

GCSE Design & Technology (Graphics) Year 10

	Topic / Theme	Knowledge and Skills	Assessment	Cultural Capital Independent Learning
Autumn – Term One	<p>Core content 1.1 The impact of new and emerging technologies</p> <p>Skills development Students will develop design & manufacturing skills in preparation for the NEA theme release.</p> <p>(1) Design production (2) Manufacture of products (3) Evaluation & product analysis</p> <p>Skills development is taught in conjunction with the core content.</p>	<p>Core content 1.1.1 Industry: a unemployment b workforce skill set c demographic movement d science and technology parks. 1.1.2 Enterprise: a privately-owned business b crowd funding c government funding for new business start-ups d not-for-profit organisations. 1.1.3 Sustainability: a transportation costs b pollution c demand on natural resources d waste generated. 1.1.4 People: a workforce b consumers c children d people with disabilities e wage levels f highly-skilled workforce g apprenticeships 1.1.5 Culture: a population movement within the EU b social segregation/clustering within ethnic minorities.</p>	<p>Core content Assessment of core content is through class marking and internal examination.</p> <p>Skills development Skills development is assessed against the GCSE NEA marking criteria grid.</p>	<p>Students will gain insight on the impact that manufacturing has on the environment and society, and the differences in various cultures and social-economic groups.</p> <p>Specific tasks within the curriculum encourage the use of a wide array of practical skills and experiences, which are designed to appeal to girls in particular to address issues of gender stereotyping and encourage future pathways and employment</p>

	<p>1.2 How the critical evaluation of new and emerging technologies informs design decisions; considering contemporary and potential future scenarios from different perspectives, such as ethics and the environment</p>	<p>1.1.6 Society: a changes in working hours and shift patterns b Internet of Things (IoT) c remote working d use of video conference meetings. 1.1.7 Environment: a pollution b waste disposal c materials separation d transportation of goods around the world e packaging of goods. 1.1.8 Production techniques and systems: a standardised design and components b just-in-time (JIT) c lean manufacturing d batch e continuous f one off g mass</p> <p>1.2.1 How to critically evaluate new and emerging technologies that inform design decisions: a budget constraints b timescale c who the product is for d the materials used e manufacturing capabilities. 1.2.2 How critical evaluations can be used to inform design decisions, including the consideration of contemporary and potential future</p>		<p>in areas with gender disparity.</p> <p>Students are encouraged to understand how other cultures, and the beliefs and views of others, affect the way products and services are designed and used. They are taught to reflect on the users of products and how users' views, beliefs and social-economic status often determine the type of product conceptualised, and why.</p>
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	<p>1.3 How energy is generated and stored in order to choose and use appropriate sources to make products and power systems</p>	<p>scenarios: a natural disasters b medical advances c travel d global warming e communication.</p> <p>1.2.3 Ethical perspectives when evaluating new and emerging technologies: a where it was made b who was it made by c who will it benefit d fair trade products.</p> <p>1.2.4 Environmental perspectives when evaluating new and emerging technologies: a use of materials b carbon footprint c energy usage and consumption during manufacture and transportation d life cycle analysis (LCA).</p> <p>1.3.1 Sources, generation and storage of energy: a fossil fuels – oil, gas, coal b biofuels – biodiesel and biomass c tidal d wind e solar f hydroelectric.</p> <p>1.3.2 Powering systems: a batteries and cells b solar cells c mains electricity d wind power.</p> <p>1.3.3 Factors to consider when choosing appropriate energy sources to make products and power systems: a portability of the power source b environmental impact c power output d circuit/system connections e cost</p>		<p>Students will gain an awareness of how the designs and work of individuals influence and reflect society, different cultures and social economic groups. Students will gain an understanding of Britain’s contemporary design practice and design heritage, as well as a knowledge of international design practice. We encourage wider reading and the exploration of academic theory of design. Research into concepts, the environment, cultures and the work of past and present designers, and their achievements, will develop the students’ understanding of their own potential and the measures, skills and knowledge necessary to succeed.</p>
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Autumn – Term Two	<p>Skills development Students will develop design & manufacturing skills in preparation for the NEA theme release.</p> <p>(1) Design production (2) Manufacture of products (3) Evaluation & product analysis</p> <p>Skills development is taught in conjunction with the core content.</p> <p>Core Content 1.4 Developments in modern and smart materials, composite materials and technical textiles</p>	<p>1.4.1 Modern and smart materials: a shape-memory alloys (SMAs) b nanomaterials c reactive glass d piezoelectric materials</p>	<p>Core content Assessment of core content is through class marking and internal examination.</p> <p>Skills development Skills development is assessed against the GCSE NEA marking criteria grid.</p>	<p>GCSE Design & Technology develops cultural awareness through studies into specific topics such as: Extra curricula clubs and access to industrial partners / STEM organisations will provide access to skills development, industrial developments, technological advancements, environmental and economic factors, the role of sustainability and ethics in user-centred design, demographic change and sociocultural influences around the world in order</p>

	<p>1.5 The functions of mechanical devices used to produce different sorts of movements, including the changing of magnitude and the direction of forces</p>	<p>e temperature-responsive polymers f conductive inks.</p> <p>1.4.2 Composites: a concrete b plywood c fibre/carbon/glass d reinforced polymers e robotic materials</p> <p>1.4.3 Technical textiles: a agro-textiles b construction textiles c geo-textiles d domestic textiles e environmentally friendly textiles f protective textiles g sports textiles</p> <p>1.5.1 Types of movement: a linear b reciprocation c rotary d oscillation.</p> <p>1.5.2 Classification of levers: a class 1, 2 and 3 b calculations related to mechanical advantage (MA), velocity ratio (VR), load, effort and efficiency.</p> <p>1.5.3 Linkages: a bell crank b reverse motion linkages.</p> <p>1.5.4 Cams: a pear shaped b eccentric (circular) c drop (snail).</p> <p>1.5.5 Followers: a roller b knife c flat followers.</p> <p>1.5.6 Pulleys and belts: a V-belt b velocity ratio (VR) c input and output speeds.</p> <p>1.5.7 Cranks and sliders.</p>		<p>to visualise future possibilities and guide career opportunities. Students are expected to create and develop designs and ideas independently with varying degrees of innovation and flair. They will develop problem solving skills through independent learning in both a design and practical context, which will enrich the potential of all students by providing valuable skills and the mind-set to progress independently, especially in terms of future pathways and employment.</p> <p>Research into materials, concepts and the work of past and present designers will develop the students' ability to work independently.</p>
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	<p>1.6 How electronic systems provide functionality to products and processes, including sensors and control devices to respond to a variety of inputs, and devices to produce a range of outputs</p>	<p>1.5.8 Gear types: a simple and compound gear train b idler gear c revolutions per minute (RPM) calculations d bevel gears e rack and pinion.</p> <p>1.6.1 Sensors, including: a the role of sensors in electronic systems b light-dependent resistors (LDRs) c thermistor.</p> <p>1.6.2 Control devices and components, including: a the role of switches in electronic systems b transistors c resistors.</p> <p>1.6.3 Outputs, including: a the role of outputs in electronic systems b buzzers c light-emitting diodes (LEDs).</p>		
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Spring – Term Three	<p>Skills development Students will develop design & manufacturing skills in preparation for the NEA theme release.</p> <p>(1) Design production (2) Manufacture of products (3) Evaluation & product analysis</p> <p>Skills development is taught in conjunction with the core content.</p> <p>Core Content 1.7 The use of programmable components to embed functionality into products in order to enhance and customise their operation</p>	<p>1.7.1 How to make use of flowcharts. 1.7.2 How to switch outputs on/off in relation to inputs and decisions. 1.7.3 How to process and respond to analogue inputs. 1.7.4 How to use</p>	<p>Core content Assessment of core content is through class marking and internal examination.</p> <p>Skills development Skills development is assessed against the GCSE NEA marking criteria grid.</p>	

	<p>1.8 The categorisation of the types, properties and structure of ferrous and non-ferrous metals</p> <p>1.9 The categorisation of the types, properties and structure of papers and boards</p>	<p>simple routines to control outputs with delays, loops and counts.</p> <p>1.8.1 Ferrous metals, including: a mild steel b stainless steel c cast iron.</p> <p>1.8.2 Non-ferrous metals, including: a aluminium b copper c brass.</p> <p>1.8.3 Properties, including: a ductility b malleability c hardness.</p> <p>1.9.1 Paper, including: a copier paper b cartridge paper c tracing paper. 1.9.2 Board, including: a folding boxboard b corrugated board c solid white board. 1.9.3 Properties, including: a flexibility b printability c biodegradability.</p>		
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GCSE Design & Technology (Graphics) Year 10

	Topic / Theme	Knowledge and Skills	Assessment	Cultural Capital Independent Learning
Spring – Term Four	<p>Skills development Students will develop design & manufacturing skills in preparation for the NEA theme release.</p> <p>(1) Design production (2) Manufacture of products (3) Evaluation & product analysis</p> <p>Skills development is taught in conjunction with the core content.</p> <p>Core Content 1.10 The categorisation of the types, properties and structure of thermoforming and thermosetting polymers</p>	<p>1.10.1 Thermoforming polymers, including: a acrylic b high impact polystyrene (HIPS) c biodegradable polymers – Biopol®.</p>	<p>Core content Assessment of core content is through class marking and internal examination.</p> <p>Skills development Skills development is assessed against the GCSE NEA marking criteria grid.</p>	

	<p>1.11 The categorisation of the types, properties and structure of natural, synthetic, blended and mixed fibres, and woven, non-woven and knitted textiles</p> <p>1.12 The categorisation of the types, properties and structure of natural and manufactured timbers</p>	<p>1.10.2 Thermosetting polymers, including: a polyester resin b urea formaldehyde.</p> <p>1.10.3 Properties, including: a insulator of heat b insulator of electricity c toughness.</p> <p>1.11.1 Natural, including: a animal – wool b vegetable – cotton. 1.11.2 Synthetic, including: a polyester b acrylic. 1.11.3 Woven, including: a plain – calico b twill – denim. 1.11.4 Non-woven, including: a felted wool fabric b bonded fibres/webs. 1.11.5 Knitted, including: a weft-knitted fabrics b warp-knitted fabrics. 1.11.6 Properties, including: a elasticity b resilience c durability.</p> <p>1.12.1 Natural timbers – hardwoods, including: a oak b mahogany c beech d balsa.</p> <p>1.12.2 Natural timbers – softwoods, including: a pine b cedar.</p> <p>1.12.3 Manufactured timbers, including: a plywood b medium density fibreboard (MDF).</p> <p>1.12.4 Properties, including: a hardness b toughness c durability</p>		
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	Topic / Theme	Knowledge and Skills	Assessment	Cultural Capital Independent Learning
Summer – Term Five	<p>Skills development Students will develop design & manufacturing skills in preparation for the NEA theme release.</p> <p>(1) Design production (2) Manufacture of products (3) Evaluation & product analysis</p> <p>Skills development is taught in conjunction with the core content.</p> <p>Core Content 1.13 All design and technological practice takes place within contexts which inform outcomes</p>	<p>1.13.1 A wide range of materials, components and manufacturing processes for a range of contexts, to inform outcomes, including: a the properties of materials and or components b the advantages and disadvantages of materials and components and manufacturing</p>	<p>Core content Assessment of core content is through class marking and internal examination.</p> <p>Skills development Skills development is assessed against the GCSE NEA marking criteria grid.</p>	

	<p>1.14 Investigate environmental, social and economic challenges when identifying opportunities and constraints that influence the processes of designing and making</p> <p>1.15 Investigate and analyse the work of past and present professionals and companies in order to inform design</p>	<p>processes c justification of the choice of mat</p> <p>1.14.1 Respect for different social, ethnic and economic groups who have different needs and values when identifying new design opportunities.</p> <p>1.14.2 An appreciation of the environmental, social and economic issues relating to the design and manufacture of products, including, fair trade, carbon offsetting, product disassembly and disposal.</p> <p>1.14.3 The main factors relating to 'Green Designs'.</p> <p>1.14.4 The main factors relating to recycling and reusing materials or products.</p> <p>1.14.5 Human capability.</p> <p>1.14.6 Cost of materials.</p> <p>1.14.7 Manufacturing capability.</p> <p>1.14.8 Environmental impact – life cycle analysis (LCA).</p> <p>1.15.1 Analysing a product to the following specification criteria: a form b function c client and user requirements d performance</p>		
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	<p>1.16 Use different design strategies to generate initial ideas and avoid design fixation</p> <p>1.17 Develop, communicate, record and justify design ideas, applying suitable techniques</p>	<p>requirements e materials and components/systems f scale of production and cost g sustainability h aesthetics i marketability j consideration of innovation. 1.15.2 The work of past and present designers and companies: a Alessi b Apple c Heatherwick Studio d Joe Casely-Hayford e Pixar f Raymond Loewy g Tesla h Zaha Hadid.</p> <p>1.16.1 Use of different design strategies, including: a collaboration b user-centred design c systems thinking.</p> <p>1.17.1 Develop and use a range of communication techniques and media to present the design ideas, including: a freehand sketching (2D and/or 3D) b annotated sketches c cut and paste techniques d digital photography/media e 3D models f isometric and oblique projection g perspective drawing h orthographic</p>		
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		<p>and exploded views i assembly drawings j system and schematic diagrams k computer-aided design (CAD) and other specialist computer drawing programs.</p> <p>1.17.2 Record and justify design ideas clearly and effectively using written techniques.</p>		
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Summer – Term Six	<p>Component 2 – NEA (coursework) Theme release – 1st June</p> <p>Students will undertake a project as part of their non-examination assessment. The project will test students' skills in investigating, designing, making and evaluating a prototype of a product that will allow them to apply the skills they have acquired and developed throughout their study. We provide three themes, each with two contextual challenges</p>	<p>1.1 Investigation of needs and research</p> <p>1.1a Identify the needs of the end user. 1.1b Outline a design problem from the context provided and identify a need for a product that could solve the problem.</p> <p>1.1c Investigate existing products to inform the product specification for the prototype, from past and present designers.</p> <p>1.1d Carry out a range of research strategies to gather relevant information, to inform the design specification for the prototype, including: a market research b research into the context in which the prototype will be used c research into other possible materials d any sustainability issues that will be considered relevant to the intended prototype.</p>	<p>1.1 Investigation of needs and research (AO1 8 marks)</p> <p>Evidence of developed investigation and identification of relevant design possibilities, which are fully justified in relation to the contextual challenge.</p> <p>Developed assessment of user needs and wants and the requirements of the prototype in response to the contextual challenge, with fully appropriate reference to form and function.</p> <p>Fully developed evidence of links between the design requirements and the research undertaken in relation to the contextual challenge.</p>	<p>Students are provided with opportunities to experience and gain skills in the use of equipment such as power machinery and specialist hand tools used in many areas of employment. Students will be able to develop knowledge in use of computer aided control equipment and robotics to manufacture products, and to develop an understanding of how everyday products are manufactured in industry.</p> <p>In GCSE Design & Technology, enrichment of knowledge in a practical context is achieved using a variety of equipment and</p>

		<p>1.2 Product specification 1.2a Production of a design brief, that addresses all needs previously identified. 1.2b Production of a product specification that includes statements that are technical, measurable and justified, and include consideration of: a form b function c user requirements d performance requirements e material and component requirements f scale of production g cost h sustainability. 1.2c Identification of criteria, which will be used to evaluate the success of the prototype.</p> <p>2.1 Design ideas 2.1a Production of a range of design ideas that address the criteria in the design brief and product specification. 2.1b Consideration of a range of issues when producing the design ideas, including: a budget b</p>	<p>Specification (AO1 8 marks) Fully sound design brief that demonstrates a realistic response to the contextual challenge, addressing most of the investigated needs and wants of the user.</p> <p>Fully developed range of specification points that are realistic, technical and measurable, based on a fully relevant investigation of research in relation to the contextual challenge.</p> <p>Fully sound justification of the performance requirements for the product in relation to the contextual challenge</p> <p>2.1 Design Fully appropriate selection and use of design strategies to inform decisions to generate a wide range of design ideas in response to the contextual challenge.</p>	<p>materials including: CNC & power tools, in addition to everyday tools & equipment.</p> <p>Students will develop knowledge of digital design and how the use of computer aided design (CAD) is used to develop solutions and design ideas. They will gain specific</p>
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		<p>aesthetics c cultural issues d sustainability issues.</p> <p>2.1c Exploration of different design approaches, including: a materials b components c processes d techniques.</p>	<p>Fully sound consideration for the user needs and specification parameters.</p> <p>Ideas demonstrate a fully sound understanding of relevant materials, processes and techniques.</p>	<p>transferable skills using CAD applications</p>
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