extended exam questions.

Some of the vocabulary that we will use includes:

- modern materials
- graphene
- nanomaterials
- shape memory alloy (SMA)
- shape memory polymer (SMP)
- thermochromic pigment
- photochromic pigment
- composite materials
- carbon fibre
- fibreglass (GRP)
- Kevlar®
- technical textiles

You could learn more about this topic by:



Modern Materials (GCSE Design & Technology Revision – YouTube)
Smart Materials Explained (GCSE Design & Technology Revision – YouTube)
Composite Materials and Technical Textiles (GCSE Design & Technology Revision – YouTube)
Systems Approach to Designing (GCSE Design & Technology Revision – YouTube)
Energy Storage and Battery Technology (GCSE Design & Technology Revision – YouTube)
BBC Bitesize GCSE Design & Technology revision resources.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots. Looking at your classwork, questioning, discussion, retrieval activities, homework and providing regular feedback. Students' knowledge and understanding will be assessed through GCSE-style quizzes, multiple-choice questions.



Year 10 Specialist PD Theory D&T GCSE



West Kirby
Grammar School

Learning about this topic is important because:

Understanding specialist technical principles in wood and polymers allows students to develop a deeper understanding of how designers select, modify and use materials to create successful products. Students will learn how the properties, characteristics and limitations of specialist materials influence product design, manufacturing methods and sustainability. This knowledge supports students in developing innovative design solutions and forms an important part of the GCSE Design & Technology Product Design specialist knowledge required for the written examination and NEA project.

This builds on:

Knowledge from GCSE Design & Technology Core Technical Principles, including materials and their properties, manufacturing processes, sustainability, product analysis and practical making skills. Students will build on their understanding of timbers and polymers by exploring specialist materials, processes and applications in greater depth.

This leads to:

Students being well prepared to undertake the GCSE written examination and apply specialist technical knowledge when designing, making and evaluating products. Students will be able to justify material choices, select appropriate manufacturing processes and consider how specialist materials can improve product performance, appearance and functionality.

We will learn:

Specialist technical principles relating to wood-based materials and polymers.
The properties, characteristics and applications of natural timbers, manufactured boards and modified wood products.
The advantages and disadvantages of hardwoods, softwoods and manufactured boards.
How wood can be modified, enhanced and processed for specialist applications.
Specialist polymer materials, including thermoplastics, thermosetting plastics and elastomers.
The properties and applications of specialist polymers used in modern product design.
How additives can improve polymer performance, including improving strength, flexibility, durability, colour and resistance to environmental conditions.
Manufacturing processes used with wood and polymers, including shaping, forming, cutting, joining and finishing techniques.

We will develop/practise skills including:

Demonstrating and applying knowledge of specialist wood and polymer materials.
Explaining why designers select particular specialist materials for specific applications.
Comparing the advantages and disadvantages of different wood-based materials and polymers.
Understanding how material properties affect product performance and manufacturing decisions.
Identifying suitable manufacturing processes for specialist materials.
Evaluating the sustainability and environmental impact of material choices.
Using appropriate Design & Technology terminology accurately.
Developing confidence in answering GCSE-style multiple-choice, short-answer and extended exam questions.

Some of the vocabulary that we will use includes:

- hardwood/softwood/manufactured boards
- grain direction
- thermoplastic/thermosetting polymers
- injection moulding
- vacuum forming
- extrusion
- line bending

You could learn more about this topic by:

Specialist Materials: Wood and Polymers (GCSE Design & Technology Revision – YouTube)
Timber Properties and Applications (GCSE Design & Technology Revision – YouTube)
Manufactured Boards and Wood Processes (GCSE Design & Technology Revision – YouTube)
Polymers and Plastic Manufacturing Processes (GCSE Design & Technology Revision – YouTube)
Material Selection in Product Design (GCSE Design & Technology Revision – YouTube)
BBC Bitesize GCSE Design & Technology revision resources.



Your teacher will assess your knowledge & understanding throughout the topic by:

Looking at your work, questioning, discussion and giving you feedback in lots of ways. Assessment will include classwork, questioning, discussion, retrieval activities, homework and regular feedback.



Year 10 Specialist PD Theory D&T GCSE



West Kirby
Grammar School



Year 10 Bamboo Tongs

Year 1026-27 Learning about this topic is important because:

Learning about this topic is important because it develops practical skills in working with sustainable materials such as bamboo, while introducing mechanical principles like first-class levers. It allows learners to combine traditional craftsmanship with modern digital manufacturing techniques, including laser engraving. This is an ideal opportunity to solve a real-world problem—such as reducing the risk of electric shock when retrieving toast from a toaster—by designing a safe, functional alternative to metal utensils. The project reinforces key mechanical learning by applying lever systems in a hands-on context, helping learners understand how force and movement can be controlled. It places a strong emphasis on producing a high-quality practical outcome efficiently, with a focus on manufacturing skills rather than extended design work. Learners experience the use of jigs, templates, and batch production methods to increase speed and consistency, mirroring real-world practices. It also builds understanding of retail product design by exploring branding, ergonomics, and user experience, while encouraging sustainable approaches to product development.

This builds on: *This project builds on prior learning from KS3 by developing learners' understanding of materials and their properties, particularly natural materials like bamboo, compared to manufactured alternatives. It reinforces basic practical skills such as measuring, marking out, cutting, and joining materials safely. Learners will revisit and extend their knowledge of mechanical systems by applying the principles of a first-class lever in a functional product. The project also builds on digital design skills using 2D design software to create logos and branding for laser engraving. Finally, it deepens awareness of sustainability in product design and manufacture by focusing on eco-friendly materials and efficient production methods.*

This leads to:

- Advanced skills in designing and manufacturing functional products for commercial use.
- Greater confidence in using digital tools and machinery, including laser cutters.
- Knowledge of how to apply ergonomic principles and create branding for products.
- Ability to evaluate and improve designs with a focus on sustainability and productivity.

We will learn:

Practical skills in working with sustainable materials like bamboo, introduce mechanical principles such as first-class levers, and combine traditional craftsmanship with modern digital manufacturing techniques such as laser engraving. This project enhances understanding of product design for retail, including branding and ergonomics, preparing learners for real-world design challenges and sustainable product development.

We will develop/practise skills including:

- Measuring and marking out bamboo strips accurately using rulers and marking tools
- Using a tenon saw safely and effectively to cut bamboo strips to size
- Creating ergonomic shapes by sanding and shaping bamboo edges smoothly
- Using jigs and templates to improve accuracy and repeatability in cutting and assembly
- Designing a logo or trade name using 2D design software (e.g., Inkscape, Adobe Illustrator)
- Operating a laser cutter to engrave designs safely and precisely
- Understanding and applying the mechanical principle of a first-class lever in product assembly

Some of the vocabulary that we will use includes:

Vocabulary used throughout this project will include terms such as **sustainable materials**, **renewable resources**, and **environmental impact** to explore the ecological benefits of using bamboo. Learners will also develop their understanding of **ergonomics**, **anthropometrics**, and **aesthetic appeal** when shaping and refining their product. Key mechanical concepts such as **first-class lever**, **fulcrum**, and **mechanical advantage** will be reinforced through practical application. In the manufacturing phase, students will encounter vocabulary like **batch production**, **jigs and templates**, **precision manufacturing**, and **quality assurance**. Digital tools will introduce terms such as **laser engraving**, **branding**, and **corporate identity**. Throughout the process, learners will reflect on ideas including **craftsmanship**, **functional prototype**, **material properties**, **product lifecycle**, and **design for manufacture**, developing a rich and technical design vocabulary suitable for GCSE-level work.

You could learn more about this topic by:

- Researching sustainable materials and their impact on the environment.
- Exploring different types of mechanical levers and their uses.
- Visiting exhibitions or companies that specialise in eco-friendly product design.
- Watching tutorials or documentaries about modern manufacturing techniques and branding strategies.
- Bamboo as a Sustainable Material:
- “Why Bamboo is the Future of Sustainable Materials”
- Keywords: bamboo sustainability explained

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:

- Practical assessments of your accuracy and safety in marking out, cutting, shaping, and assembling the bamboo tongs.
- Written or oral reflections on your use of sustainability principles and manufacturing methods.
- Participation in peer and self-assessment activities focused on continuous improvement.