

KS4 Curriculum Map

AQA GCSE Design & Technology 8552

Identifying & Investigating design possibilities

Producing a design brief & specification

Generating design ideas

Realising design ideas

Analysing & evaluating

Year 10

Rationale: In the first year of GCSE Product Design students will develop a working knowledge and understanding of a range of specified materials and their working properties- (papers and boards, natural and manufactured timbers, metals and alloys, polymers, textiles.) This will allow students to expand their making skills and vocabulary for them to answer the written exam paper and begin the NEA. Through specific theory lessons students will practise exam technique in answering a range of questions on the materials topics.

	Unit Of Work	Knowledge	Skills	Key Concepts/Theory
Autumn Term	Timber Toy	<p>How do we choose appropriate materials to make products? Why do we need a range of materials to choose from? What is the classification of the types and properties of a range of materials? What are the physical properties of materials related to use and knowledge applied when designing and making? What is the correct scientific vocabulary to use in an exam response?</p>	<ul style="list-style-type: none"> • Use models to test and explore ideas further for mechanisms. • Produce an orthographic, isometric and exploded drawing (google sketch up) to scale of the final toy in advance of making. • Correctly describe how a product could be manufactured in batch. • Demonstrate high levels of skill and accuracy when making the final product. • Produce a diary plan of make. Including photos taken during making • Demonstrate the use of quality control checks and feedback within the diary of make. • Demonstrate key vocabulary and terminology when completing practice exam questions. 	<p style="color: red;">Realising design ideas</p> <p>Materials and their working properties:</p> <ul style="list-style-type: none"> • Properties of materials • Working properties of materials • Paper and boards • Natural and manufactured timber • Metals and alloys • Polymers • Natural and synthetic fabrics and fibres
Spring Term	Polymer Clock	<p>What are the issues related to polymers in our world? How do we select the correct material for a product? How do you choose appropriate energy sources for a raw material and manufacturing process? What are the best working methods with polymers? What are the ecological issues in the design and manufacture of products in polymers?</p> <p>What affects the design of new products? What are the impacts of the products we use every day? How does the evaluation of new and emerging technologies inform design decisions? How is a workplace organised? When should a business use it? Automation &/ or the use of Robotics? What is effective business innovation? What is the impact of resources and consumption on the planet? What is a Push/Pull market? How are new jobs due to emerging technologies? What are the impacts of Fashion & trends, Faiths & beliefs, Ethics on design and manufacturing? What are the negative impacts of products on others and how to avoid them? What is Fair trade? ETI (ethical trading initiative)? What are the positive and negative Impacts of new products? What is Cad, CAM, and FSM? JIT and Lean manufacturing? What is the LCA? How can we best dispose of products at the end of their life?</p>	<ul style="list-style-type: none"> • Use mood boards and other research to develop a range of ideas for a clock. • Focus designing and development • Use models to test and explore ideas further for a range of manufacturing methods when using polymers. <ul style="list-style-type: none"> Polymorph - ergonomic pen holder including research Acrylic - Oven (Twister), Die pressing, Line bending, Laser cutting HIPS - Vacuum forming (Pen Holder) Plastic dipping coating • Use CAD/CAM within designing and making of final product • Correctly describe how a product could be manufactured in batch. • Demonstrate high levels of skill and accuracy when making the final product. 	<p style="color: green;">Identifying & Investigating design possibilities</p> <p style="color: orange;">Generating design ideas</p> <p style="color: red;">Realising design ideas</p> <p style="color: blue;">Analysing & evaluating</p> <p>New and emerging technologies:</p> <ul style="list-style-type: none"> • Industry and enterprise • People, culture and society • Sustainability and the environment • Production techniques and systems • Critical evaluation of new and emerging technologies. <p>Energy generation and storage:</p> <ul style="list-style-type: none"> • Fossil fuels • Nuclear power • Renewable energy <p>Developments in new materials:</p> <ul style="list-style-type: none"> • Modern materials

		<p>How do we choose appropriate energy sources to make products? How does the energy we use impact are lives now and in the future? What are Fossil Fuels? What is Nuclear Power? What is Renewable Energy? What are Energy Storage systems (inc. Batteries)? What are Modern and Smart materials? Do you know the following inputs Light Sensors, Temperature Sensors, Pressure sensors and Switches? Are you able to explain Programming microcontrollers – counters/timers/decision making? What are these outputs, Buzzers/speakers/lamps? What is Mechanical Devices: Movement? Are you able to change Magnitude & direction of force on a given product?</p>		<ul style="list-style-type: none"> • Smart materials • Composite materials • Technical textiles <p>Systems approach to designing:</p> <ul style="list-style-type: none"> • Input and output devices • Processes and programming microcontrollers Mechanical devices: • Types on levers • Types of linkages • Types of motion • Rotary systems
<p>Summer Term</p>	<p>Experimenting with metals:</p> <ul style="list-style-type: none"> - Camping Tool - Aluminium Coat Hook 	<p>What is Cad, CAM, and FSM. JIT and Lean manufacturing? What is the LCA? How can we best dispose of products at the end of their life? How do we calculate of material costs e.g. Calculate surface area and volume?What is the correct efficient material use, pattern spacing, nesting and minimising waste?</p> <p>Consolidate: How do we choose appropriate materials to make products? Why do we need a range of materials to choose from? What is the classification of the types and properties of a range of materials? What are the physical properties of materials related to use and knowledge applied when designing and making? What is the correct scientific vocabulary to use in an exam response?</p> <p>What are the issues related to polymers in our world? How do we select the correct material for a product? How do you choose appropriate energy sources for a raw material and manufacturing process? What are the best working methods with polymers? What are the ecological issues in the design and manufacture of products in polymers?</p>	<ul style="list-style-type: none"> • Designing and development of pewter jewellery • Use of research to identify a need. • Produce a brief and specification based on research and client wants & needs. • Use modelling to make a functional product suitable for a chosen client. • Evaluate final product against specification and client feedback • Use models to test and explore ideas further for a range of manufacturing methods when using metals. • <u>Students will begin their NEA on the 1st June which represents 50% of their final grade. Students will complete AO1- Investigation and research methods.</u> • Design possibilities identified and thoroughly explored, directly linked to the NEA contextual challenge demonstrating excellent understanding of the problems/opportunities. • A user/client has been clearly identified and is entirely relevant in all aspects to the contextual challenge. • A comprehensive investigation of their needs and wants, with a clear explanation and justification of all aspects of these. • Comprehensive investigation into the work of others that clearly informs ideas. • Demonstrate a full understanding of the impact on society including; economic and social effects within the context. • Demonstrate an investigation of design possibilities that have taken place throughout the project with excellent justification and understanding of possibilities identified. 	<p>Identifying & Investigating design possibilities</p> <p>Generating design ideas</p> <p>Analysing & evaluating</p> <p>Materials Recap:</p> <ul style="list-style-type: none"> • Electronics • Textiles • Timber • Metal • Polymer <p>Common specialist technical principles:</p> <ul style="list-style-type: none"> • Forces • Functionality • Ecological • 6-Rs • Scales of production <p><u>Designing Principles and Making Principles -NEA</u></p> <p>Identifying & Investigating design possibilities</p>

Year 11

Rationale: Students will complete their NEA securing 50% of their final grade before external moderation. Students will develop an understanding and gain confidence in exam techniques and practise exams skills required for the written paper.

	Unit Of Work	Knowledge	Skills	Key Concepts
Autumn Term	NEA	<p>Consolidation of theory knowledge based on prior attainment</p> <p>Application of previous acquired knowledge to support NEA</p>	<p>Students will begin their NEA on the 1st June which represents 50% of their final grade. Students will complete AO1 and start AO2.</p> <ul style="list-style-type: none"> Produce a design brief and specification. Produce imaginative, creative and innovative ideas, avoiding design fixation and with full consideration of functionality, aesthetics and innovation. Show that ideas have been generated, that take full account of on-going investigation. Show experimentation and excellent communication is evident, using a wide range of techniques. Use different design strategies for different purposes and as part of a fully integrated approach to designing. Show detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Demonstrate modelling, using a wide variety of methods to test their design ideas, fully meeting all requirements. Use appropriate materials/components selected with extensive research into their working properties and availability. Produce a detailed manufacturing specification with comprehensive justification to inform manufacture. 	<p>Identifying & Investigating design possibilities</p> <p>Generating design ideas</p>
Spring Term	NEA	<p>Consolidation of theory knowledge based on prior attainment.</p> <p>Application of previous acquired knowledge to support NEA.</p>	<p>Students will begin their NEA on the 1st June which represents 50% of their final grade. Students will complete AO2 and AO3.</p> <ul style="list-style-type: none"> Demonstrate the use of correct tools, materials and equipment (including CAM where appropriate) have been consistently used or operated safely with an exceptionally high level of skill. Show a high level of quality control is evident to ensure the prototype is accurate by consistently applying very close tolerances. Develop a prototype that shows a high level of making/finishing skills that are fully consistent and appropriate to the desired outcome. Show that the prototype has the potential to be commercially viable, has been produced and fully meets the needs of the client/user. 	<p>Realising design ideas</p> <p>Analysing & evaluating</p>

			<ul style="list-style-type: none"> • Show evidence that various iterations are as a direct result of considerations linked to testing, analysis and evaluation of the prototype, including well considered feedback from third parties. • Show testing of all aspects of the final prototype against the design brief and specification. Fully detailed and justified reference is made to any modifications both proposed and undertaken. • Show ongoing analysis and evaluation evident throughout the project that clearly influences the design brief and the design and manufacturing specifications. 	
Summer Term	Revision Techniques	How do we plan a 12 and 8 marker question? What are command words and how do we use them effectively? What is Point, Evidence, Explain? How does PEE increase my exam marks? What is key vocabulary? What is technical vocabulary? What areas of previous knowledge do I need to revisit? What mathematics do I need for the exam? How do I revise?	<ul style="list-style-type: none"> • Produce exemplary answers to exam questions. • Know how to plan extended answer questions. • Demonstrate the use of correct technical and key vocabulary within a given question. • Practise timed exam responses and planning. • Develop revision methods suitable to aid individual revision needs. 	

Appendix -

NEA Assessment Criteria (50% of overall GCSE Grade)	Written Paper (50% of overall GCSE Grade)
<p>A01 - Identifying, investigate & outline design possibilities:</p> <p>Section A - Identifying & Investigating design possibilities Section B - Producing a design brief & specification</p> <p>A02 - Design & make prototypes that are fit for purpose:</p> <p>Section C - Generating design ideas Section D - Developing design ideas Section E - Realising design ideas</p> <p>A03 - Analyse & Evaluate:</p> <p>Section F - Analysing & evaluating</p>	<p>Section A – Core technical principles (20 marks)</p> <p>A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding.</p> <p>Section B – Specialist technical principles (30 marks)</p> <p>Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles.</p> <p>Section C – Designing and making principles (50 marks)</p> <p>A mixture of short answer and extended response questions.</p>

