

Design & Technology curriculum intent

At KS3, and beyond, the intent of the Design & Technology department is to nurture pupils to develop the skills and knowledge that allow them to become independent learners and discerning consumers. Through the design process pupils develop their creativity, thinking skills, practical abilities and a sense of pride in their own work, in an iterative way. They grow in confidence, working individually and as members of a team, being able to appreciate the technological advancements that have contributed to the way of life they experience today in modern Britain, studying designers, both current and in the past. They also gain an insight into the classification and properties of materials and the sustainability issues that are faced by the planet, our use of the resources we harvest from it and the social, moral, cultural and ethical issues associated with inclusive and sympathetic designing and manufacturing for a range of users in a contemporary society. Pupils also develop an understanding of the increasing use of computer automation in the production of products and experience the use of CAD/CAM in lessons.

At KS4, pupils build upon their basic knowledge of materials and gain a deeper insight into the manufacturing processes involved in the journey from raw material to finished product. They study a common core of technical principles that include sustainability and the ecological and social footprint associated with responsible design. Finite and non-finite resources are researched and the technological advances that are being continually developed and incorporated into the products we, as consumers, take advantage of. Pupils gain awareness and learn from wider influences including historical, social, cultural, environmental and economic factors. Pupils have the opportunity to work creatively when designing and making and apply technical and practical expertise. Pupils experience the use of advanced software packages and CAD/CAM and understand that the equipment they use is a school-based version of industrial manufacturing techniques. In Yr10, pupils experience a mock non-exam assessment, designing a prototype product and In Yr11, demonstrate their knowledge gained of the design process by carrying out the actual Non-exam Assessment within their chosen material area and produce a concise portfolio and working prototype within a contextual challenge set by AQA.

At KS5, students build upon the knowledge gained at GCSE and are given the practical skills, theoretical knowledge and confidence to succeed in a number of future careers, including engineering, architecture, interior and product design. They investigate the historical, social, cultural, environmental and economic influences on design and technology from the viewpoint of a designer rather than a consumer. This knowledge facilitates the opportunity to put their learning into practice, producing a portfolio and prototype of a product of their choice through an extended non-exam Assessment in yr13. Students gain a real understanding of what it means to be a designer maker whilst gaining the knowledge and skills that are sought by higher education establishments, apprenticeships and employers.

Year	Knowledge (Topics/Unit of work? What pupils will 'know'	Prior Knowledge (KS2/Previous learning)	Skills acquired What pupils will be able to 'do'	Concepts developed (What pupils will understand?)	Key Vocabulary (Tier 3)	Writing Communication &
7 Core skills module	➤ The importance of health & Safety considerations in the workshop environment including risk assessment. ➤ How to use tools and machinery in a safe and sensible manner. ➤ The vacuum forming as a method of mass production. ➤ The meanings of different pictograms applied to packaging and relevant mandatory information. ➤ The age rating classifications for toys ➤ Child safety and the function of the small parts tester. ➤ The classification of polymers, their properties and sustainability issues. ➤ The environmental issues associated with oceanic pollution. ➤ How to analyse products to given criteria. ➤ What mandatory pictograms are used on the packaging of	Key stage 2 coverage from primary feeders includes: ➤ Imaginative thinking ➤ Investigating objects ➤ Using IT to aid designing and making ➤ Developing, planning and communicating ideas ➤ Gaining a knowledge of designing and understanding materials and components ➤ Carrying out focused practical tasks that develop a range of techniques, skills, processes and knowledge ➤ Carrying out designing and making assignments using a range of materials, including electrical and mechanical components including mouldable, stiff and flexible sheet materials ➤ Investigating and evaluating a range of familiar products, thinking about how they work, how they are used and the views of the people who use them	➤ Classify criteria in a specification into must, should and could. ➤ Demonstrate creativity when considering a range of design ideas. ➤ Shape a variety of materials including polymers and timbers with some confidence. ➤ Solve technical problems under the guidance of the class teacher. ➤ Carry out peer & SWOT assessments. ➤ Self-evaluate to given criteria. ➤ Independently research the topic of polymers classification after initial teacher input ➤ Construct and render 3D drawings using isometric grid. ➤ Demonstrate the safe use of the following equipment and machinery: ○ Marking out tools ○ Pillar drill and nippy vices ○ Flat files ○ Dovetail/tenon saws ○ G clamps and bench hooks ○ Scalpels, cutting mats & Maun safety rules ○ Hot glue guns	➤ Design in conjunction with technology is an ever-changing subject as new technologies are developed. ➤ The difference between a risk and a hazard. ➤ Planning is an integral element of designing and making activities. ➤ A safe working environment relies on the cooperation of all. ➤ Risk assessments are carried out in schools and industry to ensure the safety of all. ➤ How the vacuum forming process works and how it is carried out in industry. ➤ The long-term impact of harvesting raw materials on the environment and wildlife ➤ The importance of sustainability in design and the recycling of polymers. ➤ The misuse of machinery and not the machinery itself poses a H&S threat. ➤ Designers must follow established H&S protocols to protect potential users of the products they design ➤ Why the best design is almost always not the first design. ➤ Designers have a responsibility to carefully consider the materials used to manufacture products. ➤ Why mandatory pictograms are used on the packaging of products ➤ Topic specific vocabulary	➤ Abrasive paper ➤ Anthropometrics ➤ Bench hook ➤ Biodegradable plastic ➤ Chamfering ➤ Design brief ➤ Disc sander ➤ Dovetail saw ➤ Ergonomics ➤ Finite resource ➤ Flat bit ➤ Line bender/strip heater ➤ Manufactured board ➤ Pillar drill ➤ Plywood ➤ Renewable resource ➤ Sanding board ➤ Specification ➤ Sustainability ➤ Thermoforming plastic ➤ Thermosetting plastic ➤ User ➤ Vacuum former ➤ Vice	Do now tasks: ➤ Workshop preparation for practical activity ➤ What is Design and Technology? ➤ What does sustainable mean? ➤ Health and safety concerns ➤ Order planning statements ➤ List appealing design features ➤ What is a relief? ➤ Vacuum former prediction task ➤ Interpret a net in 3D ➤ What do you know about plastic? Classwork tasks-written ➤ Health and safety intro ➤ Planning sequence ➤ Specification and user investigation ➤ Design idea annotation ➤ Evaluation and SWOT analysis ➤ Polymer theory Classwork tasks-independent research ➤ Vocabulary and definitions crossword ➤ Extension to polymer theory

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	products aimed at children ➤ The information contained within a barcode.	➤ Learning how to work independently and collaboratively ➤ Developing communication techniques ➤ Working with tools, equipment and materials ➤ Learning the importance of health and safety which includes: ○ Hot glue guns ○ Craft knives ○ Sawing, using bench hooks and clamps				➤ Microplastics research Homework tasks ➤ Product analysis ➤ Game research ➤ Choke hazard tester research ➤ Vacuum forming ➤ Health & Safety Guided reading task ➤ Microplastics Assessment tasks ➤ KPI 7.1: Relief design ➤ KPI 7.2: Practical outcome ➤ KPI 7.3 Peer evaluation and SWOT analysis ➤ KPI 7.4: Polymer theory ➤ Baseline assessment task ➤ Interim quiz ➤ End of topic retrieval questions
8 Developing skills module	➤ The classification of recyclable polymers ➤ How SPI symbols are used to categorise thermoforming polymers for recycling ➤ How to write a design brief using 5WH. ➤ How to use ACCESS FM as a comprehensive product analysis tool ➤ How to generate a design specification and categorise the criterion as must, should and could.	➤ Revisit of yr7 module to include: ➤ Recap of knowledge gained ➤ Revisiting key skills acquired ➤ Reflection of progress made with practical skills ➤ Who has experience of working with tools and machinery at home or at a club? ➤ Design briefs are used to ensure that products developed are fit for purpose and user	➤ Consider and identify the positive and negative impacts products have on the wider world. ➤ Analyse a range of existing products. ➤ Generate a set of criterion for evaluation and assess their work against them. ➤ Problem solve with less intervention from class teacher. ➤ Peer assess, giving constructive feedback on how improvements can be made ➤ Independently research the topic of recycling polymers and present	➤ Different polymers are used for different applications depending on their functional properties and aesthetic qualities. ➤ Recycling polymers is a way of helping to reduce the depletion of the Earth's finite resources ➤ Manufacture boards have many benefits, including availability and workability ➤ Designers have a responsibility to consider where the materials used in manufacture have been sourced and whether that source is sustainable. ➤ Different techniques including acronyms can be used to assist in the design, analysis and evaluation of products.	➤ Anthropometrics ➤ Biodegradable ➤ Biomimicry ➤ Carbon footprint ➤ Circular economy ➤ Considerations ➤ Environmental considerations ➤ Ergonomics ➤ Finite resource ➤ Forstner bit ➤ Jig ➤ Life cycle analysis ➤ Life cycle analysis	Do now tasks: ➤ Workshop preparation for practical activity ➤ Why carry out product analysis? ➤ List 5 different aspects of aesthetics ➤ Health and safety rules ➤ What is biomimicry? ➤ Why should you record progress? ➤ Why evaluate? ➤ What do you remember of polymer theory?

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	➤ The use of Eduard de Bono's thinking hats to analyse products from different perspectives. ➤ How to carry out a life cycle analysis from 'cradle to grave'. ➤ The role of ergonomics and anthropometrics in product design. ➤ That many of the products available in Britain have been manufactured abroad and that the distance travelled from raw material to end user is known as product miles. ➤ Some of the work of designers within the Alessi company. ➤ The importance of product safety when designing products for children	➤ Specifications are developed to detail the constraints on a design ➤ Awareness of disposable income and what that means ➤ Awareness of the functionality of products ➤ Awareness of cost and how that affects the quality of a product ➤ The suitability of materials for the intended function of a product ➤ The longevity of products based on the materials selected for manufacture ➤ Mandatory symbols and pictograms are used on the packaging of products are used to protect potential consumers ➤ Awareness that particular activities may require to be planned in a specific sequence when planning the making of a product ➤ Polymers are categorised depending on whether they are recyclable, non-recyclable or biodegradable	- their findings in a way that is suitable for a mass audience ➤ Combine materials with an increasing degree of accuracy and competence ➤ Design and create a complex, functioning maze ➤ Demonstrate the accurate creation of mitre joints ➤ Develop an appropriate graphical theme depending on the target audience selected ➤ Add the following equipment and machinery to their repertoire: ○ Round files ○ A variety of abrasive aids ○ Jigs ○ Finishing techniques which include surface decoration ○ Sanding sealer ○ Wax and wire wool	➤ That in the production of most products, a range of joining methods and finishing techniques are involved. ➤ That a mitre joint is the most suitable for the corners of a square profile decorative box ➤ That the cost of a product is a very good indicator of the quality of the working conditions of the labour force making it. ➤ Topic specific vocabulary ➤ The role of biomimicry in design	➤ Medium density fibreboard ➤ Plywood ➤ Product miles ➤ Recyclable ➤ Renewable resource ➤ Specification ➤ SPI symbols ➤ Sustainability ➤ User ➤ User-centred design	Classwork tasks-written ➤ Product analysis using ACCESS FM ➤ Positive and negative impacts of products on the wider world ➤ Design brief ➤ Specification ➤ Progress record ➤ 6Rs research task ➤ Isometric drawing Classwork tasks-independent research ➤ Vocabulary and definitions crossword ➤ Polymer classification information leaflet ➤ 6Rs extension task Homework tasks ➤ Product analysis ➤ Maze and labyrinth research ➤ Designer research ➤ Corner joints ➤ Isometric drawing Guided reading task ➤ Deforestation Assessment tasks ➤ KPI 8.1: Product analysis ➤ KPI 8.2: Design brief, specification and investigation ➤ KPI 8.3: Practical outcome ➤ KPI 8.4: Polymer recycling leaflet ➤ Interim quiz ➤ End of topic retrieval questions

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		➤ Polymers are selected for their physical and working properties ➤ Biodegradable polymers continue to be developed to reduce the need for drilling for crude oil ➤ Isometric drawing is used to convey products in a 3D view ➤ Health and safety expectations within a workshop environment ➤ Guarding and setting on machinery are designed to minimise the risk of injury ➤ Emergency stop locations around the workshop ➤ Routines and procedures to ensure the safety of all ➤ The need for PPE to prevent accident or injury ➤ The use of the following equipment, tools and machinery: ○ Bench hook ○ Hand saw ○ G-clamp ○ Pillar drill ○ Flat bit ○ Drill vice ○ Nippy vice ○ Templates ○ Sanding boards				

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		- Wet and dry paper - Line bender - Vacuum former - Moulds/formers - Hot glue gun - Scalpels ➤ Materials are selected for manufacture based on cost, suitability and stock forms available These include: - Plywood - Birch dowel - Thermoplastic sheet - Felt 360-micron card - Acetate				
9 Advanced skills module	➤ How different target groups have different needs and wants. ➤ How to construct a viable, working design specification ➤ The origin and classification of papers and boards and how these are manufactured into products. ➤ The environmental impact of the use of papers and boards. ➤ How papers and boards are manufactured. ➤ That timber taken from non-managed forests can lead to deforestation and desertification.	➤ Sustainability is key to the design and manufacture of products ➤ Analysing products helps designers gain ideas regarding how a product should be to function efficiently and appeal to the intended user ➤ Recycling materials that can be used again is the responsibility of all consumers ➤ Polymer recycling is particularly important in society ➤ Polymers are categorised to aid	➤ Use tools and machinery with a higher degree of precision, focusing on overall quality and accuracy. ➤ Self-select the most appropriate tools and equipment for the practical activity being carried out. ➤ Use 2D Design software with some competence, including 3D drawings. ➤ Use Photoshop software to manipulate images ➤ Work as part of a team to create an individual part of a functioning puzzle. ➤ Select a target group to design and create a promotional packaging for ➤ Use different analysis techniques to evaluate the suitability of products	➤ Mood boards are often used by designers as an initial resource to share with clients ➤ Font size is ordered in relation to the importance of the information. ➤ How commercial printing processes differ from school-based printing. ➤ How to apply graphics to a packaging net for maximum impact. ➤ How to create an eye-catching and visually appealing advertising posters, using design criterion. ➤ Designers have moral obligations towards the target groups they are designing for. ➤ Not all internet searches return accurate facts. ➤ Different colours create different feelings, impressions and moods.	➤ Anthropometrics ➤ Biodegradable ➤ Complementary colours ➤ Consumerism ➤ Coping saw ➤ Culture ➤ Ergonomics ➤ Feedback loop ➤ Finite resource ➤ Harmonising colours ➤ Input ➤ Neutral colours ➤ Output ➤ Pillar drill ➤ Plywood ➤ Primary colours ➤ Product miles	Do now tasks ➤ Workshop preparation for practical activity ➤ What is typography? ➤ How is research different from recall? ➤ Whys is reflection and improvement time important? ➤ Planning sequence activity Classwork tasks- ➤ Communicating a target audience in images ➤ Writing a design brief and specification ➤ Team jigsaw evaluation ➤ Using 2D design to draw in 3D ➤ Packaging analysis task

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	➤ How colour is used to create different ambiances. ➤ The definitions of system, input, output and control. ➤ How to give examples of automated systems ➤ How simple automated systems are created using flowchart software. ➤ How feedback loops make flowchart programs run without ending. ➤ The work of at least one prominent product designer. ➤ How to use basic functions of Adobe Photoshop to manipulate images ➤ How to use the basic functions of 2D Design to create 3D drawings ➤ How plywood is manufactured ➤ The different printing methods used in the manufacture of paper and board products ➤ The different methods of polymer forming, including: ○ Laminating ○ Line bending ○ Vacuum forming ○ 3D printing	- recycling and to retain purity ➤ Consumers need to be made aware of the impact on the environment ➤ Crude oil is a finite resource ➤ Cutting down on the use of non-renewable resources is of particular importance in modern society ➤ Users and purchasers of products are not necessarily the same ➤ Technical drawing is used in design to convey 2D and 3D images of a product ➤ 2D Design is used to create accurate drawings suitable for laser cutting ➤ CAD/CAM is an important element of modern designing and manufacturing ➤ Health and safety procedures include how to minimise the impact of minor injuries ➤ Finishing techniques are used to enhance the aesthetic appeal of products ➤ Designing and manufacturing products for	➤ Use Flowol software to create simulations of automated systems. ➤ Create a functional 3D puzzle with precision. ➤ Add the following equipment and machinery to their repertoire: ○ Coping saws ○ Disc sander ○ Square files	➤ Using drawing software is easier to modify than an image created on paper. ➤ How plywood is manufactured and what gives it strength. ➤ How to use tools to shape, finish and accurately work. ➤ Why it is important to cut on the waste side of work after marking out. ➤ What a system is. ➤ What computer control means. ➤ How a feedback loop is used to make a system. ➤ Topic specific vocabulary.	➤ Recyclable ➤ Renewable resource ➤ Secondary colours ➤ Target group ➤ Tertiary colours ➤ User ➤ User-centred design	➤ Packaging evaluation ➤ Systems and control Classwork tasks-independent research ➤ Vocabulary and definitions crossword ➤ Colour psychology research task ➤ Polymer manufacturing processes research ➤ Printing processes research Homework tasks ➤ Graphic designer research ➤ Writing specifications ➤ Using a coping saw ➤ Plywood manufacture ➤ Product designer research Guided reading task ➤ Recycling paper Assessment tasks ➤ KPI 9.1 3D cross practical ➤ KPI 9.2: 3D cross evaluation ➤ KPI 9.3: Colour psychology research ➤ KPI 9.4: Systems and control traffic lights ➤ Interim quiz ➤ End of topic retrieval questions

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		specific age ranges means that health and safety considerations must be acknowledged and adhered to ➤ The use of the following equipment, tools and machinery: ○ Bench hook ○ Hand saw ○ Pillar drill ○ Forstner bit ○ G-clamp ○ Mitre block ○ Pre-manufactured components ○ Sanding sealer ○ Wax ○ Wire wool ○ Drill press locking clamp ○ Sanding boards ○ Abrasive paper ○ Line bender ○ Scalpels ○ Hot glue gun ○ PVA glue				
10 Term 1	➤ That a systems approach can be applied to designing including programmable components. ➤ How to carry out research into design problems ➤ That collaboration is commonly used in the world of design ➤ How global collaboration is	➤ Building on the knowledge gained during KS3: ➤ Mood boards are used by designers and clients to convey lifestyle, likes, colour pallets and preferred materials and design styles ➤ Design briefs and specifications are drawn up in collaboration	Theory folder (all year): ➤ Carry out a variety of research and investigation tasks to build up a theory folder full of case studies to be used for revision and to reference in longer essay-style exam question answers ➤ Complete A3 revision sheets for each topic covered.	Approaches to designing: Designing strategies ➤ Investigation for research data ➤ Collaboration ➤ Systems thinking ➤ Iterative approach Electronic systems ➤ Systems ➤ Systems diagrams ➤ Inputs/outputs Electronic systems processing ➤ Processes ➤ Digital and analogue signal ➤ Programming microcontrollers	➤ Analogue/digital signal ➤ Atmospheric pollution ➤ Biomass ➤ Closed loop system ➤ Deforestation ➤ Desertification ➤ Ecological footprint ➤ Enterprise/Fairtrade ➤ Greenhouse gas ➤ Health and safety at work act ➤ Input/output ➤ Iterative design ➤ Product miles ➤ Social footprint	Do now ➤ Activities are integrated into all lessons, either to recall learning from previous lessons or to promote thinking regarding new topics/concepts to be taught Classwork tasks ➤ Activities include: Summarising theory

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	possible using the internet and shared software ➤ How the most successful design development follows an iterative approach ➤ How advances in electronic systems and miniaturisation have greatly improved the size and efficiency of electronic components ➤ How studying the work of past and present designers can help influence creativity in design ➤ How design movements have been influenced by a variety of factors including industrialisation, advancements in manufacturing capabilities, the aftermath of war and technological developments ➤ How to create and develop design ideas for a client to a written brief. ➤ The sources and origins of materials and how they are harvested or extracted ➤ How the use of anthropometric data is used to ensure that products are	between designer and client to ensure products developed are fit for purpose and meet the client's needs and wants ➤ Different styles of saw are appropriate for different functions depending on their usability and the materials being used for a specific task ➤ CAD/CAM is used widely in industry and in schools/colleges to create bespoke products/components ➤ Tolerance is used in the manufacture of products to ensure that components fit together as required ➤ Colour psychology is an important element in design ➤ The design of packaging relates directly to the intended target audience ➤ Photoshop is used in the manipulation of images used in packaging design and the advertising of products ➤ Manipulation of images in the media does not always give a true representation ➤ Mandatory information must be included in packaging design	➤ Complete practical activities to improve skill levels. ➤ Complete end of topic tests for each of the theory topics covered to ascertain understanding. ➤ Demonstrate the application of KS3 maths in their work and exam answers. ➤ Develop competent practical skills working with a variety of materials, tools and equipment. MINI NEA: ➤ Develop the skills of: ➤ Investigate a design problem ➤ Produce a design brief and specification ➤ Carry out material investigations ➤ Using 2D Design to create a net for laser cutting ➤ Create functioning comb joints ➤ Fabricate and give finish to their prototype product ➤ Evaluate the final product	➤ Decision making The work of others ➤ Designers and design companies ➤ Graphic design ➤ Textile design ➤ Architecture ➤ Product design ➤ Industrial design ➤ Product design companies ➤ Textile design companies ➤ Researching and writing an investigation ➤ Design investigation: Philippe Starck Ecological, environmental and social issues ➤ Ecological and social issues ➤ Carbon offsetting ➤ 6Rs ➤ Fairtrade Designing Products: Research and investigation ➤ Market research ➤ Gathering data ➤ Ergonomics ➤ Anthropometrics Briefs and specifications ➤ Design brief ➤ Modifications to design briefs ➤ Design specification ➤ Manufacturing specification Exploring and developing ideas ➤ Using an iterative design process ➤ Avoiding design fixation ➤ Design strategies ➤ Modelling and testing ➤ Evaluating work to improve outcomes Communication of ideas ➤ Methods of communication ➤ 2D & 3D sketching/drawing ➤ 3D drawing ➤ Perspective drawing ➤ Annotated/exploded drawings ➤ Working drawings ➤ Systems and schematic diagrams	➤ Stakeholder ➤ Surface/underground mining ➤ Switches/timers ➤ The 6Rs ➤ 2D/3D sketching ➤ Aesthetics ➤ Anthropometrics ➤ Automation ➤ CAD/CAM/CNC ➤ Collaboration ➤ Design brief ➤ Design fixation ➤ Destructive testing ➤ Ergonomics ➤ Functionality ➤ Inclusive design ➤ Innovation ➤ Iterative design ➤ Manufacturing specification ➤ Market research/testing ➤ Marketability ➤ Primary/secondary research ➤ Product analysis ➤ Prototype ➤ User-centred design ➤ Carbon footprint ➤ Fossil fuels ➤ Hydraulics ➤ Kinetic energy ➤ Non-renewable ➤ Nuclear energy ➤ Pneumatics ➤ Pollution ➤ Raw material ➤ Renewable energy ➤ Sustainability	content into A3 revision sheets ➤ Creating case studies to use as examples in longer exam answers ➤ Categorising and defining different materials and their uses ➤ Sources, origins and properties of materials Classwork tasks-independent research ➤ Researching topic areas, building upon content ➤ Reading more widely and understanding own impact on the environment ➤ Creating debates regarding controversial topics (fossil fuels v renewables, NIMBY) Homework tasks ➤ These are designed to check for understanding of each topic covered and to broaden the knowledge base through research. HW tasks are written and challenge pupils to deepen their knowledge ➤ Exam questions are also set for each topic with a range of 1-8 marks,

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	designed to cater for the majority of users ➤ How the study of ergonomics is used to ensure that products are designed to be as 'usable' as possible ➤ That design ideas can be conveyed using different drawing styles and through actual and virtual modelling ➤ About advances in renewable energy sources and potential drawbacks ➤ About non-renewable energy sources and the sustainability issues faced ➤ About mechanical devices and the different types of motion.	➤ Font size and style used attracts potential audiences to the most important information that the retailer wants to advertise ➤ Design should be iterative and that a final design is often able to be improved upon ➤ Flowcharts can be used to program systems so that they are automated ➤ Feedback loops ensure that programs run without ending ➤ Complex flowcharts can include decision-making so that, dependent on the conditions, alternative outcomes are created ➤ Polymer manufacturing processes ➤ Commercial and school printing processes		➤ Mathematical modelling ➤ Physical modelling ➤ Audio and visual recordings Computer-based tools ➤ Effects of computer-based tools on communication ➤ Use of CAD/CAM and spreadsheet software Prototype development ➤ Prototypes ➤ Evaluating prototypes ➤ Using CAFÉ QUE Energy and mechanisms: Energy generation ➤ Non-renewable energy sources ➤ Non-renewable energy summary ➤ Renewable energy sources ➤ Wind turbines and solar energy ➤ Tidal energy and hydroelectric power ➤ Biofuel Energy storage ➤ Storing energy ➤ Pneumatics and hydraulics ➤ Kinetic energy and flywheel ➤ Batteries ➤ Disposal of batteries Mechanical systems ➤ Types of motion ➤ Levers/linkages ➤ Rotary systems Mini NEA: ➤ The need to carry out research before developing design ideas for a new product. ➤ How to develop a design brief and specification ➤ How to use 2D Design to create a marketable product using CAD/CAM ➤ Why evaluation is important		familiarising pupils with the complexity required for each mark band Guided reading tasks ➤ These tasks are used to broaden knowledge and facilitate the 'reading around a subject' culture fostered. They promote discussion and deeper thinking. Assessment tasks ➤ End of topic tests ➤ Depth of information included in theory folder ➤ Independent research tasks ➤ Homework
10 Term 2	➤ All materials have unique physical and working properties	➤ A systems approach can be applied to designing including	In addition to continuation of theory topics required for GCSE examination:	Materials and their properties: Properties of materials ➤ Forces and stresses	➤ Aesthetics ➤ Chemical properties ➤ Compression	Do now ➤ Activities are integrated into all

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	➤ Materials are selected for a particular application based on their physical and working properties ➤ Stock forms, types and sizes of materials in order to calculate and determine the quantities of materials or components required. ➤ The categorisation of different materials and their working properties. ➤ Stock forms and standard components used in the manufacture of products ➤ Material finishing techniques. ➤ The most suitable selection of materials based on the physical and working properties required. ➤ That the selection of materials and components should consider a variety of factors such as cost and functionality.	- programmable components. ➤ Carrying out research into design problems ➤ Collaboration is commonly used in the world of design ➤ Global collaboration is possible using the internet and shared software ➤ The most successful design development follows an iterative approach ➤ Advances in electronic systems and miniaturisation have greatly improved the size and efficiency of electronic components ➤ Studying the work of past and present designers can help influence creativity in design ➤ Design movements have been influenced by a variety of factors including industrialisation, advancements in manufacturing capabilities, the aftermath of war and technological developments ➤ Creating and developing design ideas for a client to a written brief ➤ Sources and origins of materials and how	MOCK NEA: ➤ Work to a given client and scenario ➤ Research the background to a problem ➤ Working within the parameters of a given packaging space ➤ Develop design solutions to address the problem posed and the needs and wants of the user ➤ Evaluate solutions proposed and gaining feedback from peers ➤ Suggest modifications in the light of feedback to improve the effectiveness and useability of the product prototyped	➤ Improving functionality ➤ Material properties ➤ Papers and boards ➤ Timber ➤ Metals ➤ Polymers ➤ Textiles ➤ New materials ➤ Composite materials and technical textiles Stock forms and standard components ➤ Selection of materials and components ➤ Papers and boards ➤ Timber ➤ Metals ➤ Polymers ➤ Textiles ➤ Electronic systems ➤ Mechanical devices Finishing materials ➤ Surface treatments and finishes ➤ Papers and boards ➤ Timber ➤ Metals ➤ Polymers ➤ Textiles ➤ Modifying material properties Selection of materials ➤ Papers and boards ➤ Timber ➤ Metals ➤ Polymers ➤ Textiles	➤ Dynamic/static force ➤ Equilibrium ➤ Functionality ➤ Interfacing/webbing ➤ Physical properties ➤ Raw material ➤ Shear/torsion ➤ Compression/tension ➤ Tensile strength ➤ Working properties ➤ Lamination ➤ Standard components ➤ Coniferous/deciduous ➤ Finishing ➤ FSC ➤ Hardwood/softwood ➤ Knock down fittings ➤ Manufactured board ➤ Stock forms ➤ Volatile organic compounds (VOCs) ➤ Alloys/ferrous ➤ Non-ferrous metals ➤ Fossil fuels ➤ Functionality ➤ Surface/underground mining ➤ Biodegradable/thermoforming ➤ Thermosetting polymers ➤ Life cycle assessment ➤ Microbeads/polymer pollutants ➤ Animal-based/plant-based fibres ➤ Synthetic fibres ➤ woven/non-woven fibres ➤ blended & mixed fibres ➤ felted/knitted fibres ➤ plant-based natural fibres ➤ Fibres/rolls/yarns ➤ Warp/weft threads ➤ Woven fabrics ➤ Seam allowance/selvage ➤ Composite materials ➤ Corn starch polymers ➤ Microencapsulation ➤ Microfibres ➤ Nanomaterials ➤ Smart materials	lessons, either to recall learning from previous lessons or to promote thinking regarding new topics/concepts to be taught Classwork tasks ➤ Activities include: Summarising theory content into A3 revision sheets ➤ Creating case studies to use as examples in longer exam answers ➤ Categorising and defining different materials and their uses ➤ Sources, origins and properties of materials Classwork tasks-independent research ➤ Researching topic areas, building upon content ➤ Reading more widely and understanding own impact on the environment ➤ Creating debates regarding controversial topics (fossil fuels v renewables, NIMBY) Homework tasks ➤ These are designed to check for understanding of each topic covered and to broaden the knowledge base

Year	Knowledge (Topics/Unit of work? What pupils will 'know'	Prior Knowledge (KS2/Previous learning)	Skills acquired What pupils will be able to 'do'	Concepts developed (What pupils will understand?)	Key Vocabulary (Tier 3)	Writing & Communication
		they are harvested or extracted ➤ The use of anthropometric data is used to ensure that products are designed to cater for the majority of users ➤ The study of ergonomics is used to ensure that products are designed to be as 'usable' as possible ➤ Design ideas can be conveyed using different drawing styles and through actual and virtual modelling ➤ Advances in renewable energy sources and potential drawbacks ➤ Non-renewable energy sources and the sustainability issues faced ➤ Mechanical devices and the different types of motion.			➤ Technical textiles ➤ UV degradation ➤ Mechanical devices ➤ Lever/linkage ➤ Gear/cam/pulley/belt ➤ Friction/traction	through research. HW tasks are written and challenge pupils to deepen their knowledge ➤ Exam questions are also set for each topic with a range of 1-8 marks, familiarising pupils with the complexity required for each mark band Guided reading tasks ➤ These tasks are used to broaden knowledge and facilitate the 'reading around a subject' culture fostered. They promote discussion and deeper thinking. Assessment tasks ➤ End of topic tests ➤ Depth of information included in theory folder ➤ Independent research tasks ➤ Homework
10 Term 3	➤ How to shape and form materials, using cutting, abrasion and addition for their preferred material area ➤ How technological advances and new and emerging technologies have altered the production methods traditionally	➤ All materials have unique physical and working properties ➤ Materials are selected for a particular application based on their physical and working properties ➤ Stock forms, types and sizes of materials in order to calculate and determine the	In addition to continuation of theory topics required for GCSE examination: NEA: ➤ Select a contextual challenge as given by AQA. ➤ Select a client and identify a need for a new or improved product.	For pupils preferred material area: Tools, equipment and processes ➤ Scales of manufacture ➤ Influence of quality on selection of equipment and material management Manufacturing processes used including: ➤ Tools ➤ Wasting processes ➤ Addition processes	➤ Abrading ➤ Accuracy ➤ Addition processes ➤ Reforming & reforming ➤ Finishing processes ➤ Allowance ➤ One-off/batch/mass/continuous flow production ➤ Batik/dyeing ➤ Bonding/interfacing ➤ Fusible interfacing/lamination ➤ Debossing/embossing	Do now ➤ Activities are integrated into all lessons, either to recall learning from previous lessons or to promote thinking regarding new topics/concepts to be taught Classwork tasks

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	used in the manufacture of products ➤ How the marketing of products has changed with the increasing use of digital platforms ➤ How designers and manufacturers have a responsibility to consider environmental and sustainability issues in the development and manufacture of products ➤ How designers and manufacturers have a responsibility to consider the potential cultural and social impact of the products they design and manufacture	quantities of materials or components required. ➤ Categorisation of different materials and their working properties. ➤ Stock forms and standard components used in the manufacture of products ➤ Material finishing techniques ➤ Suitable selection of materials based on the physical and working properties required. ➤ Selection of materials and components should consider a variety of factors such as cost and functionality	➤ Carry out investigations, primary and secondary data to understand client/user needs ➤ Study the work of past and present designers to inform their own designing ➤ Study the environmental and social impacts of designing and manufacturing new products	➤ Deforming and reforming processes Measurement and production aids ➤ Planning ➤ Measurement and production aids ➤ Ensuring accuracy ➤ Quality control ➤ Health and safety New and emerging technologies: Impact on industry ➤ Crowdfunding ➤ Virtual marketing and retail ➤ Co-operatives ➤ Fairtrade ➤ Planned obsolescence ➤ Impact on employment Impact on production ➤ CAD/CAM ➤ Just in time manufacturing ➤ Flexible manufacturing systems ➤ Continuous improvement and efficient working ➤ Technology push ➤ Market pull Impact on society and the environment ➤ Technologies that have a positive and negative impact ➤ Life cycle assessment ➤ Recycling ➤ Impact on culture ➤ Impact on society	➤ Extrusion/injection moulding ➤ Gathering/piping ➤ Pleating/quilting ➤ Quality assurance ➤ Quality control ➤ Technical textiles ➤ Templates/jigs/patterns ➤ Tessellation ➤ Weaving/webbing ➤ Automation ➤ CAT ➤ Inclusive design ➤ Landfill ➤ Life cycle assessment ➤ Market pull ➤ Technology push ➤ Patent ➤ Planned obsolescence ➤ Product miles ➤ Rapid prototyping ➤ Renewable energy ➤ Robotics	➤ Activities include: Summarising theory content into A3 revision sheets ➤ Creating case studies to use as examples in longer exam answers ➤ Categorising and defining different materials and their uses ➤ Sources, origins and properties of materials Classwork tasks-independent research ➤ Researching topic areas, building upon content ➤ Reading more widely and understanding own impact on the environment ➤ Creating debates regarding controversial topics (fossil fuels v renewables, NIMBY) Homework tasks ➤ These are designed to check for understanding of each topic covered and to broaden the knowledge base through research. HW tasks are written and challenge pupils to deepen their knowledge ➤ Exam questions are also set for each

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						topic with a range of 1-8 marks, familiarising pupils with the complexity required for each mark band Guided reading tasks ➤ These tasks are used to broaden knowledge and facilitate the 'reading around a subject' culture fostered. They promote discussion and deeper thinking. Assessment tasks ➤ End of topic tests ➤ Depth of information included in theory folder ➤ Independent research tasks ➤ Homework
11 Term 1	Revisit: ➤ Approaches to designing ➤ Designing products ➤ Energy and mechanisms ➤ Materials and their properties	➤ Shaping and forming materials, using cutting, abrasion and addition for their preferred material area ➤ Finishing techniques ➤ The addition of pre-manufactured components ➤ Tinkercad software is used to create bespoke 3D printed components ➤ 3D designing and printing is used to enhance the functionality of prototype products	NEA: ➤ Use a range of design strategies to generate imaginative and creative designs. ➤ Develop the use of a range of appropriate techniques to communicate design ideas including 2D and 3D drawings and computer modelling. ➤ Select materials and components appropriate to the task considering cost, functionality and availability. ➤ Work to specific tolerances, cutting,	➤ The need to develop a design specification that gives details of the constraints on a design project. ➤ That specification points must be measurable so that when this is evaluated, the outcome can be assessed fully ➤ The need to consider a wide range of design ideas and possibilities, avoiding design fixation ➤ Regular contact with the client is essential to make sure the final outcome meets their needs and wants ➤ The need to research materials, components, joining and finishing	Recall key vocabulary above whilst revisiting theory topics covered in yr10	Do now ➤ Activities are integrated into all lessons, either to recall learning from previous lessons or to promote thinking regarding new topics/concepts to be taught Classwork tasks Activities include: ➤ Creating case studies to use as examples in longer exam answers ➤ Working on the supporting evidence for NEA
11 Term 2	➤ Revisit: ➤ Tools, equipment and processes ➤ New and emerging technologies NEA: ➤ How to evaluate prototypes fully using client feedback and				Recall key vocabulary above whilst revisiting theory topics covered in yr10	

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	testing to suggest improvements. ➤ How to make final alterations to NEAs based on generic feedback to maximise the final internally moderated raw score	➤ Technological advances and new and emerging technologies have altered the production methods traditionally used in the manufacture of products ➤ The marketing of products has changed with the increasing use of digital platforms ➤ Designers and manufacturers have a responsibility to consider environmental and sustainability issues in the development and manufacture of products ➤ How designers and manufacturers have a responsibility to consider the potential cultural and social impact of the products they design and manufacture	shaping and forming materials. ➤ Material management and the economical use of material. ➤ Work with specialist tools and equipment with precision. ➤ Use specialist techniques and processes. ➤ Use appropriate finishing processes, depending on the intended use for the prototype produced ➤ Design and develop prototypes in response to client needs and wants. ➤ Test and evaluate final prototype, suggesting areas for improvement or further development	methods before finalising design ideas. ➤ A high regard for health and safety considerations must be observed at all times ➤ The need for accuracy in manufacture to produce a functioning and high-quality prototype. ➤ To gain the highest marks for the NEA, a range of traditional and modern manufacturing techniques must be demonstrated, including the use of CAD/CAM ➤ The need to carry out market research on a finished prototype to gauge opinions on suitability. ➤ The need to test a prototype fully with the client and others. ➤ The need to evaluate the prototype and suggest improvements.		Classwork tasks- independent research ➤ Researching topic areas, building upon content when revisiting yr10 content Homework tasks ➤ Exam questions are set for each topic with a range of 1-8 marks, familiarising pupils with the complexity required for each mark band Assessment tasks ➤ NEA scores for each section ➤ Homework
11 Term 3	➤ The internally moderated raw mark for their NEA ➤ How to plan and answer exam questions based on the value of marks available for the answer ➤ How to apply theory and mathematical knowledge when formulating exam question answers ➤ How to time the time allotted to exam questions based on the value of the marks available for the answer				Recall key vocabulary above whilst revisiting theory topics covered in yr10	
12 Term 1	➤ The uses of materials and their applications. ➤ The theory of Polymers and polymer processing and finishing techniques. ➤ The theory of Timbers and timber processing and finishing techniques ➤ The theory of Papers & boards and	For students who have already gained a GCSE in Design and Technology: ➤ Recap of theory covered in KS4 For students who have not studied GCSE: ➤ Bridging work for the summer prior to starting A Level introduces basic knowledge of topics covered	➤ Demonstrate skills in a range of communication and presentational techniques for conveying proposals and intentions to clients and potential users. ➤ Be able to describe how computers are used in modern manufacturing, giving specific industrial examples. ➤ Use different approaches to user centred design,	➤ The different scales of production in modern industrial and commercial practice. ➤ The relationship between material cost, form and manufacturing processes in the efficient use of materials. ➤ How computer systems are used to plan and control manufacturing, reduce waste and respond quickly to changes in consumer demand.	➤ Addition/forming/redistribution ➤ Air seasoning ➤ Annealing/case hardening ➤ Hardening and tempering ➤ Quenching ➤ Work hardening ➤ Anodising/electroplating ➤ Powder coating ➤ Composite/modern materials ➤ Smart material ➤ Compressive strength ➤ Debossing/embossing ➤ Elastomer ➤ Ferrous/non-ferrous metal	Do now ➤ Activities are integrated into all lessons, either to recall learning from previous lessons or to promote thinking regarding new topics/concepts to be taught Classwork tasks ➤ Activities include: Summarising theory

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	- associated processing and finishing techniques. ➤ The theory of Composites, smart and modern materials and associated processing and finishing techniques. ➤ The theory of Metals and metal processing and finishing techniques. ➤ Modern and industrial scales of production. ➤ Digital design and manufacture ➤ The requirements for product design and development	➤ Revisiting fundamental topics covered at KS3 Topics to include: ➤ Materials and their applications ➤ Modern and industrial scales of production ➤ Sustainability issues associated with design and manufacture ➤ Designers and manufacturers responsibilities ➤ New and modern materials ➤ Smart materials ➤ Composite materials ➤ Digital design and manufacture (CAD/CAM)	- using not only one strategy or process but a variety. ➤ Study the work of key historical design styles, design movements and influential designers. ➤ Articulate the principles of key design styles and movements and how the work of influential designers represents those principles.	➤ Sub-assembly as a separate line of manufacture for certain parts of a product. ➤ Digital design and manufacture, including CAD/CAM, virtual modelling, rapid prototyping electronic data interchange, production, planning and control networking. ➤ Copyright, patents, registered designs, trademarks and logos and 'open design'. ➤ The importance of marketing and brand identity including corporate identification and global marketing. ➤ The importance of design for manufacturing, maintenance, repair and disposal and the need to modify designs to make them more efficient to manufacture. ➤ The importance of accuracy in manufacturing and how testing can eliminate errors. ➤ Understand the importance of national and international standards in product design.	➤ Hardness ➤ Hardwood/softwood ➤ Kiln seasoning ➤ Manufactured board ➤ Mechanical properties ➤ Physical properties ➤ Planed all round (PAR) ➤ Planed square edge (PSE) ➤ Rough sawn ➤ Safer working temperatures (polymers) ➤ Screen printing ➤ Stock form ➤ Substrate ➤ Tensile strength ➤ Thermoplastic ➤ Thermosetting polymer ➤ Toughness	- content into A3 revision sheets ➤ Creating case studies to use as examples in longer exam answers ➤ Categorising and defining different materials and their uses ➤ Sources, origins and properties of materials Classwork tasks-independent research ➤ Researching topic areas, building upon content ➤ Reading more widely and understanding own impact on the environment ➤ Creating debates regarding controversial topics (fossil fuels v renewables, NIMBY) Homework tasks ➤ These are designed to check for understanding of each topic covered and to broaden the knowledge base through research. HW tasks are written and challenge pupils to deepen their knowledge ➤ Exam questions are also set for each topic with a range of
12 Term 2	➤ Health & safety ➤ Protecting designs and intellectual property. ➤ Design for manufacturing, maintenance, repair and disposal ➤ Feasibility studies ➤ Enterprise and marketing in the development of products ➤ Design communication ➤ Design methods and processes ➤ Technology and cultural changes ➤ Design processes	➤ The uses of materials and their applications. ➤ The theory of Polymers and polymer processing and finishing techniques. ➤ The theory of Timbers and timber processing and finishing techniques ➤ The theory of Papers & boards and associated processing and finishing techniques. ➤ The theory of Composites, smart and modern materials and associated	➤ Discuss and implement the stages of a range of design processes and methodologies in order to apply personal judgement in the NEA. ➤ Work in an iterative way, revisiting stages in the design process to develop and produce the best possible design solution. ➤ Select appropriate tools, equipment and processes and demonstrate good and safe working practices. ➤ Plan for accuracy when making prototypes and demonstrate the procedures used to reduce		➤ Anthropometrics ➤ Ergonomics ➤ Automated guided vehicle ➤ Radio frequency identification ➤ Batch/bespoke/line production ➤ Bought-in/standardised ➤ Computational fluid dynamics ➤ Finite element analysis ➤ Copyright/intellectual property ➤ Patent/trademark/logo ➤ COSHH ➤ Risk and hazard ➤ Risk assessment ➤ Division of labour ➤ Line production ➤ Electronic point of sale ➤ Flexible manufacturing system/modular/cell production ➤ Health and safety at work act/safety precaution	

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	➤ Critical analysis and evaluation	- processing and finishing techniques. ➤ The theory of Metals and metal processing and finishing techniques. ➤ Modern and industrial scales of production. ➤ Digital design and manufacture The requirements for product design and development	waste and ensure manufacturing is within tolerance.		➤ Just in time/KANBAN/quick response manufacturing ➤ Master production schedule ➤ Registered design ➤ Unregistered design rights ➤ Open design ➤ Scale of production ➤ Standardised components ➤ Sub-assembly ➤ Unit production systems ➤ Task analysis ➤ User-centred design ➤ Vertical integration ➤ Vertical in-house production	1-8 marks, familiarising pupils with the complexity required for each mark band Guided reading tasks ➤ These tasks are used to broaden knowledge and facilitate the 'reading around a subject' culture fostered. They promote discussion and deeper thinking. Assessment tasks ➤ End of topic tests ➤ Depth of information included in theory folder ➤ Independent research tasks ➤ Homework
12 Term 3	➤ Selecting appropriate tools, equipment and processes ➤ Accuracy in design and manufacture ➤ Responsible design ➤ Design for manufacture and project management ➤ National and international standards in product design ➤ The requirements for NEA projects and the implications of designing a product for a real-life client. ➤ Deadlines in relation to the completion of each NEA section. ➤ That the design process is iterative rather than linear.	➤ Health & safety ➤ Protecting designs and intellectual property. ➤ Design for manufacturing, maintenance, repair and disposal ➤ Feasibility studies ➤ Enterprise and marketing in the development of products ➤ Design communication ➤ Design methods and processes ➤ Technology and cultural changes ➤ Design processes ➤ Critical analysis and evaluation	➤ Select a client and identify a need for a new or improved product. ➤ Carry out investigations, primary and secondary data to understand client/user needs. ➤ Study the work of past and present designers to inform their own designing. ➤ Study the environmental and social impacts of designing and manufacturing new products.	NEA: ➤ The need to select a client that they can have regular access to. ➤ The need to carry out research before developing design ideas for a new product. ➤ Efficient and effective time management is essential in a timed designing and making activity ➤ The importance of considering the needs and wants of a client when designing for them. ➤ The importance of carrying out comprehensive research into a design problem before trying to develop a solution ➤ That design is an iterative process which requires constant evaluation	➤ NEA: ➤ Analysis ➤ Anthropometrics ➤ Artistic influence ➤ Client ➤ Client profile ➤ Concept sketches ➤ Considerations ➤ Constraints ➤ Context ➤ Current trends ➤ Design movements ➤ Development ➤ Disassembly ➤ Ergonomics ➤ Evaluation ➤ Formative ➤ Gantt chart ➤ Historical research ➤ Identify ➤ Interview ➤ Investigate ➤ Iterative design ➤ Mood board ➤ Objectives ➤ Observation ➤ Opportunity	

Year	Knowledge (Topics/Unit of work? What pupils will 'know'	Prior Knowledge (KS2/Previous learning)	Skills acquired What pupils will be able to 'do'	Concepts developed (What pupils will understand?)	Key Vocabulary (Tier 3)	Writing & Communication
					➤ Past and present design trends ➤ Primary research ➤ Product analysis ➤ Questionnaire ➤ Rationale ➤ Research plan ➤ Secondary research ➤ Solution ➤ Strategies ➤ Summative ➤ Task analysis ➤ Techniques	
13 term 1	➤ How to design and develop design ideas for a client to a written brief. ➤ How to develop a wide range of design ideas, avoiding design fixation. ➤ How to shape and form materials, using cutting, abrasion and addition. ➤ How to use specialist techniques and processes such as jigs, patterns and templates where appropriate ➤ How surface treatments and finishes are applied to enhance aesthetics, functionality and durability of products	➤ Selection of appropriate tools, equipment and processes ➤ Accuracy in design and manufacture ➤ Responsible design ➤ Design for manufacture and project management ➤ National and international standards in product design ➤ The requirements for NEA projects and the implications of designing a product for a real-life client. ➤ Deadlines in relation to the completion of each NEA section. ➤ The design process is iterative rather than linear.	➤ Use a range of design strategies to generate imaginative and creative designs. ➤ Develop the use of a range of appropriate techniques to communicate design ideas including 2D and 3D drawings and computer modelling. ➤ Select materials and components appropriate to the task considering cost, functionality and availability. ➤ Work to specific tolerances, cutting, shaping and forming materials. ➤ Material management and the economical use of material. ➤ Work with specialist tools and equipment with precision.	➤ The need to develop a design specification that gives details of the constraints on a design project. ➤ That specification points must be measurable so that when this is evaluated, the outcome can be assessed fully ➤ The need to consider a wide range of design ideas and possibilities, avoiding design fixation ➤ Regular contact with the client is essential to make sure the final outcome meets their needs and wants ➤ The need to research materials, components, joining and finishing methods before finalising design ideas. ➤ A high regard for health and safety considerations must be observed at all times ➤ The need for accuracy in manufacture to produce a functioning and high-quality prototype. ➤ To gain the highest marks for the NEA, a range of traditional and modern manufacturing techniques must be	NEA: ➤ Component ➤ Component selection ➤ COSHH regulations ➤ Cutting list ➤ Design brief ➤ Design developments ➤ Finishing techniques ➤ Health and safety ➤ Manufacturing plan ➤ Material selection ➤ Modelling techniques ➤ Practical disassembly ➤ Practical investigations ➤ Production documentation ➤ Project management ➤ Specification ➤ Trialling techniques	Do now ➤ Activities are integrated into all lessons, either to recall learning from previous lessons or to promote thinking regarding new topics/concepts to be taught Classwork tasks Activities include: ➤ Creating case studies to use as examples in longer exam answers ➤ Working on the supporting evidence for NEA Classwork tasks-independent research ➤ Researching topic areas, building upon content when revisiting yr10 content Homework tasks ➤ Exam questions are set for each topic with a range of 1-8 marks, familiarising pupils with the
13 Term 2	➤ How to evaluate prototypes fully using client feedback and	➤ Designing and developing design ideas for a client to a written brief	➤ Use specialist techniques and processes.		➤ Alterations ➤ Environmental concerns ➤ Evaluation ➤ Fitness for purpose	

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	testing to suggest improvements. ➤ How to make final alterations to NEAs based on generic feedback in order to maximise the final internally moderated raw score	➤ Developing a wide range of design ideas, avoiding design fixation. ➤ Shaping and forming materials, using cutting, abrasion and addition. ➤ Using specialist techniques and processes such as jigs, patterns and templates where appropriate ➤ Surface treatments and finishes are applied to enhance aesthetics, functionality and durability of products	➤ Design and develop prototypes in response to client needs and wants. ➤ Comprehensively test and evaluate prototypes developed to identify potential modifications and improvements to fully meet the needs of the client and other potential users.	demonstrated, including the use of CAD/CAM ➤ The need to carry out market research on a finished prototype to gauge opinions on suitability. ➤ The need to test a prototype fully with the client and others. ➤ The need to evaluate the prototype and suggest improvements. ➤ The need to investigate how commercial manufacturing processes could be used in the batch/mass manufacture if their prototype were to be put into production	➤ Justification ➤ Manufacturing process ➤ Manufacturing technique ➤ Mass production ➤ Mass production techniques ➤ Modification ➤ Modifications ➤ Prototype ➤ Recommendations ➤ SWOT analysis ➤ Test outcomes ➤ Test plan ➤ Test strategies	complexity required for each mark band Assessment tasks ➤ NEA scores for each section ➤ Homework
13 Term 3	➤ The internally moderated raw mark for their NEA ➤ How to plan and answer exam questions based on the value of marks available for the answer ➤ How to apply theory and mathematical knowledge when formulating exam question answers ➤ How to time the time allotted to exam questions based on the value of the marks available for the answer	➤ Evaluating prototypes fully using client feedback and testing to suggest improvements. ➤ Making final alterations to NEAs based on generic feedback in order to maximise the final internally moderated raw score			Recall key vocabulary above whilst revisiting theory topics covered in yr12	

Year	Assessment (KPIs: Diagnostic + Summative)	Cumulative Links (What is revisited?)	Adaptive Teaching (How all pupils access learning)	Future Links (KS4/KS5)
7 Term 1	7.1 Develop and communicate design ideas using annotated sketches 7.2 Follow procedures for safety and understand the process of risk assessment 7.3 Evaluate their products against the original specification and identify ways of improving them. 7.4 Understand how to classify materials ➤ Baseline assessment ➤ Interim assessment ➤ Quick quiz ➤ End of topic Knowledge Test ➤ Verbal feedback given within lessons ➤ Written feedback given in booklets ➤ Summative WWW and EBI in booklet fronts ➤ Mini whiteboard 'checking for understanding' opportunities ➤ Responses to 'Do now' activities	Skills gained at KS2 to include: ➤ Product analysis ➤ Planning ➤ Developing and communicating ideas ➤ Working with tools, equipment, materials and components ➤ Evaluating processes and products ➤ Construction and use of materials ➤ The use of IT to assist in researching and developing design ideas ➤ Health and safety awareness	➤ Project booklets ➤ Vocabulary organisers ➤ Knowledge organisers ➤ Yr7 revision hub ➤ Classroom displays ➤ 'Your work' display ➤ Scanned exemplars of pupil work meeting different minimum expectation levels ➤ Think, pair share ➤ Small group tasks ➤ Mini white boards ➤ Do now tasks ➤ PowerPoint introductions ➤ Verbal instructions ➤ Displayed sequence of tasks ➤ Chunked activities ➤ Note-taking during IT demonstrations ➤ Pacing activities throughout lesson ➤ Modelling tasks ➤ Demonstrating practical activities ➤ Annotated seating plans ➤ Context sheets ➤ Support during activities ➤ Circulation	➤ Primary schools ➤ Personal experience outside school ➤ Technological advancements ➤ Future jobs/career paths ➤ Related GCSE D&T ➤ Related A Level Product Design ➤ T levels ➤ University courses ➤ Apprenticeships ➤ Documentaries ➤ Cross-curricular links to Science, Maths, IT, CPE, Media, Business Studies ➤ Businesses
8 Term 1	8.1 Evaluate products that they are less familiar with using themselves 8.2 Develop design specifications that include environmental, aesthetic, cost, maintenance, quality and safety 8.3 Select appropriately from specialist tools, techniques, processes, equipment and machinery 8.4 Understand the properties of materials ➤ Interim assessment ➤ Quick quiz ➤ End of topic Knowledge Test ➤ Verbal feedback given within lessons ➤ Written feedback given in booklets ➤ Summative WWW and EBI in booklet fronts ➤ Mini whiteboard 'checking for understanding' opportunities ➤ Responses to 'Do now' activities	➤ Product analysis ➤ Health and safety awareness ➤ Use of materials, equipment and machinery in yr7 ➤ Product safety ➤ Sustainability ➤ Finite/non-finite resources ➤ Environmental issues ➤ Polymer categorisation ➤ Manufactured boards ➤ Designing for a target audience ➤ Relevant pictograms and symbols ➤ Thermoforming, thermosetting and biodegradable polymers ➤ Methods of design communication	➤ Project booklets ➤ Vocabulary organisers ➤ Knowledge organisers ➤ Yr7 revision hub ➤ Classroom displays ➤ 'Your work' display ➤ Scanned exemplars of pupil work meeting different minimum expectation levels ➤ Think, pair share ➤ Small group tasks ➤ Mini white boards ➤ Do now tasks ➤ PowerPoint introductions ➤ Verbal instructions ➤ Displayed sequence of tasks ➤ Chunked activities ➤ Note-taking during IT demonstrations ➤ Pacing activities throughout lesson	➤ Personal experience outside school ➤ Technological advancements ➤ Future jobs/career paths ➤ Related GCSE D&T ➤ Related A Level Product Design ➤ T Levels ➤ University courses ➤ Apprenticeships ➤ Documentaries ➤ Cross-curricular links to Science, Maths, IT, CPE, Media, Business Studies ➤ Businesses

Year	Assessment (KPIs: Diagnostic + Summative)	Cumulative Links (What is revisited?)	Adaptive Teaching (How all pupils access learning)	Future Links (KS4/KS5)
			➤ Modelling tasks ➤ Demonstrating practical activities ➤ Annotated seating plans ➤ Context sheets ➤ Support during activities ➤ Circulation	
9 Term 1	9.1 Use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely 9.2 Produce short reports, making suggestions for improvements 9.3 Give oral and digital presentations and use computer-based tools 9.4 How to apply the concept of feedback in systems ➤ Interim assessment ➤ Quick quiz ➤ End of topic Knowledge Test ➤ Verbal feedback given within lessons ➤ Written feedback given in booklets ➤ Summative WWW and EBI in booklet fronts ➤ Mini whiteboard 'checking for understanding' opportunities ➤ Responses to 'Do now' activities	➤ Product analysis techniques ➤ Using tools, equipment and machinery ➤ The importance of accuracy in the design and manufacture of products ➤ Economical use of materials is important in the manufacture of products ➤ Working as a member of a team in a collaborative project ➤ Evaluation techniques ➤ Using SWOT as an evaluation tool ➤ How some manufactured boards are constructed ➤ Sustainability is the responsibility of all designers, manufacturers and consumers ➤ Designing for a specific consumer or target group ➤ Using CAD allows for accuracy in design ➤ CAD/CAM aids accuracy in manufacture and reduces labour ➤ SPI symbols are displayed on recyclable polymers	➤ Project booklets ➤ Vocabulary organisers ➤ Knowledge organisers ➤ Yr7 revision hub ➤ Classroom displays ➤ 'Your work' display ➤ Scanned exemplars of pupil work meeting different minimum expectation levels ➤ Think, pair share ➤ Small group tasks ➤ Mini white boards ➤ Do now tasks ➤ PowerPoint introductions ➤ Verbal instructions ➤ Displayed sequence of tasks ➤ Chunked activities ➤ Note-taking during IT demonstrations ➤ Pacing activities throughout lesson ➤ Modelling tasks ➤ Demonstrating practical activities ➤ Annotated seating plans ➤ Context sheets ➤ Support during activities ➤ Circulation	➤ Personal experience outside school ➤ Technological advancements ➤ Future jobs/career paths ➤ Related GCSE D&T ➤ Related A Level Product Design ➤ T Levels ➤ University courses ➤ Apprenticeships ➤ Documentaries ➤ Cross-curricular links to Science, Maths, IT, CPE, Media, Business Studies
10 Term 1	10.1 Approaches to designing ➤ Designing strategies ➤ Electronic systems ➤ Electronic system processing ➤ Work of others ➤ Ecological, environmental and social issues 10.2 Designing products ➤ Research and investigation ➤ Briefs and specifications ➤ Exploring and developing ideas ➤ Communication of ideas ➤ Computer-based tools ➤ Prototype development 10.3 Energy and mechanisms	➤ KS3 content to include: ➤ Health and safety considerations ➤ Collaboration ➤ Designing for a specific target audience ➤ Mechanical devices ➤ Systems and control ➤ Inputs and outputs ➤ Open and closed loop systems ➤ Methods of communicating design ideas ➤ The work of other designers ➤ Philippe Starck ➤ Environmental concerns ➤ Sustainability ➤ The six Rs	➤ Theory folder resources ➤ AQA Subject specific vocabulary ➤ AQA command words ➤ Vocabulary organiser booklet ➤ Topic knowledge organisers ➤ Topic divider check sheets ➤ Learning checklists ➤ KS4 revision hub ➤ Classroom displays ➤ 'Your work' display ➤ Scanned exemplars of pupil work meeting different minimum expectation levels ➤ Think, pair share	➤ Personal experience outside school ➤ Work experience ➤ Parent's/carer's jobs/careers ➤ Future jobs/career paths ➤ Related GCSE D&T ➤ Related A Level Product Design ➤ T Levels ➤ University courses ➤ Apprenticeships ➤ Documentaries
10 Term 2				
10 Term 3				

Year	Assessment (KPIs: Diagnostic + Summative)	Cumulative Links (What is revisited?)	Adaptive Teaching (How all pupils access learning)	Future Links (KS4/KS5)
	➤ Energy generation ➤ Energy storage ➤ Mechanical systems 10.4 Materials and their properties ➤ Properties of materials ➤ Stock forms and standard components ➤ Finishing materials ➤ Selection of materials 10.5 Tools, equipment and processes ➤ Scale of manufacture ➤ Papers and boards manufacturing processes ➤ Timber-based manufacturing processes ➤ Metals and alloys manufacturing processes ➤ Polymer manufacturing processes ➤ Composite material and textile manufacturing processes ➤ Measurements and production aids 10.6 New and emerging technologies ➤ Impact on industry ➤ Impact on production ➤ Impact on society and the environment	➤ Ergonomics and anthropometrics ➤ Design briefs and specifications ➤ CAD/CAM ➤ Evaluation and testing ➤ Communication methods ➤ Renewable and non-renewable ➤ Recyclable materials ➤ Mechanical devices ➤ Nets/developments ➤ Sources and origins of materials ➤ Polymer theory ➤ Textile sources and origins ➤ Joining materials ➤ Stock forms of materials ➤ Pre-manufactured components ➤ Finishing materials ➤ Scales of production ➤ Die cutting ➤ Colour printing processes ➤ Sawing and abrading ➤ Wood joints ➤ Manufactured boards ➤ Laser cutting ➤ Vacuum forming ➤ Timber wasting processes ➤ Addition processes ➤ Line bending ➤ Commercial polymer manufacturing processes ➤ Measurement and production aids ➤ Tolerance ➤ Workshop tools and machinery ➤ Textile manufacturing processes ➤ New and emerging technologies ➤ Graphene ➤ Impact on sustainability and the environment ➤ Life cycle assessment ➤ Technology push and market pull - Inclusivity	➤ Small group tasks ➤ Mini white boards ➤ Do now tasks ➤ PowerPoint introductions ➤ Verbal instructions ➤ Displayed sequence of tasks ➤ Chunked activities ➤ Note-taking during IT demonstrations ➤ Pacing activities throughout lesson ➤ Modelling tasks ➤ Demonstrating practical activities ➤ Annotated seating plans ➤ Context sheets ➤ Support during activities ➤ Circulation	➤ Cross-curricular links to Science, Maths, IT, CPE, Media, Business Studies ➤ Design businesses ➤ Design styles and movements ➤ Technological advancements ➤ Documentaries ➤ TV programs
11 Term 1	11.1 Identifying and investigating design possibilities	In preparation for examined NEA:	➤ Theory folder resources	➤ Personal experience outside school
11 Term 2	➤ Design possibilities identified ➤ Client identification relevant to context ➤ Investigations	Mini NEA:	➤ AQA Subject specific vocabulary	➤ Work experience
11 Term 3	➤ Design focus ➤ Evidence of investigations 11.2 Producing a design brief and specification ➤ Design brief	➤ Writing a design brief and specification ➤ Material investigation ➤ Using 2D design with accuracy ➤ Understanding CAD/CAM in a school setting ➤ Evaluating a finished prototype	➤ Vocabulary organiser booklet ➤ Topic knowledge organisers ➤ Topic divider check sheets ➤ Learning checklists ➤ KS4 revision hub	➤ Parent's/carer's jobs/careers ➤ Future jobs/career paths ➤ Related GCSE D&T

Year	Assessment (KPIs: Diagnostic + Summative)	Cumulative Links (What is revisited?)	Adaptive Teaching (How all pupils access learning)	Future Links (KS4/KS5)
	➤ Specification 11.3 Generating design ideas ➤ Generation of ideas ➤ On-going investigation ➤ Experimentation ➤ Use of different strategies 11.4 Developing design ideas ➤ Development ➤ Modelling ➤ Materials and components selection ➤ Manufacturing specification 11.5 Realising design ideas ➤ Use of tools and equipment ➤ Prototype ➤ Quality control ➤ Commercial viability 11.6 Analysing and evaluating ➤ Iterations linked to testing ➤ Testing ➤ Ongoing analysis	Mock NEA: ➤ Initial context ➤ Global goals ➤ General questionnaire ➤ The six Rs ➤ Initial ideas sketching ➤ Orthographic drawing ➤ Isometric drawing ➤ Product investigation ➤ Modelling techniques ➤ Early mock-up evaluation ➤ Consumer testing and suggested improvements	➤ Classroom displays ➤ Exemplars of pupil work meeting different minimum GCSE grades ➤ Think, pair share ➤ Small group tasks ➤ Mini white boards ➤ Do now tasks ➤ PowerPoint introductions ➤ Verbal instructions ➤ Displayed sequence of tasks ➤ Chunked activities ➤ Note-taking during IT demonstrations ➤ Pacing activities throughout lesson ➤ Modelling tasks ➤ Demonstrating practical activities ➤ Annotated seating plans ➤ Context sheets ➤ Support during activities ➤ Circulation NEA: NEA proposal submission form NEA checklist PowerPoint presentations for all section requirements Generic feedback form NEA guideline booklet	➤ Related A Level Product Design ➤ T Levels ➤ University courses ➤ Apprenticeships ➤ Documentaries ➤ Cross-curricular links to Science, Maths, IT, CPE, Media, Business Studies ➤ Outside speakers ➤ STEM trips ➤ Design businesses ➤ Design styles and movements ➤ Technological advancements ➤ Documentaries ➤ TV programs

Year	Unit/Big Idea	Disciplinary Thinking & Methods	Cumulative Links (What is revisited?)	Assessment (Diagnostic + Summative)	Adaptive Teaching (How all pupils access learning)	Future Links (KS4/KS5)
12 Term 1	➤ Materials and their applications ➤ Polymers ➤ Woods ➤ Composites, smart and modern materials ➤ Papers and boards ➤ Metals ➤ Modern and industrial scales of practice	➤ Classify materials ➤ Classify material properties as appropriate to application ➤ Test materials and draw conclusions based on fitness for purpose ➤ Experiment with materials ➤ Experiment with joining methods ➤ Apply reasoned choices ➤ Carry out specific practical enquiries including disassembly of products	Revisit and build upon KS4 topics of: Approaches to designing ➤ Designing strategies ➤ Electronic systems ➤ Electronic system processing ➤ Work of others ➤ Ecological, environmental and social issues Designing products ➤ Research and investigation ➤ Briefs and specifications ➤ Exploring and developing ideas	➤ Theory folder contents ➤ Quality of homework tasks ➤ Response to 'Do now' quick quizzes ➤ Response to cold calling ➤ Engagement with mini whiteboard tasks ➤ Mid-term assessments ➤ End of topic assessments ➤ Depth of information included in case studies	➤ Theory folder resources ➤ AQA Subject specific vocabulary ➤ AQA command words ➤ Vocabulary organiser booklet ➤ Topic knowledge organisers ➤ Topic divider check sheets ➤ Learning checklists ➤ KS5 revision hub ➤ Classroom displays	➤ Personal experience outside school ➤ Work experience ➤ Parent's/carer's jobs/careers ➤ Part-time jobs ➤ Curriculum enrichment sessions ➤ Outside speakers ➤ STEM trips ➤ Future jobs/career paths ➤ Related A Level Product Design

Year	Unit/Big Idea	Disciplinary Thinking & Methods	Cumulative Links (What is revisited?)	Assessment (Diagnostic + Summative)	Adaptive Teaching (How all pupils access learning)	Future Links (KS4/KS5)
	➤ Digital design and manufacture ➤ The requirements of product design and development	➤ Read and carry out research to develop case studies ➤ Significance of technological advances ➤ Classify scales of production and give examples of each ➤ Selection of appropriate materials ➤ Selection of appropriate joining methods ➤ Explore and develop design ideas through research ➤ Apply an iterative design approach ➤ Demonstrate of a user-centred design approach ➤ Apply primary and secondary research as appropriate to a given problem or brief ➤ Classify primary and secondary research methods ➤ Generate a design brief for a specific client ➤ Generate measurable specifications ➤ Generate and select design ideas for further development ➤ Evaluate own work ➤ Evaluate the work of others ➤ Test and suggest further improvements to prototypes made ➤ Gain feedback from peers to improve/develop design ideas ➤ Gain feedback from client to suggest further improvement to prototypes made ➤ Manage time ➤ Work to given deadlines ➤ Critically evaluate the effective use of time when compared to initial time plan ➤ Identify design movement principles evident in products ➤ Develop empathy through the study of inclusive and empathic design approaches	➤ Communication of ideas ➤ Computer-based tools ➤ Prototype development - Energy and mechanisms ➤ Energy generation ➤ Energy storage ➤ Mechanical systems - Materials and their properties ➤ Properties of materials ➤ Stock forms and standard components ➤ Finishing materials ➤ Selection of materials - Tools, equipment and processes ➤ Scale of manufacture ➤ Papers and boards ➤ Timber-based manufacturing processes ➤ Metals and alloys ➤ Manufacturing processes ➤ Polymer manufacturing processes ➤ Composite material and textile manufacturing processes ➤ Measurements and production aids - New and emerging technologies ➤ Impact on industry ➤ Impact on production ➤ Impact on society and the environment	➤ Depth of information in research tasks ➤ Depth of information recorded on A3 revision sheets ➤ Drawing skills ➤ Improvement in drawing skills ➤ Annotation skills ➤ Ability to record design ideas on paper ➤ 2D Design proficiency ➤ Tinkercad proficiency ➤ Practical capability ➤ Problem solving ➤ Communication skills ➤ Use of correct technical terminology ➤ Exam question answering technique ➤ Reactiveness to feedback ➤ Self-assessment ➤ Product analysis ➤ Time management ➤ Planning ➤ Organisational skills ➤ Practical outcome ➤ Prototype suitability for client ➤ Presentation skills ➤ Thinking outside the box	➤ Exemplars of student's work meeting different A Level grades ➤ Small group tasks ➤ Mini white boards ➤ Do now tasks ➤ PowerPoint introductions ➤ Verbal instructions ➤ Chunked activities ➤ Note-taking during IT demonstrations ➤ Pacing activities throughout lesson ➤ Modelling tasks ➤ Demonstrating practical activities ➤ Support during activities ➤ After-school support sessions ➤ Circulation	➤ University visits ➤ University courses ➤ Careers events ➤ Apprenticeships ➤ Documentaries ➤ Cross-curricular links to Science, Maths, IT, CPE, Media, Business Studies ➤ Design businesses ➤ Design styles and movements ➤ Technological advancements ➤ Documentaries ➤ TV programs ➤ DATA subscription magazines
12 Term 2	➤ Health and Safety ➤ Protecting designs and intellectual property ➤ Design for manufacture, maintenance, repair and disposal ➤ Feasibility studies ➤ Enterprise and marketing in the development of products ➤ Design communication ➤ Design methods and processes					
12 Term 3	➤ Design theory ➤ Technology and cultural changes ➤ Design processes ➤ Critical analysis and evaluation ➤ Selecting appropriate tools, equipment and processes ➤ Accuracy in design and manufacture ➤ Responsible design ➤ Design for manufacture and					

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		➤ Generate measurable specifications ➤ Generate and select design ideas for further development ➤ Evaluate own work ➤ Evaluate the work of others ➤ Test and suggest further improvements to prototypes made ➤ Gain feedback from peers to improve/develop design ideas ➤ Gain feedback from client to suggest further improvement to prototypes made ➤ Manage time ➤ Work to given deadlines ➤ Critically evaluate the effective use of time when compared to initial time plan ➤ Identify design movement principles evident in products ➤ Develop empathy through the study of inclusive and empathic design approaches ➤ Develop the skills of becoming a discerning consumer ➤ Analysis of existing products ➤ Problem solving and design refinement ➤ Avoiding design fixation ➤ Progress record keeping using digital camera and written commentary ➤ Identify target audience ➤ Identify areas of strength, weakness, opportunities for improvement and threats ➤ Document findings ➤ Present NEA in a professional and logical format ➤ Work skilfully and safely with tools, equipment and machinery	➤ Not over-complicating design ideas that cannot be made well ➤ Thoroughly testing prototype and drawing conclusions ➤ Asking for third party feedback ➤ Suggesting modifications to improve the design in the light of testing and feedback ➤ Evaluating use of time, materials selected, joining methods and finishing techniques	➤ Practical capability ➤ Problem solving ➤ Communication skills ➤ Use of correct technical terminology ➤ Exam question answering technique ➤ Reactiveness to feedback ➤ Self-assessment ➤ Product analysis ➤ Time management ➤ Planning ➤ Organisational skills ➤ Practical outcome ➤ Prototype suitability for client ➤ Presentation skills ➤ Thinking outside the box ➤ NEA written evidence	➤ Support during activities ➤ After-school support sessions ➤ Circulation NEA: ➤ NEA proposal submission form ➤ NEA checklist ➤ PowerPoint presentations for all section requirements ➤ Generic feedback form ➤ NEA guideline booklet	➤ Technological advancements ➤ Documentaries ➤ TV programs ➤ DATA subscription magazines

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