



Topic Name	Term	Skills Developed	Next link in curriculum	Prior Learning
Inclusive Design Iconic Designers Papers & Boards	Year 12- Autumn	<p>Empathy: Understanding diverse user needs and designing products that are accessible and usable by people of all abilities.</p> <p>Problem-Solving: Identifying barriers to accessibility and devising innovative solutions to overcome them.</p> <p>Ethical Awareness: The importance of creating inclusive products that cater to all users, promoting equality and social responsibility.</p> <p>Research Skills: Gathering insights into the needs of different user groups.</p> <p>Critical Thinking: Analysing the design philosophy, methods, and influence of iconic designers.</p> <p>Creative Inspiration: From iconic designs and designers to inform and inspire their own design work.</p>	<p>Inclusive Design principles ensure products made from any material are accessible and usable.</p> <p>The study of Iconic Designers provides inspiration and insight into effective material use.</p> <p>Papers & Boards are essential for prototyping and packaging.</p> <p>Together, these topics create a comprehensive understanding of product design that integrates creativity, functionality, and sustainability.</p>	<p>A-level Product Design builds on the foundation established during the GCSE DT. At the GCSE level, students are introduced to key concepts such as user-centred design, the impact of iconic designers, and basic material properties and processes for papers, boards.</p> <p>Students gain a deeper understanding of inclusive design by tackling more complex user needs and accessibility challenges. They analyse the historical and contemporary impact of iconic designers more critically and draw more sophisticated inspiration for their own work.</p>



<p>Polymers</p> <p>Timbers</p> <p>Metals</p>	<p>YEAR 12- Spring</p>	<p>Materials: Knowledge of different types of polymers, their properties, and applications.</p> <p>Manufacturing Techniques: Processes such as injection moulding, extrusion, and 3D printing.</p> <p>Environmental: Awareness of issues related to the use and disposal of plastic materials.</p> <p>Innovation: Exploring new uses and combinations of polymers in product design.</p> <p>Materials: Properties of various woods, including hardwoods and softwoods.</p> <p>Sustainability: Knowledge of sustainable forestry practices and the environmental impact of timber use.</p> <p>Properties: Different types of metals and their properties, such as strength, malleability, and conductivity.</p> <p>Industrial Processes: Processes like casting, forging, and welding.</p>	<p>Polymers, Timbers, and Metals in A-level Product Design are closely linked to Scales of Production, Commercial Manufacturing, and Computer Systems.</p> <p>Understanding the properties and processing techniques of these materials is essential for optimising production processes and determining the most efficient scale of production, whether it be mass production, batch production, or one-off production.</p> <p>This knowledge is also crucial in commercial manufacturing, where students learn about sourcing materials, managing inventory, and maintaining quality standards.</p>	<p>In material studies of Polymers, Timbers and Metals, students explore the properties and uses in greater detail, including advanced manufacturing techniques and sustainability considerations.</p>
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<p>Scales of Production</p> <p>Commercial manufacturing</p> <p>Computer Systems</p>	<p>Year 12- Summer</p>	<p>Understanding Production Methods: Different production scales, such as one-off, batch, and mass production, and the advantages and disadvantages of each.</p> <p>Efficiency & Optimisation: Skills in optimising design and manufacturing processes to suit different scales of production, aiming for cost-effectiveness and efficiency.</p> <p>Quality Control: Knowledge of maintaining quality standards across various production scales, including techniques for monitoring, and improving product quality.</p> <p>Adaptability: Adapt designs and manufacturing processes based on the scale of production, considering factors such as demand, production speed, and resource availability.</p> <p>Industry Practices: Manufacturing processes and standards, including how products are made at a commercial level.</p>	<p>Scales of Production, Commercial Manufacturing, and Computer Systems are closely linked to the subsequent topics of Digital Design and Design Communication.</p> <p>The skills gained in understanding production scales and commercial manufacturing processes provide a strong foundation for exploring how products are designed and produced digitally.</p> <p>Proficiency in CAD and CAM from Computer Systems directly supports advanced digital design, enabling students to create precise and innovative models. Additionally, the knowledge of integrating various digital technologies and manufacturing methods enhances students' ability to effectively communicate and present their design concepts, bridging the gap between initial ideas and final products.</p>	<p>Scales of Production, Commercial Manufacturing, and Computer Systems in A-level Product Design course build upon the foundational knowledge established in GCSE DT.</p> <p>At the GCSE level, students are introduced to basic manufacturing processes and concepts such as batch production, machinery usage, and introductory CAD principles.</p> <p>As they progress to A-level, students delve deeper into these topics, exploring advanced concepts like production scale optimisation, industry-standard manufacturing practices, and the integration of computer systems into design and manufacturing processes.</p> <p>They learn to analyse and evaluate design solutions and manufacturing methods with greater sophistication, considering technical, economic, and ethical factors.</p>
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<p>Digital Design & Manufacture</p> <p>Design Communication</p>	<p>Year 13- Autumn</p>	<p>CAD/CAM Skills: Proficiency in using software to create precise digital models of their designs. Ability to produce detailed 2D and 3D drawings and renderings. Understanding how to translate digital designs into physical products using CNC machines, 3D printers, and laser cutters. Knowledge of the various processes and materials used in digital manufacturing.</p> <p>Prototyping Skills: Skills in rapid prototyping and iterative design, allowing them to quickly test and refine their ideas. Familiarity with additive and subtractive manufacturing techniques.</p> <p>Visual Communication: Creating clear and compelling visual presentations of their designs, including sketches, drawings, and renderings. Ability to use design elements such as colour, typography, and layout to effectively convey ideas.</p> <p>Drawing Skills: Creating accurate technical drawings that communicate the specifications and dimensions of a design. Skills in using various drawing techniques, such as orthographic projection, exploded views, and assembly drawings.</p> <p>Presentation Skills: Ability to present design concepts and processes effectively. Development of verbal and written communication skills to explain and justify design choices.</p>	<p>Digital tools and effective communication techniques enhance modern design methods, allowing for more precise and efficient development and presentation of ideas.</p> <p>Understanding design influences and styles informs students' aesthetic and functional choices, enriching their digital designs and ensuring cultural and stylistic relevance.</p> <p>This allows for a holistic understanding of the design process, encourages innovative thinking, and prepares students for professional environments by combining technical expertise with a deep knowledge of design principles and history.</p>	<p>A-Level Product Design builds on the foundations laid during GCSE DT.</p> <p>Students advance from basic CAD and CAM skills to more complex software and manufacturing techniques, enabling them to create intricate 3D models and detailed technical drawings.</p> <p>In design communication, students' progress from simple sketches and basic technical drawings to producing high-quality renderings and precise technical diagrams, and they learn to create compelling presentations.</p> <p>This deeper technical knowledge, enhanced communication ability, and improved critical thinking and problem-solving skills prepare students for higher education and professional practice in design and related fields.</p>
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<p>Design Methods</p> <p>Design influences, style and movements</p>	<p>Year 13- Spring</p>	<p>Problem-Solving Skills: Identify and define design problems and create effective solutions through structured approaches such as design thinking and user-centred design.</p> <p>Research & Analysis: Skills in conducting thorough research to gather information about user needs, market trends, and existing products.</p> <p>Project Management: Skills in planning and managing design projects, including setting objectives, scheduling tasks, and monitoring progress to ensure timely completion.</p> <p>Historical & Cultural Awareness: Understanding the impact of historical design movements and styles on contemporary design. Learn how cultural, social, and economic factors influence design trends and practices.</p> <p>Critical Analysis: Critically evaluate and analyse different design styles and movements. Learn to assess the strengths and weaknesses of various design approaches and their relevance to current projects.</p> <p>Aesthetic & Functional: Understanding how different styles and movements affect the visual and functional aspects of design. This includes appreciating the interplay between form and function.</p>	<p>Understanding design methods provides students with a framework to analyse and appreciate the approaches used by renowned designers, linking theoretical concepts to practical applications.</p> <p>Similarly, knowledge of Design influences and movements offers context for studying individual designers and their contributions, enabling students to critically examine how designers are influenced by historical styles and movements.</p> <p>These topics also prepare students to integrate modern and smart materials into their designs effectively, fostering innovative thinking and informed material selection.</p> <p>By connecting these areas of study, students gain a holistic understanding of the design process, from historical context to practical application, enhancing their creativity, technical expertise, and critical analysis skills essential for success in contemporary design practice.</p>	<p>Students advance from basic problem-solving and research techniques to more sophisticated design thinking and user-centred design methods, enhancing their ability to tackle complex challenges.</p> <p>They refine their skills in idea generation, concept development, and project management, allowing for more thorough and professional execution of design projects.</p> <p>In studying design influences, students deepen their understanding of historical and cultural contexts, engaging in critical analysis and drawing inspiration from a wide range of design movements and styles.</p> <p>This progression from GCSE to A-Level equips students with a comprehensive understanding of the design process, preparing them for higher education and professional practice in the field of design.</p>
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<p>Designers and their work</p> <p>Modern and Smart materials</p>	<p>Year 13-Summer</p>	<p>Historical & Contextual: Develop an appreciation for the contributions of renowned designers throughout history, understanding their influence on design trends and practices. Analyse the design methodologies, processes, and philosophies employed by these designers, gaining insights into effective problem-solving and creative approaches.</p> <p>Critical Analysis & Evaluation: Skills in critically evaluating the work of designers, including assessing the functionality, aesthetics, and cultural significance of their designs. Learn to identify the strengths and weaknesses of different design approaches and articulate their own informed opinions.</p> <p>Inspiration & Innovation: Inspiration from the work of designers, students learn to incorporate innovative design elements and concepts into their own projects. Develop creativity and vision by studying a diverse range of design styles, techniques, and solutions.</p> <p>Materials: Understanding of the properties, capabilities, and applications of modern and smart materials, such as shape-memory alloys, carbon fibre composites, and conductive polymers. Learn to select appropriate materials based on their specific properties and performance requirements, considering factors such as strength, durability, flexibility, and conductivity.</p> <p>Integration & Implementation: Skills in integrating modern and smart materials into design solutions, exploring innovative ways to leverage their unique properties and functionalities. Learn to apply these materials creatively to enhance product performance, functionality, and user experience.</p> <p>Sustainability & Environmental: Explore the sustainable aspects of modern and smart materials, considering factors such as recyclability, energy efficiency, and environmental impact. Learn to make informed decisions about material usage, balancing performance requirements with environmental considerations.</p>	<p>These two topics complete the course.</p> <p>Students explore the works of designers to gain insights into different problem-solving approaches and creativity, enhancing their ability to apply systematic design processes effectively.</p> <p>Additionally, the study of modern and smart materials influences material selection, prototyping, and testing stages of the design process, thereby impacting the overall design outcome.</p> <p>These topics link with previous areas of study such as design factors, human factors, manufacturing processes, commercial production, and marketing.</p> <p>By connecting theoretical concepts with practical applications and real-world examples, students develop an understanding of industry practices, contemporary design trends, and the commercial implications of their design decisions.</p>	<p>By studying Designers and their work, students deepen their comprehension of historical design movements and influential figures, analysing their methodologies and contributions to design. This builds upon Design influences at GCSE level.</p> <p>Similarly, the study of Modern and Smart materials expands upon the material knowledge acquired in GCSE DT, students apply traditional material understanding to advanced materials with unique properties.</p> <p>By linking A-Level topics to prior GCSE learning, students’ progress naturally, developing a contextual understanding of design principles and enhancing their problem-solving skills.</p> <p>These connections allow students to apply their knowledge and skills effectively to complex design challenges, preparing them for further education and professional practice in product design.</p>
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West Kirby
Grammar School

A-LEVEL PRODUCT DESIGN – Years 12 & 13

