

Curriculum Mapping: Design & Technology – Product Design Year 12-13

		Autumn 1 & 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12	<p style="text-align: center;">Technical Principles Metals, Timber Plastics, Design Principles Drawing Techniques, Design theory</p>	<p style="text-align: center;">Technical & Design Principles Paper & Board, Composite, Modern and Smart materials Responsible Design, International Standards, Protecting Designs, Critical analysis,</p>	<p style="text-align: center;">NEA Section A & B Technical Principles Industrial Practice, H&S, Modern Manufacture</p>	<p style="text-align: center;">NEA Section B & C Technical Principles Digital Manufacture, Design for Repair</p>	<p style="text-align: center;">NEA Section C - Design Technical Principles Feasibility Studies, Enterprise</p>	
	<p style="text-align: center;">Technical Principles Physical and mechanical properties of metals, timber, polymer, forming, addition, redistribution, fabrication, finishes, performance characteristics, enhancement, casting, welding, joining thermos plastic, thermosetting, synthetic and bioplastic, elastomer, tolerance, lathe, micrometer, vernier calliper. Design Principles 2D & 3D drawing, rendering, exploded diagram, isometric, dimensioning Design theory: Art& Crafts, Art Deco, Modernism, Post modernism. Technical and cultural changes</p>	<p style="text-align: center;">Technical Principles Paper, Board, microns, gsm, lithographic, gravure, silk screen and digital printing, die cutting, enhancement, modern, smart, composite. Design Principles ISO 9000, BSI, WEEE, eco-labelling, patent, copyright, trademarks, product miles, waste, environmental impact, conservation</p>	<p style="text-align: center;">NEA Context, client, user, target market, primary and secondary research, product analysis, evaluation & justification. Technical Principles Scale of production, JIT, QRM, Flexible, vertical, Health & Safety, COSH, hazard, risk, control</p>	<p style="text-align: center;">NEA Design Specification, criteria, justification, design presentation, annotation, additional research, client feedback. Technical Principles CAD/CAM, laser cutting, CNC routing, plotter cutting, simulation, CFD, FEA, EDI, 6R's, standard parts</p>	<p style="text-align: center;">NEA Design Specification, criteria, justification, design presentation, annotation, additional research, client feedback. Technical Principles Feasibility, SWOT analysis, marketing, branding, entrepreneurs, ribs, snap fittings, components,</p>	
	<p>Justification: Students extend their knowledge of the core material types and properties. Theoretical study runs alongside practical activities to allow the students to explore physical and mechanical properties of materials.</p> <p>Extended use of 3D drawing techniques to produce technical design drawings.</p> <p>Knowledge, understanding of how design eras impacted the development of the consumer society and its impact on society.</p> <p>Discovering how technical and cultural changes have impacted our planet and product design.</p> <p>Core skills build on those learnt in KS4 and lay the foundations for the NEA and external exam.</p>	<p>Justification: Students will extend their knowledge of materials. Theoretical study runs alongside practical activities to allow the students to explore physical and mechanical properties of materials.</p> <p>Exploring the impact products have on the environment and designer responsibility.</p> <p>Regulations and standards that are inherent in design in order to protect the planet and the consumer.</p> <p>Enabling students to critically analyse existing products so that they can use this technique on their own in the NEA.</p>	<p>Justification: NEA Section A Define a student lead design context, interview a client and research potential design solutions. Technical Principles Students will learn how products are manufactured commercially looking at differing production methods for efficiency.</p> <p>Understanding the importance and regulations involved with Health & Safety in the workplace.</p>	<p>Justification: NEA Section B & C Write a design specification outlining the product being designed, produce a range of design ideas to show the concept to the client for approval. Technical Principles Students will learn how products are developed and manufactured commercially using digital processes.</p> <p>Understanding the 'right to repair' movement supporting sustainable product design.</p>	<p>Justification NEA Section C Produce a range of design ideas to show the concept to the client for approval. Review designs and model proposals. Technical Principles Students will learn how commercial enterprises develop products for market and check their viability.</p>	
<p>Assessment: Feedback on theory work is given to students with the opportunity to revise and perfect their work. Unit tests, exam style questions, practical work is marked formally with a grade. NEA work is given feedback in line with exam board criteria.</p>						
<p>Wider reading/Cultural capital External speakers are invited to the school to widen students' knowledge of potential careers and opportunities within DT. Real life examples are built into learning wherever possible to give students access to how DT fits into the wider world. Wider reading includes AQA A Level Design & Technology Product Design by Hodder, My Revision Notes: AQA Design & Technology Product Design by Hodder, Essential maths skills (in DT) by Hodder</p>						

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Year 13		<p style="text-align: center;">Non-Examined Assessment (NEA) Section C - Design Development Technical Principles Adhesives, Ergonomics & Anthropometrics, Product Development cycle</p>	<p style="text-align: center;">Non-Examined Assessment (NEA) Section D & E Manufacture & Evaluation Technical Principles Quality control and Testing</p>	<p style="text-align: center;">Exam Preparation Revision of all theory topics for Technical, Design and Making principles.</p>	Study leave
		<p style="text-align: center;">NEA Modelling, iteration, innovation, creative, 2D & 3D, CAD/CAM, prototype, testing, user feedback, research, material properties, material testing, final design, manufacturing specification, production plan, risk assessment, production schedule, costing. Technical Principles Adhesive, PVA, Contact, UV Hardening, Solvent, Tensol, Cement Ergonomics, Anthropometrics, ease of use, percentiles, comfort Evolution, growth, maturity, decline, replacement</p>	<p style="text-align: center;">NEA CAD/CAM, Quality Control, Health & Safety, making skills, tolerances, finishing, commercially viable. Testing, analysing, evaluating, modifications, user feedback. Technical Principles Quality assurance, Quality control, destructive and non- destructive testing, TQM, Six Sigma, accuracy, tolerance, x-rays, ultrasound</p>	<p style="text-align: center;">Material Categorisation, properties, enhancement, manufacture. Mathematics application Environmental considerations Commercial manufacture Design process and responsibility Moral, social and ethical impacts of products Design history Standards and regulatory bodies New technological approaches to design</p>	
		<p>Justification: Section D - Development Students develop their chosen design idea through iterative modelling, evaluation, and conducting client feedback throughout. Material research and testing will support their design decisions. They will produce a technical manufacturing specification that includes a final design, production plan, production schedule, costing and risk assessment. Planned quality control will be a significant feature. Technical Principles Students will learn a range of adhesives for use on a range of materials. How design for human use and comfort is supported by the principles of ergonomics and anthropometrics. Evaluate the development of a product commercially, understanding each stage in the process.</p>	<p>Justification: Section D - Manufacture Students use a range of practical making skills to manufacture and finish their final prototype to a high quality with use of close tolerances. Section E – Analysis & Evaluation Students test the final prototype to assess fitness for purpose against the design specification, gaining client feedback to establish the overall success of their product and suggest future modifications. Technical Principles Understanding commercial processes for testing and ensuring products are fit for purpose and safe for the user.</p>	<p>Justification: Students to complete theoretical studies and revise all topics for the two external papers. Mathematical applied skills to DT contexts. Activities include, mini tests, exam questions, note taking and targeted questioning.</p>	Study leave
<p>Assessment: External Assessment: A Level Product Design – 50% of A Level 2 x Written exams split over Technical Principles – Paper 1 2.5 hours 120 marks & Design and Making Principles – Paper 2 1.5 hours 80 marks. Extended answer questions and includes 15% mathematics NEA Internal Assessment: 50% of A Level Substantial Design and make task completed as a A3, 45-page E-portfolio and completed 3D prototype.</p>					
<p>Wider reading/Cultural capital External speakers are invited to the school to widen students' knowledge of potential careers and opportunities within DT. Real life examples are built into learning wherever possible to give students access to how DT fits into the wider world. Wider reading includes Design: The Whole Story by Elizabeth Wilhide, Cradle to Grave: Rethinking the Way We Make Things by Michael Braungart & William McDonough, https://www.asme.org/topics-resources/content/9-material-discoveries-that-could-transform-manufacturing - new and innovative materials.</p>					