CIM - Curriculum Intent Map Product Design
Exam board - GCSE: Edexcel Exam board – A Level: AQA

Why study Design and Technology

- Design and Technology prepares students to become creative and critical thinkers, developing skills to design and deliver prototypes that solve real world problems.
- We provide students with an introduction to basic hand skills in the workshop.
- Learning about design practice and cutting-edge technologies enables students to tackle a variety of contextual challenges which will help them to understand and appreciate the design and manufacture of existing products, making them more empathetic designers and more discriminating purchasers.

Subject Content

GCSE Design and Technology will prepare students to participate confidently and successfully in an increasingly technological world. Students will gain awareness of and learn from wider influences on Design and Technology, including historical, social, cultural, environmental, and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise.

The subject content is split into three sections:

- Core technical principles
- Specialist technical principles
- Designing and making principles

Students must also demonstrate mathematical and scientific knowledge and understanding, in relation to Design and Technology.

Assessment (KS3)

Students are assessed through a combination of written work and holistic grading of practical work. Students are formally assessed a minimum of 5 times per year.

Assessment (GCSE and A 'Level)

Both GCSE and A level courses are split into Non-exam Assessment (NEA) and written exam papers. Each of the sections contribute 50% to the overall qualification. The GCSE course has one written exam paper, and the A level course has two written papers.

Curriculum equality and access

All assessments are administered carefully to ensure that all learners are treated fairly.
All learners have equitable opportunity to access the qualifications and assessments, and that the qualification is awarded in a way that is fair to every learner. All learners achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

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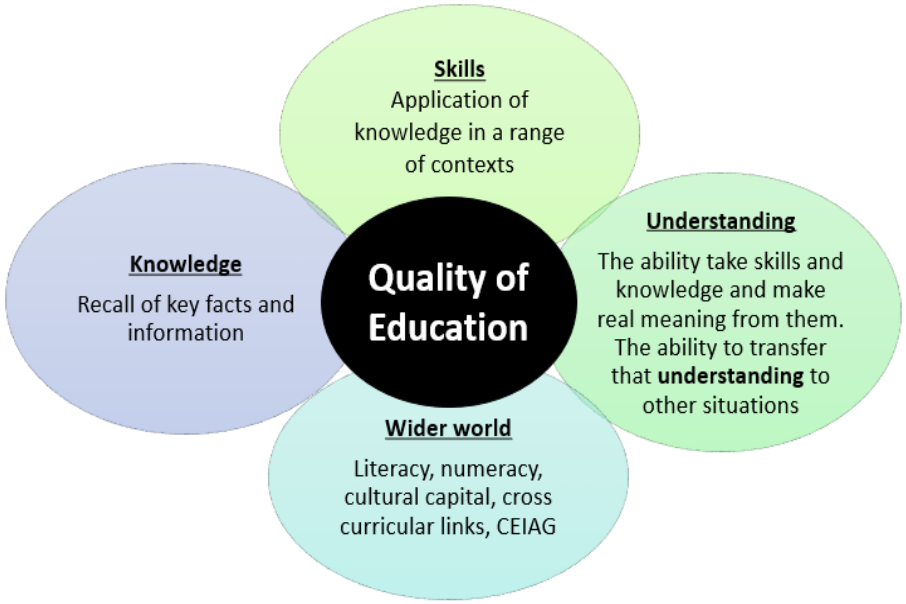
What are the objectives for your curriculum?

Design and Technology prepares students to become creative and critical thinkers, developing skills to design and deliver prototypes that solve real world problems.
We provide students with an introduction to basic hand skills.
Learning about design practice and cutting-edge technologies will allow students to be able to take on a variety of contextual challenges which will help them to understand and appreciate the design and manufacture of existing products, making them more empathetic designers and more discriminating purchasers.



What do you want pupils to be able to know and do by the time they leave?

Throughout the course, students will engage with a diverse range of materials, including papers, boards, timber, metals, polymers, and textiles, to underpin their potential design solutions. Additionally, they will delve into broader design principles, understanding how designs impact users and the environment. Developing a deeper understanding of specific materials and associated techniques is essential for constructing working prototypes and achieving functional design solutions, drawing insights from existing designs. The iterative process of "Explore, Create, Evaluate" effectively guides the development of design solutions, refining needs and solutions iteratively for enhanced outcomes. Moreover, students will gain insights into emerging technologies and their industrial applications, including the utilization of CAD/CAM systems for rapid prototyping. Engineering students receive heightened exposure to CAD and CAM practices, mirroring contemporary industrial standards.

How does your curriculum plan set out the sequence and structure of how it's going to be implemented?

The Product Design curriculum is structured as a spiral, ensuring that key skills and theoretical knowledge are revisited and deepened as students' progress through the year groups. Key elements of this are: CAD, design influences, drawing conventions, environmental impact, material selection

Why is it shaped the way it is? What values have guided your decisions about the curriculum you have in place?

Progression of skills and complexity of topics ensures that students develop technical knowledge, creative thinking, and design capability across a range of materials, preparing them effectively for careers in the wider world.

How does your curriculum reflect your school's context?

Extracurricular activities **Careers links** **Curriculum links** **Threshold topics (bold)** **PSHE, PD and cultural capital links**

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The content of Design and Technology requires students to apply mathematical and scientific knowledge, understanding and skills. This content reflects the importance of Product Design as a pivotal STEM subject.

To what extent have you made these objectives clear? Does everybody know them?
These objectives are regularly reinforced at KS4 and fully embedded within KS3 lessons. The objectives are signposted in lessons as and when required.

How does your curriculum reflect national policy (for example, British values and PSHE)? How do you ensure that curriculum knowledge is interleaved?
Regular discussions of social and global issues as part of materials choice and selection. Design projects are selected to enhance students' understanding of sustainability and future-proof design practices.

How does your curriculum cater for disadvantaged and minority groups? How do you ensure these pupils aren't 'shut out' of pursuing subjects they wish to study because of too sharp a focus on exam results
Design projects are chosen to be accessible and engaging for all learners, particularly at KS4 for the NEA and students are supported and resources differentiated to support ALL pupils in the subject area.

Meeting the needs of SEND students within the classroom

Intent:
- Identification of key fundamental building blocks based on student need

Implementation:
- Knowledge of SEND need - knowing who they are, targeted T&L and classroom strategies to meet need.
- Staff trained to meet needs of SEND students specifically to their subject area
- Differentiated teaching and resources based on identified needs
- Targeted live marking and questioning
- Deploying TA's to support wider group to allow subject specialist support for SEND (helicopter approach)
- Personalised home learning
- Access arrangements – identification and application
- **Impact:**
- Grading below Grade 1 to monitor progress
- Structured accessible assessments.

Extracurricular activities **Careers links** **Curriculum links** **Threshold topics (bold)** **PSHE, PD and cultural capital links**

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	Knowledge	Skills	Understanding	Wider world
Year 13	• National and international standards in product design • Performance characteristics of materials • Forming, redistribution and addition processes – polymers, woods and metals • The use of finishes – woods, metals and polymers • Modern and industrial commercial practice • Digital design and manufacture – CAD, CAM • Product development and improvement • Fitness for purpose/accuracy of production • Aesthetics, ergonomics and anthropometrics when designing • Protecting designs and intellectual property • Design for manufacturing, maintenance, repair and disposal • Feasibility study • Enterprise and marketing in the development of products • Modern manufacturing systems	**NEA portfolio** • **AO2 Section C – Development of design proposal(s) (25 marks)** • Generating design proposals that take full account of the design brief and specification. • **A02 Section D – Development of design prototype(s) (25 marks)** • Manufacturing a prototype using all potential resources, tools machines and equipment to a high level with appropriate ongoing testing • **A03 Section E – Analysing and evaluating (20 marks)** • On-going analysis & evaluation that informs the manufacture of the prototype. Testing and fitness for the needs of the client/user. Critical analysis of the final prototype.	• Understand how materials can be shaped and formed and designs added • Understand how computer systems are used in production/distribution and storage. • Understand how products need to meet specification criteria and be fit for purpose. • Understand how computer systems are used in modern manufacturing • Understand and be able to correctly interpret the command words used in the written papers e.g. explain/justify/analyse etc. • Understand the responsibilities in the use of sustainable materials and components.	• **Sustainability** – environmental impact of materials and production • **Socio-economic factors** – influence of design on society and employment • **Technology push / market pull** in innovation • **Global marketing** and product appeal across cultures • Site visit based on NEA focus area • **Maths/Science** – material properties, testing, and data analysis • **Calculation** of quantities, material use, and costs • **Efficient design** through 2D nets and material optimisation • **Material selection** – recyclability and sustainability • **Data use** – interpreting results, evaluating outcomes • **Human factors** – ergonomics and anthropometrics • **Market research** – analysing user needs and data presentation • Careers links - Advertising art director, Furniture designer, Industrial / product designer, Interior and spatial designer, Automotive engineer, Graphic designer, Materials engineer, Product manager.
Year 12	• Materials and their applications • Classification of materials • Methods for investigating and testing materials • Performance characteristics of a range of materials – papers and boards, polymers, metals, woods, elastomers, biodegradable polymers, smart materials, modern materials • Different design methods • Design influences – design styles and key design movements • Designers and their work • Technology and cultural changes • Scales of production • Responsible design • Materials enhancement	• Develop critical analysis and evaluation skills • Selecting appropriate tools, equipment and processes • Design for manufacture skills • Digital design and manufacture skills • Design communication skills Students will complete two design and make tasks in term 1 and 2 focused on preparing them for the NEA task Project 1 – Jewellery - In this project students will create a piece of pewter cast jewellery of their choice based on a famous design movement	• Understand why/how elastomers are used to enhance products • Understand how biodegradable polymers degrade • Understand why/how materials are combined to make composites with enhanced properties • Develop an understanding of the iterative design process • Understand how design styles and movements have been influences through to socio economic factors • Understand designers responsibilities in the use of sustainable materials and components • Understand the range of enhancement methods used on materials	• Sustainability – responsible use of materials, repair, and disposal • Socio-economic influences on design and production • Ethical design – legislation, safety, and consumer protection • Cultural design movements and their global impact • Site visits to local manufacturers or design studios • Workshops in metal casting, CAD/CAM, or 3D printing • Science – material properties, elasticity, biodegradability • Maths – measurement, tolerances, quantities, and costings

Extracurricular activities **Careers links** **Curriculum links** **Threshold topics (bold)** **PSHE, PD and cultural capital links**

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	• Forming, redistribution and addition processes for all material types • Health and safety • Design for manufacturing, maintenance, repair and disposal • Enterprise and marketing in the development of products	<u>Project 1 – phone project</u> - In this project students will use CAD/CAM and metal working skills to design and make a phone holder. They will also consider sustainability, health and safety and design for manufacture, maintenance, repair and disposal in their designing. • **<u>AO1 Section A – Identifying & investigating design possibilities (20 marks)</u>** • Identify context and complete investigations and initial sketches to assess project feasibility. • **<u>AO1 Section B – Producing a design brief and specification (10 marks)</u>** • Create a clear, challenging brief and detailed specification based on investigation findings.	• Understand the use of finishes • Understand the legislation set out to protect consumers. • Understand the six Rs of sustainability • Understand how designers refine and re-develop products in the lifecycle of a specific product.	• ICT – CAD/CAM software for design and prototyping • Business – enterprise, marketing, and scales of production • Art & Design – design movements and visual communication • Careers links – industrial or product designers, engineering (all sectors), entrepreneur, CAD technician, production manager, graphic designers, stylist
Year 11	• Design contexts, user needs, and design problems • Properties and characteristics of natural & manufactured timbers • Environmental impact and sustainability in material selection • Forces, stresses, stock forms, shaping, and assembly methods • Manufacturing processes and surface finishes for woods • Tools, equipment, machines, and workshop safety • Role and structure of design briefs and specifications • Quality control and accuracy in manufacturing • Full revisit of GCSE core theory content (1.1–1.17) • Exam knowledge: materials, processes, systems, energy, new technologies	**<u>NEA portfolio</u>** • Researching user needs and writing justified design briefs and specifications • Generating, developing, and refining design ideas using sketching, modelling, and feedback • Selecting suitable materials and components for function, quality, and aesthetics • Manufacturing a prototype using accurate, safe workshop practice • Recording manufacturing processes through a detailed diary of manufacture • Carrying out testing and modifications throughout the making process • Evaluating the prototype against specification criteria and user needs **<u>Exam & Theory Skills</u>** • Applying technical knowledge in structured and extended answers • Using command words (explain/justify/analyse/evaluate) effectively • Using revision tools, retrieval practice, and mock assessments	• How material properties influence design decisions • How products must meet specification criteria and user needs • How forces and stresses affect product performance • How iterative development leads to improved design outcomes • How quality control ensures accuracy and fitness for purpose • How to interpret exam questions and apply subject-specific terminology • Responsibilities regarding sustainability and efficient use of materials	• **Science:** materials, forces, testing • **Maths:** measurement, data, tolerances, costs • **Computing:** CAD/CAM, digital modelling • **Art & Design:** aesthetics, sketching • **Geography:** sustainability, resource impact • Links to following careers: • Product/industrial designer • Furniture designer/maker • CAD technician / modelmaker • Engineer (design, mechanical, manufacturing) • Architect / interior designer • Discussion about post 16 pathways • Design for a range of users (inclusive design) • Ethical & sustainable design decisions • Cultural influences on products • Global manufacturing awareness • Teamwork, communication & resilience • Safe working practices

Extracurricular activities **Careers links** **Curriculum links** **Threshold topics (bold)** **PSHE, PD and cultural capital links**

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Year 10	• New and emerging technologies and their impact on design decisions. • Ethical, environmental and future considerations in product design. • Energy generation, storage and selection for products. • Smart, composite and modern materials • Mechanisms: levers, cams, pulleys, cranks, sliders and gears. • Electronic systems: sensors, controls and outputs. • Programmable components and product customisation. • Material properties of metals (ferrous and non-ferrous), polymers, papers and boards, textiles and timbers. • Design contexts and the influence of social, environmental and economic factors. • Design strategies used by past and present designers and companies.	• Investigating design problems and user needs • Generating and developing design ideas using a range of strategies. • Measuring, marking out, cutting, shaping and joining materials safely and accurately. • Manufacturing products using timber, metals, polymers and manufactured boards. • Using hand tools, machines and equipment correctly and safely using the correct PPE. • Developing CAD models and producing components using 3D printing. • Applying basic testing and evaluation to improve outcomes. • Recording and communicating design ideas and making processes.	• How materials are selected based on properties, function and context. • How mechanisms, electronics and programmable components add functionality. • How design decisions are influenced by ethical, environmental and economic factors. • How digital technologies support design and manufacture. • How accuracy, quality control and safe working affect final outcomes. • How design ideas evolve through modelling, testing and refinement. • How designers respond to user needs, constraints and real-world contexts.	• STEM enrichment • Visits to design museums • Product designer / industrial designer • Furniture maker / metalworker • CAD technician / 3D printing technician • Design engineer / mechanical engineer • **Science:** material properties, electricity, energy, mechanisms • **Maths:** measurement, accuracy, scale, data and tolerances • **Computing:** CAD, programmable components, 3D modelling • **Art & Design:** sketching, modelling, aesthetics • **Geography:** sustainability, materials sourcing • Safe working practices and risk awareness • Ethical & environmental considerations in design • Understanding how products are designed and made in industry • Problem-solving, resilience, and independence • Awareness of how design affects everyday life
Year 9	Students will rotate throughout the year, completing one rotation each in Food, Product Design, Engineering, IT, and Computing (two lessons per week).			
	Passive Speaker • Properties and uses of hardwoods, softwoods and manufactured boards • Principles of acoustic amplification through shape and material • CAD modelling for design development and manufacturing plans • Safe use of workshop tools, machinery, and finishing techniques **Memphis acrylic letter** • Properties and uses of acrylic and other thermoplastics • How to design for laser cutting using CAD software • Safe operation of laser cutting equipment	**Passive Speaker** • Use CAD software to model and plan manufacture • Measure, mark out, cut, and assemble wooden components accurately • Operate tools and equipment safely and precisely • Apply high-quality finishing techniques • Test, evaluate, and refine design for performance and presentation **Memphis acrylic letter** • Use CAD software to design accurate letter forms and decorative elements • Apply Memphis-inspired patterns and colour schemes • Prepare CAD files for laser cutting	**Passive Speaker** • How material choice and shape affect sound performance • How precision and accuracy impact quality and function • How CAD and CAM support modern manufacturing processes • Understanding how materials and structure affect sound and strength **Memphis acrylic letter** • How design movements influence modern products and styles • How material choice affects aesthetics and product quality • How user needs and visual appeal shape design	• **Science** – sound waves, resonance, and vibration • **Physics** – electrical energy and circuits • **Maths** – measurement, angles, and geometry • **ICT** – advanced CAD/CAM and digital design • **Art & Design** – Memphis movement, colour theory, visual balance • **English** – analytical writing and design evaluation • Cultural design movements (Memphis, Bauhaus, minimalism) • Ethical design and environmental impact • Global material sourcing and fair production • Creative identity and individuality in design • Competitions (TeenTech, Design Ventura)

Extracurricular activities **Careers links** **Curriculum links** **Threshold topics (bold)** **PSHE, PD and cultural capital links**

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	• Awareness of design trends, cultural influences, and material sustainability • What is biomimicry and how it is used to improve design ideas	• Assemble and finish acrylic components to a high standard • Evaluate design outcomes for accuracy, style, and user appeal	decisions • Understanding the principles of the Memphis design movement and its use of shape, pattern, and colour	• Guest speakers from design, architecture, or engineering • After-school CAD/3D printing club (KS3) – create custom keyrings using CAD and laser cutting • Product / Industrial Designer • Manufacturing / CNC Engineer • **Design Engineer** – mechanical + creative problem solving • **Graphic / Brand Designer** – style and communication • **Creative Technologist** – merging design with electronics
Year 8	**Students will rotate throughout the year, completing two Design & Technology modules, two Food Technology modules, and one Textile module (two lessons per week).**			
	Mood light project • Basic circuits and knowledge of how LEDs, resistors and switches work. • How to solder safely and assemble circuits • Use of CAD and laser cutting • Properties of materials for casings and light diffusion • How electronic systems control light and movement **Moving Toy** • Properties and uses of wood and manufactured boards • How CAMs, linkages, and levers create movement and force • Safe use of hand tools and machines • How materials and mechanisms combine to achieve motion **Bag project** • Properties and uses of woven fabrics such as denim • Understanding fabric strength, durability, and suitability for purpose • How to use a sewing machine safely and	**Mood light project** • Design and model using CAD • Solder a working LED circuit • Laser cut and vacuum form components • Assemble, test, and refine the product • Apply accuracy and problem-solving throughout **Moving Toy** • Measure, mark out, cut, and join wood accurately • Use hand tools and equipment safely • Build and test CAM and linkage systems • Apply finishing techniques to improve aesthetics • Evaluate and refine product performance **Bag project** • Measure, mark out, and cut fabric accurately • Thread and operate a sewing machine confidently • Sew seams, hems, and casings neatly and securely • Insert a drawstring and finish the product to a high standard	**Mood light project** • How using electronics achieve functional outcomes • How materials and processes affect performance • The role of new technologies in modern design **Moving Toy** • How mechanical systems convert motion and force • How precision and assembly quality will impact movement • How mechanical design meets user and functional needs **Bag project** • How fabric choice affects strength, durability, and aesthetics • How accuracy and quality control impact product finish • How to use specialist tools and equipment	• After-school CAD/3D printing club (KS3) – create custom keyrings using CAD and laser cutting • STEM competitions (e.g., designing for sustainability or robotics challenges) • Maths – ratios, scale drawing, trigonometry in structural design, and accurate measurement • Science – conductivity in circuits, forces and motion in mechanisms, energy transfer in LEDs • ICT – advanced use of CAD for precision design, data representation in prototypes, simulation software • English – persuasive writing for design pitches, analysing product reviews, reflective design journals • Geography – global material sourcing and supply chain sustainability • Mechanical Engineer – applying CAM systems and movement design • Electronics Engineer – designing functional circuits and LED systems • Project Manager – applying teamwork, planning, and evaluation

Extracurricular activities **Careers links** **Curriculum links** **Threshold topics (bold)** **PSHE, PD and cultural capital links**

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	effectively • Construction methods for seams, hems, and casings • Basic pattern cutting and fabric layout techniques	• Evaluate and refine design ideas for function and appearance	precisely • How design choices link to user needs and sustainability	• Discussion of ethical and environmental impacts of modern manufacturing • Cultural influences in textile and product design – exploring how patterns, forms, and materials reflect different societies • Personal development through teamwork and project management in design activities
Year 7	**Students will rotate throughout the year, completing two Design & Technology modules, two Food Technology modules, and one Textile module (two lessons per week).**			
	Chocolate Bar Mould & Box Design • Vacuum forming and thermoplastics • Properties and uses of plastics • Packaging, design and branding principles • Use of CAD/CAM in packaging design **Wooden block bot** • Types and properties of wood • Simple mechanical movement (joints, pivots) • Safe use of tools and machinery • Finishing and surface treatments **Felt Mini Monster** • Properties and uses of felt • Basic hand-stitching and construction methods • Pattern making and use of templates • Safe use of textile tools and equipment • Sustainability and fibre sources	**Chocolate Bar Mould & Box Design** • Safely use vacuum former and tools • Design and model using CAD • Apply layout, colour, and typography • Cut, fold, and assemble packaging • Test and refine product ideas **Wooden block bot** • Use research to generate creative design ideas • Measure, cut, shape and join wood accurately • Use tools and equipment safely and precisely • Apply suitable finishing techniques • Evaluate work against design criteria and feedback **Felt Mini Monster** • Cut and assemble fabric accurately • Use neat, secure stitching • Join, stuff, and finish a small product • Add decoration and embellishment • Evaluate and improve design	**Chocolate Bar Mould & Box Design** • How design meets user needs • Links between form, function, and materials • Role of digital tools in precision and creativity • Impact of material choice on sustainability **Wooden block bot** • How material properties influence design • How structures and mechanisms affect performance • Importance of precision and quality control • How design, function and aesthetics connect **Felt Mini Monster** • How materials and techniques affect function and quality • How design meets user needs and preferences • Importance of accuracy and finishing • How textile design links to sustainability	• How consumer choices impact global sustainability • Fair trade and ethical production in textiles and manufacturing • The role of globalisation in product design and material sourcing • How sustainable innovation supports a circular economy • CAD - Use of 2D SketchUp • After-school CAD/3D printing club (KS3) – create custom keyrings using CAD and laser cutting • Opportunities to join STEM or Design Clubs or enrichment activities (e.g. model-making, robotics, or eco-design projects) • Engineer – mechanical, materials, or design engineering • Packaging Designer – for branding and retail • Interior Designer – linking material properties and user needs • Model Maker / Prototype Specialist – linking CAD and physical manufacturing • Science – energy transfer in manufacturing, environmental science (pollution and recycling) • ICT – digital presentation of design portfolios and data logging in manufacturing • Maths – geometry in design, ratios in scale modelling, and material cost calculations • English – persuasive writing for marketing and reflective evaluations of design process

Extracurricular activities **Careers links** **Curriculum links** **Threshold topics (bold)** **PSHE, PD and cultural capital links**

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At The Elizabethan Academy we offer a curriculum that:

- is broad, balanced, inspiring and inclusive
- builds confidence, independence and **resilience**
- encourages students to develop the **skills, knowledge and understanding** required to succeed academically
- encourages students to participate in a wide variety of activities which extend beyond the classroom
- places creativity and imagination at the heart of learning to develop enquiring minds
- enables students to understand the connections and links between different subjects
- raises students' aspirations through promoting academic excellence
- develops students' **social and cultural knowledge**, skills and understanding
- develops students' **respect for spiritual and moral values**, and tolerance towards other races, religions and ways of life.
- gives students the opportunities to put theoretical skills into practice and expand their knowledge beyond the exam specification
- prepares students for the world of work in a rapidly changing world.

Extracurricular activities **Careers links** **Curriculum links** **Threshold topics (bold)** **PSHE, PD and cultural capital links**

Design & Technology: Key Stage 3 **Grade Descriptors Year 7**

Y7	Designing	D&T: Making	DT: Tech Knowledge	Evaluating	Food: Cooking and Nutrition
Emerging	I can do simple research with guidance. I can explain basic details of a design problem. I can list key requirements for my design. I can produce a few design ideas with simple rendering. I can label my designs. I can explain the main steps to make my product with help.	I can make a simple product with teacher support. I can demonstrate basic practical skills using a limited number of tools and processes, with support.	I can identify basic properties of materials and give a simple reason for my choices	I can identify some strengths and weaknesses in my product. I can carry out basic tests on my product with some support.	I can identify basic healthy and unhealthy foods. I can cook a simple dish using basic cooking techniques like chopping and boiling, with help. I can identify where some ingredients come from.
Developing	I can research using a few sources with some independence. I can describe the design problem and suggest possible solutions. I can list specific design criteria for my product. I can develop several design ideas with some creativity. I can add notes to explain my designs. I can list the main steps to make my product.	I can make a product that shows some attention to detail, with limited teacher support. I can use a range of materials, tools, and processes with some independence and growing confidence	I can describe key properties of common materials and explain why they are suitable for my product.	I can describe what works well and what could be improved in my product. I can test my product independently and describe how well it works.	I can explain why some foods are healthier than others. I can follow a recipe and cook a few different dishes using techniques such as frying, baking, and grilling on my own. I can identify where some ingredients come from and describe their characteristics.
Meeting	I can choose useful sources and explain how they improved my design ideas. I can evaluate design problems and adapt solutions using feedback. I can write clear, measurable design criteria with ACCESSFM. I can create varied and creative, fully rendered design ideas. I can use ACCESSFM to annotate my design ideas. I can create a logical step-by-step plan with simple checks.	I can make a product that is accurate and precise, solving problems during the process. I can use a wide range of tools, materials, and processes accurately and with some precision	I understand the properties of materials and components and can explain how my choices help my product to function well.	I can explain specific strengths and development areas in my product and suggest future improvements. I use accurate testing methods to check if my product meets the design criteria.	I can apply basic nutrition principles to make balanced food choices. I can independently cook a variety of dishes using a range of cooking techniques. I can identify when ingredients are in season and explain their nutritional benefits
Exceeding	I can research from a range of sources and analyse my findings to guide my design choices. I can analyse design problems and justify my decisions with evidence. I can write detailed design criteria to ensure my designs are fit for purpose. I can create unique ideas using strategies like biomimicry and user-focused design. I can use ACCESSFM with subject-specific vocabulary to annotate and present my design ideas. I can make an accurate plan for manufacture with quality control and explain my material choices.	I can make a high-quality product using a wide range of materials, tools, and processes. I can confidently and independently use a broad range of tools, materials, and techniques to produce high-quality work.	I can confidently select materials and components based on a secure understanding of their properties and explain why they are the most suitable choice for my product. **Electronics/systems:** I can effectively use advanced mechanical and electronic systems (such as gears, levers, sensors) to enable movement and control in my product design.	I can give a detailed evaluation of my product, explaining key strengths and weaknesses, and how specific improvements made during the process helped meet the design criteria. I carry out detailed testing using both qualitative and quantitative methods.	I can explain nutrition principles and how to make balanced food choices for different people or purposes. I can independently cook a variety of dishes using a range of cooking techniques **to a high standard**. I can understand the source, seasonality, and use of a wide range of ingredients and what nutritional benefits they bring to a recipe.

Design & Technology: Key Stage 3 **Grade Descriptors Year 8&9**

Y8-9	Designing	D&T: Making	DT: Tech Knowledge	Evaluating	Food: Cooking and Nutrition
Emerging	• I can research using a few sources with some independence. • I can describe the design problem and suggest possible solutions. • I can list specific design criteria for my product. • I can develop several design ideas with some creativity. • I can add notes to explain my designs. I can list the main steps to make my product.	• I can make a product that shows some attention to detail, with limited teacher support. I can use a range of materials, tools, and processes with some independence and growing confidence	I can describe key properties of common materials and explain why they are suitable for my product.	• I can describe what works well and what could be improved in my product. I can test my product independently and describe how well it works.	• I can explain why some foods are healthier than others. • I can follow a recipe and cook a few different dishes using techniques such as frying, baking, and grilling on my own. I can identify where some ingredients come from and describe their characteristics.
Developing	• I can choose useful sources and explain how they improved my design ideas. • I can evaluate design problems and adapt solutions using feedback. • I can write clear, measurable design criteria with ACCESSFM. • I can create varied and creative, fully rendered design ideas. • I can use ACCESSFM to annotate my design ideas. I can create a logical step-by-step plan with simple checks.	• I can make a product that is accurate and precise, solving problems during the process. I can use a wide range of tools, materials, and processes accurately and with some precision	I understand the properties of materials and components and can explain how my choices help my product to function well.	• I can explain specific strengths and development areas in my product and suggest future improvements. I use accurate testing methods to check if my product meets the design criteria.	• I can apply basic nutrition principles to make balanced food choices. • I can independently cook a variety of dishes using a range of cooking techniques. I can identify when ingredients are in season and explain their nutritional benefits
Meeting	• I can research using a range of sources and analyse my findings to guide my design choices. • I can analyse design problems and justify my decisions with evidence. • I can write detailed design criteria to ensure my designs are fit for purpose. • I can create unique ideas using strategies like biomimicry and user-focused design. • I can use ACCESSFM with subject-specific vocabulary to annotate and present my design ideas. I can make an accurate plan for manufacture with quality contro and explain my material choices.	• I can make a high-quality product using a wide range of materials, tools, and processes. I can confidently and independently use a broad range of tools, materials, and techniques to produce high-quality work.	• I can confidently select materials and components based on a secure understanding of their properties and explain why they are the most suitable choice for my product. **Electronics/systems:** I can effectively use advanced mechanical and electronic systems (such as gears, levers, sensors) to enable movement and control in my product design.	• I can give a detailed evaluation of my product, explaining key strengths and weaknesses, and how specific improvements made during the process helped meet the design criteria. I carry out detailed testing using both qualitative and quantitative methods.	• I can explain nutrition principles and how to make balanced food choices for different people or purposes. • I can independently cook a variety of dishes using a range of cooking techniques **to a high standard**. I can understand the source, seasonality, and use of a wide range of ingredients and what nutritional benefits they bring to a recipe.
Exceeding	• I can research widely, using experts and investigations, to mak informed design decisions. • I can rethink design problems and independently identify and develop effective solutions. • I can write detailed design criteria that meet user needs and ensure the product is fit for purpose. • I can create innovative, commercially viable ideas that meet design criteria and user needs. • I can present my design ideas effectively through sketches, plans, and annotations using specialist terminology. • I can create detailed manufacturing plans with materials, tools, timings, safety, and quality checks for others to follow.	• I can create complex, commercially viable products (with only minor modifications) that meet the needs of users. • I can accurately select and use specialist tools, techniques, and computer-aided manufacture to produce high-quality, professional outcomes.	• I can apply advanced knowledge of materials and components to make well-judged choices that ensure my product is functional, durable, and appealing. **Electronics/systems:** I can integrate mechanical systems, electronics, and computer control to create an intelligent product that responds to inputs and controls outputs using programmable components.	• I critically reflect on both the strengths and limitations of my product, considering user needs, commercial potential, and the wider impact of my design. I actively use feedback from intended users to refine and improve my product. I analyse existing products or other designers' work to inform my suggested improvements.	• I can adapt or create recipes to meet specific dietary needs or preferences. • I can plan and prepare complex meals using a wide range of advanced cooking techniques. I can confidently explain how nutrition, ingredients, and seasonality impact food choices for individuals and communities

Link to KS3 national curriculum		Fd	Fd	DT	DT	Tex	Fd	Fd	DT	DT	Tex	Fd	Y9 Eg	Y9 Pd
		F&N	Seasonal food	Choc	Bots	Mini. Monster	F&N	Special diets	Mood light	Moving toy	Bag	Food Science	Speaker	Memphis letter
		C&N Tech	Design	Design	Make	Make	C&N Tech	Design	Make	Make	Design	C&N Tech	Make	Design
[National Curriculum - Design and technology key stages 3 and 4]		Make	C&N Tech	Make	Evaluate	DT Tech	Make	C&N Tech	DT Tech	Evaluate	Make	Make	Evaluate	DT Tech
use research and exploration, such as the study of different cultures, to identify and understand user needs	Design		Yes	Yes				Yes			Yes		Yes	
identify and solve their own design problems and understand how to reformulate problems given to them			Yes	Yes				Yes			Yes			Yes
develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations				Yes							Yes			Yes
use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses				Yes	Yes						Yes			Yes
develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools			Yes	Yes	Yes			Yes			Yes			Yes
select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture	Make	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties		Yes	Yes	n/a	n/a	n/a	Yes	Yes	n/a	n/a	Yes	Yes	Yes	Yes
analyse the work of past and present professionals and others to develop and broaden their understanding	Evaluate				Yes	Yes			Yes				Yes	Yes
investigate new and emerging technologies					Yes				Yes				Yes	
test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups						Yes				Yes			Yes	
understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists					Yes				Yes	Yes	Yes			
understand and use the properties of materials and the performance of structural elements to achieve functioning solutions	DT Tech			Yes	Yes	Yes			Yes	Yes	Yes		Yes	Yes
understand how more advanced mechanical systems used in their products enable changes in movement and force					Yes					Yes				
understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]						Yes			Yes					
apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].						Yes			Yes					
understand and apply the principles of nutrition and health	C&N - Tech	Yes	Yes				Yes	Yes				Yes		
cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet		Yes	Yes				Yes	Yes				Yes		
become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes]		Yes	Yes				Yes	Yes				Yes		
understand the source, seasonality and characteristics of a broad range of ingredients.			Yes				Yes	Yes				Yes		

Year 10 – Design Technology

	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Knowledge, Skills and Understanding – Theory	1.1 - How critically evaluating new and emerging technologies informs design decisions, considering ethical, environmental, and future scenarios. 1.2 - How evaluating new technologies informs design decisions, considering ethical, environmental, and future perspectives. 1.3 - How energy is generated and stored to select suitable sources for products and power systems.	1.4 - Developments in modern and smart materials, composite materials and technical textiles. 1.5 - Mechanisms: levers, cams, pulleys, cranks and sliders, gears. 1.6 - How electronic systems use sensors, controls and devices to provide functionality through various inputs and outputs.	1.7 - Using programmable components to add and customise product functionality. 1.8 - Materials Properties: Metals – ferrous metals, non-ferrous metals and their properties. 1.9 – Materials Properties: Papers and Boards – paper, board and their properties.	1.10 - Materials Properties: Polymers – thermoforming polymers, thermosetting polymers and their properties. 1.11 - Materials Properties: Textiles – natural fibres, synthetic fibres, woven textiles, non-woven textiles. 1.12 - Materials Properties: Timbers – natural timbers (hardwoods and softwoods), manufactured timbers.	1.13 - All design and technological practice takes place within contexts which inform outcomes. 1.14 - Investigate environmental, social and economic challenges when identifying opportunities and constraints that influence the processes of designing and making. 1.15 - Investigate and analyse the work of past and present professionals and companies in order to inform design. 1.16 - Use different design strategies to generate initial ideas and avoid design fixation. 1.17 - Develop, communicate, record and justify design ideas, applying suitable techniques.	
Practical	**Timbers Project** Creating a product to solve a design problem using softwood and manufactured boards. Developing practical skills in safe tool use, measuring, marking, cutting and joining timber. Producing an accurate, well-finished product and recording progress through simple testing and evaluation.		**Metals Project** Developing practical skills in marking out, cutting, shaping and joining metals. Students work with ferrous and non-ferrous metals, using the brazing hearth and precision hand tools to manufacture a product from an engineering drawing.		**CAD and 3D Printing Project** Designing a customised product, developing the model in CAD, and printing and refining the final design. CAD and 3D Printing	**NEA:** 1.1 (Research) Investigating user needs and contextual challenges.
ASSESSMENT	Theory assessed half-termly to check understanding. Each assessment is focused on the topic that has been taught in that half-term. Practical work assessed. Work is being assessed against the mark scheme for the NEA making section.					Yr10 Mock.
Embed your Learning	Topics are uploaded to Seneca for students to complete after it is taught.					
Extend your knowledge	**Product Evaluation Task:** Choose a modern product (e.g., Dyson fan, smart speaker, or electric bike). Identify the technologies used and how they improve user experience. **Timber Investigation:** Visit a DIY store (B&Q, Wickes) and photograph different timber types—label softwoods, hardwoods, and manufactured boards. **Mechanism Hunt:** Find examples of levers, gears, cams, and pulleys around home or outdoors—take photos and explain how each mechanism changes force or movement. **Smart Materials in Use:** Find three objects that use smart materials (e.g., thermochromic mugs, memory foam, self-darkening lenses). Write a short explanation of the technology.		**Microcontroller Challenge:** Use an online simulator (TinkerCAD Circuits) to build a simple LED circuit or program a flashing sequence. **Paper & Board Use:** Examine packaging from food or tech products - identify the material type and why it was chosen. **Polymers Around You:** Identify a range of plastics at home and classify them as thermosetting or thermoplastic (use recycling codes to help). **Textiles Exploration:** Look at clothing labels—identify fibre types (cotton, polyester, elastane) and compare their properties. **Recycling Comparison:** Investigate how polymers, textiles, and wood are recycled differently.		**Designer Research:** Choose one designer (e.g., James Dyson, Naoto Fukasawa, Raymond Loewy) and analyse how their work influences products today. **User Interview Task:** Interview a family member about a design problem they have at home—record the need and sketch two ideas. **Inspiration Board:** Create a mood board of design styles (minimalist, art deco, biomimicry). **Survey Creation:** Make a short survey to collect user feedback that will help define a design brief.	

Year 11 – Design Technology

	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	HT 6
Knowledge, Skills and Understanding 	**Theory** **7.1–7.3:** Design contexts; sources, properties, and environmental impact of natural and manufactured timbers; and factors influencing timber selection. **NEA** **Research (1.1):** Investigating user needs and contextual challenges. **Design brief & specification (1.2):** Defining clear and justified design requirements. **Initial ideas (2.1):** Generating and annotating creative, functional design proposals.	**7.4–7.8:** Forces and stresses in timbers, stock forms and sizes, manufacturing processes, shaping and assembly methods, and surface finishes. **Annotating and refining initial ideas** (2.1–2.2). **Developing design ideas** (2.3) through sketching, modelling, and feedback. **Producing a final design proposal** (2.5) that meets the specification. **Selecting appropriate materials** and components (3.1a) for function, quality, and aesthetics.	Begin **making (3.2)** — planning and producing the final prototype. Maintain a detailed **Diary of Manufacture (3.1b)** to record processes, tools used, and quality checks. Apply workshop skills, accuracy, and safe working practices. Test and adapt components or techniques as the prototype develops.	• Continue **making (3.2)** — completing construction and assembly of the final prototype. • Maintain and finalise the **Diary of Manufacture (3.1b)**, recording accuracy checks, quality control, and problem-solving. • Carry out **testing and modifications** to ensure the product meets the specification.	**1.1–1.17:** Full revision of core content — including new and emerging technologies, energy generation, materials, systems, and design theory. Undertake focused exam preparation through topic revision, practice papers, and exam-style questions. Complete the **evaluation (4.1)** — testing and analysing the final prototype against the design specification	
	NEA section 1.1 and 1.2 assessment	**Regular in class assessments to check understanding of theory topics being covered alongside** Mock paper 1 NEA section 2.1 – 2.3 assessment	Mock paper 2 - just before half term All sections 1.1 to 2.5 assessed	n/a students will need to focus on NEA work this half term	**NEA Final Deadline - Friday 24th April**	
Embed your Learning 	Revision Tasks will be set on Seneca for each topic area – students to complete knowledge organisers after each theory lesson		Revision Tasks will be set on Seneca for each topic area – students to complete knowledge organisers after each theory lesson		Exam preparation homework focusing on topic revision and completion of practice papers and exam-style questions.	
Extend your knowledge 	Compare natural and manufactured timbers — create a mini case study showing environmental pros and cons. Investigate a designer or company known for sustainable timber use (e.g. furniture or architecture). Create a short presentation on how deforestation and responsible sourcing affect design decisions.	Research how large-scale manufacturers use CNC machinery or automation in timber production. Create a visual guide to different timber joints or finishes and explain which would be best for your NEA product. Create a comparison chart of different material groups (metals, polymers, textiles, timbers, papers/boards) showing advantages and disadvantages.	Investigate a sustainable or innovative new material (e.g. bioplastics, mushroom leather) and present how it could impact design. Experiment at home or using online simulators (e.g. Tinkercad Circuits) to design a basic electronic system. Sketch or prototype a product that could use a programmable component to improve its performance.	Create a revision resource (quiz, infographic, or flashcards) covering one key area of the specification. Write a short article or blog-style reflection: *"How sustainable design is shaping the future of technology."* Analyse a past exam paper question and model a high-level response using keywords from the specification.		

Year 12 – Design Technology

	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Knowledge, Skills and Understanding 	Materials and their applications Testing materials Performance characteristics – papers and boards, polymers, biodegradable polymers, Woods, metals	Design methods and processes Design theory Technology and cultural changes Desing processes Critical analysis and evaluation Selecting appropriate tools, equipment and processes Accuracy in design and manufacture	Responsible design Design for manufacture Enhancement of materials Forming, redistributing and addition processes (3 weeks) The use of finishes	Modern and industrial commercial practice Digital design and manufacture Product design and development Health and safety Design for manufacturing, maintenance, repair & disposal Enterprise and marketing in the development of products	Design communication (TP) Internal exams – AS external exams Technology and cultural changes (A-level specific) (DMP) Design processes – prototype development (A-level specific) (DMP) Design processes (A-level specific) (DMP) – iterative design in commercial contexts	Design theory (A-level specific) (DMP) Design theory (A-level specific) (DMP) Selecting appropriate tools, equipment and processes (A-level specific) (DMP) Responsible design (A-level specific) (DMP) Design for manufacture and project management (A-level specific) (DMP)
	NEA preparation (Jewellery project) - pewter casting based on a design movement. Research into chosen movement, develop design ideas and sketches, create moulds, cast and finish pewter jewellery. Focus on materia properties, safe workshop practice, and design evaluation.		**NEA preparation (Phone stand project)** - CAD/CAM and 3D printing, research into theme, manufacturing techniques – turning, brazing, milling, writing a design specification, design ideas, CAD modelling		**AO1 Section A – Identifying and investigating design possibilities (20 marks)** - Rationale for chosen context clearly identified. Investigation including: disassembly, practical experimentation, visits, surveys and interviews, focus groups, primary and secondary research. Investigation material thoroughly analysed and initial concepts generated. **AO1 Section B – Producing a design brief and specification (10 marks)** - Produce a clear and challenging design brief and fully detailed design specification reflecting thorough consideration of investigations undertaken.	
	Baseline assessment – AS level paper 1	End of term formal assessment based on theory content covered in HT1 and HT2	Practical and skills assessment of pewter jewellery outcome and design portfolio	End of HT term formal assessment based on theory content covered in HT1-3	Practical & skills assessment of balancing toy outcome and portfolio NEA Tracker section A&B	EOY 12 - PPEs week 35-6
Embed your Learning 	Please use this link to access all the knowledge organisers for the year 12 theory topics KORGS					
Extend your knowledge 	**Materials, Design Methods, and Responsible Design** • Material Swap Challenge: Redesign a product using different materials. Justify choices for cost, performance, and sustainability. • Visit a local recycling or manufacturing site and suggest how circular design could improve their products. • Research how brands like Patagonia or IKEA use sustainable design principles. • Carry out an Ethical Design Audit of a company's materials and processes; propose one improvement. • Explore a design movement (e.g. Bauhaus, Memphis) and create a quick visual showing its influence on modern design.		**Half Term 3 & 4 – Manufacturing, Processes, and Commercial Practice** • Reverse Engineer a small product (e.g. lamp or speaker). Sketch construction and suggest one redesign. • Watch *How It's Made* or *Inside the Factory* and note key differences from school manufacture. • Create a short CAD Timeline showing how CAD/CAM has evolved and impacted design. • Compare additive vs. subtractive manufacturing and list pros, cons, and uses.		**Half Term 5 & 6 – Industry, Enterprise, and Advanced Design Practice** • Watch a virtual factory tour (BMW, Dyson, Lego) and summarise how quality control and automation are used. • Choose a **brand** and develop a redesigned product concept reflecting its values and sustainability goals. • Enter a design competition (e.g. Dyson Award, Design Ventura, Young Engineer for Britain). • Visit a design exhibition (e.g. New Designers, London Design Festival) and record key ideas in your sketchbook. • Build a digital design portfolio to document your research and project progress.	

Year 13 – Design Technology

	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	HT6
Knowledge, Skills and Understanding 	National and international standards in product design Materials and their applications Classification of materials Methods for investigating and testing materials Performance characteristics of materials Forming, redistribution and addition processes (A-level specific) (TP)	Forming, redistribution and addition processes (A-level specific) The use of finishes (A-level specific) Modern and industrial commercial practice (A-level specific) Digital design and manufacture (A-level specific)	Digital design and manufacture (A-level specific) The requirements for product design and development Protecting designs and intellectual property Design for manufacturing, maintenance, repair and disposal Feasibility studies Enterprise and marketing in the development of products	Modern manufacturing systems Detailed product study Detailed product comparison Detailed product analysis Exam preparation – Exam technique Exam preparation	‹am preparation and ›evision for paper 1 and aper 2	
	AO2 Section C – Development of design proposal(s) (25 marks) Generate design proposals that take full account of the design brief and specification. Produce a comprehensive and fully detailed manufacturing specification.		**A02 Section D – Development of design prototype(s) (25 marks)** Manufacturing a prototype using all potential resources, tools machines and equipment to a high level. On-going development directly related to the design proposals. On-going testing and evaluation **A03 Section E – Analysing and evaluating (20 marks)** On-going analysis and evaluation that informs the manufacture of the prototype. Testing and fitness for the needs of the client/user. Critical analysis of the final prototype. Modifications and improvements including consideration of levels of production.			
	NEA tracker section A- B	Y13 PPEs – full A level paper 1 & 2 NEA tracker section A- C	NEA section A, B, C, D marked & feedback given Y13 PPEs – full A level paper 1 & 2	Regular in class assessments to check understanding.	Internal moderation and submission of NEA marks to AQA	
Embed your Learning 	Please use this link to access all the knowledge organisers for the year 13 theory topics KORGS					
Extend your knowledge 	**Materials, Standards & Manufacturing Practice** Create concise revision flashcards for material classifications, properties, and applications – include one *exam example* for each. Research BSI and ISO standards and summarise how they appear in exam questions or past papers. Write a short evaluation paragraph comparing two forming or finishing processes, using PEE (Point–Evidence–Explain). Watch a factory tour video (e.g. Dyson or BMW) and identify three quality-control measures you could reference in an essay. Practise a 6-mark question on materials testing or performance – focus on using precise technical vocabulary. Summarise modern and industrial processes in a single-page “cheat sheet” for quick recall before exams.		**Product Development, IP & Marketing** Research a patented product and explain briefly how IP protects its innovation. Complete a feasibility study for your NEA – focus on cost, manufacture, and sustainability. Compare two design companies (e.g. Dyson vs Apple) to practice analysis and evaluation. Create a lifecycle diagram of a product and note key points for improvement (AO3 practice).	**Analysis, Systems & Exam Technique** • Complete at least two full practice papers under timed conditions; self-mark using the official mark scheme. • Build a product comparison grid (materials, function, manufacture, cost) to strengthen applied analysis answers. • Answer one 9-12 mark exam question each week – focus on structure, evidence, and evaluative depth. • Produce a revision mind map connecting topics (materials, processes, standards, and design theory). • Research modern manufacturing systems (e.g. lean, JIT, automation) and practise linking them to real-world examples in written responses. • Use exam command words (analyse, evaluate, justify) to rewrite notes into question-answer form for active recall.		