

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 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 Yr11, pupils demonstrate their knowledge of the design process by carrying out a 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 are given the practical skills and theoretical knowledge and confidence to succeed in a number of future careers, including engineering and product design. They investigate 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 in to practice by 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 and employers.

Year	Knowledge (Topics /Contexts) What pupils will 'know'.	Skills acquired What pupils will be able to 'do'.	Concepts developed What pupils will 'understand'.	Assessment (KPIs)
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 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. ➤ The information contained within a barcode.	➤ 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. ➤ Construct 3D drawings using isometric grid. ➤ Demonstrate the safe use of the following equipment and machinery: • Marking out tools • Pillar drill and nippy vices • Round files • Dovetail saws and • G clamps • Scalpels & Maun safety rules • Hot glue gun	➤ 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 importance of sustainability in design and the recycling of polymers. ➤ The misuse of machinery and not the machinery itself poses a H&S threat. ➤ Why the best design is almost always not the first design. ➤ Designers have a responsibility to carefully consider the materials used to manufacture products. ➤ Topic specific vocabulary	➤ KPI 7.1: Develop and communicate design ideas using annotated sketches (Relief design task) Detailed feedback. ➤ KPI 7.2: Follow procedures for safety and understand the process of risk assessment (Practical performance) ➤ KPI 7.3: Evaluate own products against the original specification and identify ways of improving them (Peer evaluation task) ➤ KPI 7.4 Understand how to classify materials (Polymer research). Detailed feedback.

Year	Knowledge (Topics /Contexts) What pupils will 'know'.	Skills acquired What pupils will be able to 'do'.	Concepts developed What pupils will 'understand'.	Assessment (KPIs)
8 Developing skills module	➤ The importance of polymer recycling and raising awareness of environmental issues. ➤ The environmental impact of drilling for oil used in the manufacture of polymers. ➤ 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. ➤ 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. ➤ Many of the products that are 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.	➤ 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 rate their work against them. ➤ Problem solve with less intervention from class teacher. ➤ Peer assess, giving constructive feedback on how to improve. ➤ Independently research the topic of timbers and present their findings. ➤ Combine materials with an increasing degree of accuracy and competence. ➤ Accurately calculate cost and total weight of materials used. ➤ Add the following equipment and machinery to their repertoire: • Fret saws • Frame saws • Sanding sealer • Wax and wire wool	➤ Different timbers are used for different applications depending on their physical and aesthetic qualities. ➤ Manufacture boards have many benefits, including workability, over timber from soft and hardwood trees. ➤ 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. ➤ In the production of most products, a range of joining methods and finishing techniques are involved. ➤ 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	➤ KPI 8.1: Evaluate products that they are less familiar with using themselves (ACCESS FM product analysis) ➤ KPI 8.2: Develop design specifications that include environmental, aesthetic, cost, maintenance, quality and safety (Design brief, specification & user needs brainstorm). ➤ KPI 8.3: Select appropriately from specialist tools, techniques, processes, equipment and machinery (Practical performance) ➤ KPI 8.4: Understand the recyclability of thermoforming polymers and the different SPI symbols displayed on them.

Year	Knowledge (Topics /Contexts) What pupils will 'know'.	Skills acquired What pupils will be able to 'do'.	Concepts developed What pupils will 'understand'.	Assessment (KPIs)
9 Advanced skills module	➤ How different target groups have different needs and wants. ➤ How to construct a viable, working design specification ➤ That timber taken from non-managed forests can lead to deforestation and desertification. ➤ About the work of at least one prominent graphic designer. ➤ The different manufacturing processes used to shape polymers. ➤ The suitability of different polymer manufacturing processes. ➤ 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 graphic or product designer.	➤ Use tools and equipment with a higher degree of precision, focusing on overall quality and accuracy. ➤ Work safely, understanding the correct equipment to use in order to ensure safety. ➤ Create image boards that portray different target audiences and ages. ➤ Develop their own design briefs and specifications independently. ➤ Design and manufacture a commercially viable product. ➤ Use 2D Design software with some competence, including 3D drawings. ➤ Use Adobe Photoshop to manipulate images. ➤ Self-select the most appropriate tools and equipment for the practical activity being carried out. ➤ Work as part of a team to create an individual part of a functioning puzzle. ➤ 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	➤ The role of typography in design ➤ How the use of different fonts creates different impressions. ➤ Different colours create different feelings, impressions and moods. ➤ Designers have moral obligations towards the target groups they are designing for. ➤ 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 poster. ➤ Topic specific vocabulary ➤ Using drawing software is easier to alter than an image on paper. ➤ How plywood is constructed and what gives it strength.	➤ KPI 9.1: Use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely. ➤ KPI 9.2: Produce short reports, making suggestions for improvements (3D cross evaluation). ➤ KPI 9.3: Give oral and digital presentations and use computer-based tools (Colour Psychology) ➤ KPI 9.4: Know how to apply the concept of feedback in systems (Systems & control traffic lights task).

Year	Knowledge (Topics /Contexts) What pupils will 'know' .	Skills acquired What pupils will be able to 'do' .	Concepts developed What pupils will 'understand' .	Assessment (KPIs)
10 Term 1a	Approaches to designing: Design strategies: ➤ Different design strategies and iterative design ➤ User-centred approach to design ➤ Systems thinking Electronic systems: ➤ System structures ➤ Systems block diagrams ➤ Electronic system components The work of others: ➤ Designers ➤ Design companies ➤ Design movements Ecological, environmental and social issues: ➤ Ecological issues in the design and manufacture of products ➤ The 6Rs ➤ Social issues in the design and manufacture of products ➤ Fair Trade	Theory: Approaches to designing: ➤ Recognise different design strategies and be able to use the most appropriate approach. ➤ Explain the key features of different design movements ➤ Understand each of the 6Rs and be able to give examples of how each can be applied Mock NEA1: ➤ Apply the philosophies/ethos' of design companies in their own designing ➤ Design for a specific target audience, considering their needs and wants ➤ Carry out a variety of research and investigation tasks ➤ Use 2D Design to a level that will allow them to create finger jointed pieces ➤ Use Tinkercad to create 3 dimensional drawings suitable to be 3D printed ➤ Understand the concept of working to tolerance ➤ Test and evaluate their prototype product, suggesting how improvements can be made	Theory: Approaches to designing: ➤ The main features of iterative design, user-centred design and a systems-based approach to design ➤ The advantages and disadvantages of using each design strategy ➤ The main stages that make up an electronic system ➤ The selection and use of appropriate input, process and output devices in products ➤ How to analyse and evaluate the work of at least two different designers ➤ How to use the work of past and present designers to aid in their own designing ➤ How to apply the philosophies/ethos' of design companies in their own designing ➤ How to apply the principles of different design movements into their own designing ➤ How to explain how designing and making is affected by ecological, environmental and social issues ➤ How to discuss the benefits of fair trade for producers and consumers	➤ KPI 10.1: Approaches to design Know, understand and explain different approaches to designing and making: Strategies, the work of others and environmental, ecological and social considerations
10Term 1b	Designing products: Research and investigation: ➤ Conducting research and investigation ➤ Gathering data ➤ Ergonomics and anthropometrics Briefs and specifications: ➤ Design briefs and specifications ➤ Manufacturing specifications	Theory: Designing products: ➤ Demonstrate how to describe the main methods of conducting research and investigation ➤ Classify primary and secondary research techniques ➤ Demonstrate and understanding of ergonomics and anthropometrics and be able to give definitions of both	Theory: Designing products: ➤ How to modify a design brief as a result of user feedback ➤ How to produce a manufacturing specification for a product or system ➤ How to describe the main stages of developing design ideas ➤ How to use and produce working drawings	➤ KPI 10.2: Designing products Know, understand and explain that when designing products, research, investigations, design briefs, specifications, idea development and communication methods all need to be considered ➤ KPI 10.3 Energy and mechanisms:

Year	Knowledge (Topics /Contexts) What pupils will 'know' .	Skills acquired What pupils will be able to 'do' .	Concepts developed What pupils will 'understand' .	Assessment (KPIs)
	Exploring and developing designs: ➤ Using an iterative process ➤ Sketching and modelling ➤ Testing and evaluation Communication of ideas: ➤ Sketching, 3D sketching ➤ Exploded drawings ➤ Annotation ➤ Working drawings ➤ Systema and schematic drawings ➤ Mathematical modelling ➤ Computer-based tools ➤ Physical modelling ➤ Other ways of communicating ideas Computer based tools: ➤ Effects of computer-based tools on communication ➤ Meeting with clients and other stakeholders ➤ Presenting ideas to clients ➤ Use of CAD/CAM ➤ Use of spreadsheet software Prototype development: ➤ Prototypes ➤ Evaluating prototypes Energy and mechanisms: Energy generation and storage: ➤ Non-renewable energy sources ➤ Renewable energy sources ➤ Storing energy ➤ Types of motion ➤ Principles of levers ➤ Mechanical devices ➤ Linkages & CAMs ➤ Gears & pulleys	➤ Understand how to use the ACCESS FM and 5WH acronyms to write design briefs and specifications ➤ Identify different drawing styles ➤ Demonstrate the use of different drawing styles to communicate different pieces of information ➤ Demonstrate proficient use of CAD using 2D and 3D drawing packages to convey ideas ➤ Categorise renewable and non-renewable energy sources ➤ Understand and explain types of motion and how mechanisms change the direction of motion ➤ Understand how linkages and CAMS function and be able to give examples of each Mock NEA 2: ➤ Investigate the demographic of a given target audience and the surrounding issues ➤ Demonstrate the importance of researching the work of designers ➤ Carry out secondary research into the problem to be solved ➤ Explain how ecological, environmental and social issues need to be considered in the designing of products. ➤ Write a comprehensive design brief using 5WH ➤ Write a comprehensive specification using ACCESS FM	➤ How to describe mathematical modelling and computer-based tools are used to communicate design ideas ➤ How to explain how ideas can be physically modelled ➤ How to explain the effects and benefits of computer-based tools when communicating ideas ➤ How to describe how computer-based tools can be used to share and present ideas and technical information ➤ How to explain why designers produce prototypes ➤ How to explain the considerations that need to be taken into account of when designing prototypes ➤ How to describe and explain how a prototype of a product or system can be evaluated Energy and mechanisms: Energy generation and storage: ➤ How to describe how energy is generated and stored ➤ How to explain the advantages and disadvantages of using renewable energy sources to power products and systems Mechanical systems: ➤ How to describe the four types of motion ➤ How to describe the basic principles of a lever ➤ How to explain the different classes of lever ➤ How to describe how linkages, cams, gears and pulleys transfer motion ➤ How to explain how these mechanical devices are used to change the magnitude and direction of forces	Know, understand and explain energy storage and mechanisms, mechanical systems
10 Term 2a	Materials and their properties: Properties of materials:	Theory: Materials and their properties:	Materials and their properties: Properties of materials:	➤ KPI 10.4: Materials and their properties: Properties of materials,

Year	Knowledge (Topics /Contexts) What pupils will 'know' .	Skills acquired What pupils will be able to 'do' .	Concepts developed What pupils will 'understand' .	Assessment (KPIs)
	➤ Working properties ➤ Physical properties ➤ Typical relative properties of different types of material Materials: ➤ Papers & boards ➤ Timber ➤ Metals ➤ Polymers ➤ Textiles	➤ Explain the different categorisation of materials within the material classification ➤ Investigate the working and physical properties of materials ➤ Be able to explain why materials are available in stock forms and the names of standard components Mock NEA 2: ➤ Produce sketches using perspective and isometric projection ➤ Work in an iterative way, avoiding design fixation and being open to altering initial ideas ➤ Produce an exploded drawing ➤ How to annotate a drawing effectively to explain features of a design ➤ Use modelling as well as sketching to assist in the development of a prototype product ➤ Use card models, toiles and breadboards ➤ Use CAD/CAM to develop a prototype product ➤ Record the benefits of using CAD/CAM software to design accurate products ➤ Write a detailed manufacturing schedule	➤ How to explain the meanings and properties of materials ➤ How to explain the difference between hardwood, softwood timbers and manufactured timbers, characteristic properties, how timber is converted into usable material, its common uses and the stock forms they are available in ➤ How to explain the difference between ferrous and non-ferrous metals, characteristic properties, how metal is converted into usable material and the stock forms they are available in ➤ How to explain what happens to polymers at the end of their usable life ➤ How to explain how fabric is constructed from fibres, the difference between natural, synthetic and blended fibres ➤ How to explain the characteristic properties and common uses of a variety of variety of textiles	new materials, standard components and finishes
10 Term 2b	New materials: ➤ Modern materials ➤ Metal foams ➤ Graphene ➤ Nanomaterials ➤ Smart materials ➤ Composites ➤ Technical textiles Standard components: ➤ Stock forms	Theory: ➤ Understand the importance of material investigation and developments in material technology ➤ Be able to explain why materials are available in stock forms and the names of standard components ➤ Understand the use of finishes for different materials and how they	New materials: ➤ How to describe the characteristics of a variety of new materials, and what is meant by a smart material and a composite material ➤ List specific technical textiles, and modern, smart and composite materials and their typical uses Standard components: ➤ How to explain why standard components are used	➤ KPI 10.4: Materials and their properties: Properties of materials, new materials, standard components and finishes

Year	Knowledge (Topics /Contexts) What pupils will 'know'.	Skills acquired What pupils will be able to 'do'.	Concepts developed What pupils will 'understand'.	Assessment (KPIs)
	➤ Reasons for using standard components ➤ Types of standard components Finishing materials: ➤ Purpose of finishing ➤ Metal-based materials ➤ Polymers ➤ Timber-based materials ➤ Textile-based materials ➤ Papers and boards ➤ Electronic and mechanical systems	are used to enhance functionality and aesthetics Mock NEA 2: ➤ Produce a functioning prototype and storyboard the progress of the making	➤ How to list standard components used with a variety of different materials Finishing materials: ➤ How to explain the purpose of surface treating and finishing materials ➤ How to describe how surface treatments and finishing techniques are applied to a range of materials	
10 Term 3a	Selection of materials: ➤ Functionality and choice of materials ➤ Factors affecting material selection ➤ Properties required for commercial products Working with materials: ➤ Meeting the needs needed by a product ➤ Examples of how material properties can be modified ➤ Reinforcing the design to enhance performance ➤ Methods of reinforcement Tools, equipment and processes: Scales of manufacture: ➤ Scales of manufacture ➤ Influence of quality on selection of materials ➤ Material management Manufacturing processes: ➤ Papers and boards ➤ Timber-based materials ➤ Metals and alloys ➤ Polymers ➤ Textiles and electronic systems Measurement and production aids:	Theory: ➤ Explain why certain materials are used for certain functions based on their working and physical properties ➤ Categorise products into correct scales of production ➤ Study the manufacturing processes of at least one material (polymers covered at KS3) into products/components for products ➤ Identify production aids used in the manufacture of products to ease time and ensure consistency ➤ Explain the importance of accuracy and how tolerance is key in manufacture ➤ Demonstrate, through the mini NEA, how quality control and quality assurance are an essential part of manufacture Mock NEA 2: ➤ Evaluate final prototype against the design brief and specification ➤ Carry out consumer testing and suggest improvements based on findings ➤ Evaluate their prototype in relation to scales of manufacture	Selection of materials: ➤ How to describe a wide range of factors that can influence the choice of material for a product ➤ How to explain the important properties required by commercial products Working with materials: ➤ How to explain why reinforcement is used in products ➤ How to describe how the properties of a material can be enhanced ➤ How to describe a range of examples of how product design can be modified to improve the performance of a product Tools, equipment and processes: Scales of production: ➤ How to describe the characteristics and give examples of different scales of manufacture ➤ How to explain why the equipment used changes with the scale of manufacture Manufacturing processes: ➤ How to describe what is meant by wasting, addition and deforming and reforming ➤ How to identify the processes and equipment used to manufacture products from different materials	➤ KPI 10.5: Tools, equipment and processes: Scales of production, manufacturing processes, production aids and ensuring accuracy

Year	Knowledge (Topics /Contexts) What pupils will 'know' .	Skills acquired What pupils will be able to 'do' .	Concepts developed What pupils will 'understand' .	Assessment (KPIs)
	➤ Measurement and reference points ➤ The importance of production aids ➤ Jigs ➤ Templates ➤ Patterns Ensuring accuracy: ➤ The difference between accuracy and precision ➤ Why accuracy is important ➤ Tools to improve accuracy ➤ Tolerance ➤ Quality control and quality assurance	and modifications that would need to be made	➤ How to select the appropriate tools to carry out processes on different materials and justify choice ➤ How to identify the processes and equipment used to manufacture electronic systems Measurement and production aids: ➤ How to explain the meaning and importance of reference points used in measurements ➤ How to explain the reasons why production aids are used ➤ How to describe how jigs, templates and patterns are used in product manufacture Ensuring accuracy: ➤ How to explain the reasons why accuracy is important when manufacturing products and prototypes ➤ How to explain the meaning and importance of quality control and quality assurance ➤ How to explain the importance of tolerance when manufacturing products	
10 Term 3b	New and emerging technologies: Impact on industry: ➤ Impact on industry ➤ Impact on enterprise ➤ Impact on employment Impact on production: ➤ CAD/CAM ➤ Improving manufacturing efficiency ➤ Technology push and market pull Impact on society and the environment: ➤ Impact on sustainability and the environment ➤ Impact on culture ➤ Impact on society NEA information:	Theory: New and emerging technologies: ➤ Explain the impact on industry, enterprise and employment ➤ Explain how the increasingly complex use of CAD/CAM has improved manufacturing, and efficiency ➤ Write a case study, giving specific examples, of how technology push and market pull have influenced product development and demand ➤ Describe how companies utilising advances in technology and science have had to consider sustainability and the environment	New and emerging technologies: Impact on industry: ➤ How to explain the impact of new and emerging technologies on industry and enterprise ➤ How to discuss the potential effects of new and emerging technologies on employment Impact on production: ➤ How to explain the impact of CAD and CAM on production ➤ How to explain how production techniques and systems improve manufacturing efficiency. Impact on society and the environment: ➤ How to explain the impact of new and emerging technologies on sustainability and the environment	➤ KPI 10.6: New and emerging technologies: Impact on industry, production, society & the environment

Year	Knowledge (Topics /Contexts) What pupils will 'know' .	Skills acquired What pupils will be able to 'do' .	Concepts developed What pupils will 'understand' .	Assessment (KPIs)
	➤ The requirements for their NEA projects. ➤ Deadlines in relation to the completion of each NEA section.	➤ Describe how designers of products have had to consider culture when designing products so that they do not offend different cultures, faiths and beliefs ➤ Describe how companies need to consider the effects of introducing/removing a manufacturing setting from an urban setting ➤ Approaches to designing and making: Strategies, the work of others and considerations revisit NEA: ➤ Select a contextual challenge as given by AQA. ➤ 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	➤ How to discuss the potential effects of new designs on culture and society	
11 Term 1	➤ How to design and develop design ideas for a client to a written brief. ➤ 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 suitable. ➤ How surface treatments and finishes are applied to enhance aesthetics, functionality and durability of products.	Theory: ➤ Approaches to designing and making: Strategies, the work of others and considerations revisit ➤ Designing products: Research, and investigations revisit ➤ Energy and mechanisms: Energy storage and mechanisms, mechanical systems revisit NEA: ➤ Produce and design brief and specification for a prototype product for a specific client, addressing their needs and wants	➤	➤ KPI 11.1: Know, explain and demonstrate the making principles of material management, health and safety and manufacturing processes. ➤ KPI 11.2: Section A: Identifying & investigating design possibilities ➤ KPI 11.3: Section B: Producing a design brief & specification ➤ KPI 11.4: Section C: Generating design ideas ➤ KPI 11.5: Section D: Developing design ideas

Year	Knowledge (Topics /Contexts) What pupils will 'know'.	Skills acquired What pupils will be able to 'do'.	Concepts developed What pupils will 'understand'.	Assessment (KPIs)
		Theory: ➤ Materials and their properties: Properties of materials revisit ➤ Tools, equipment and processes: Scales of production, manufacturing processes, production aids and ensuring accuracy revisit 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. ➤ Work to specific tolerances, cutting, shaping and forming materials. ➤ Material management and the economical use of material.		
11 Term 2	➤ How to document, with written and photographic evidence, how the making/manufacture of the prototype product took place ➤ How to evaluate final prototypes fully using client feedback and testing to suggest improvements.	➤ Select materials and components appropriate to the task considering cost, functionality and availability. ➤ Work with specialist tools and equipment with precision. ➤ Use specialist techniques and processes. ➤ Design and develop prototypes in response to client needs and wants. ➤ Evaluate final prototype against design brief and specification ➤ Conduct consumer testing and evaluate results ➤ Suggest improvements in the light of consumer testing and evaluation against the design brief and specification	➤ The importance of considering the needs and wants of a client when designing for them. ➤ The need to develop a specification that gives details of the constraints on a design project. ➤ The need to consider a wide range of design ideas and possibilities, avoiding design fixation. ➤ The need to research materials, components, joining and finishing methods before finalising design ideas. ➤ The need for accuracy in manufacture in order to produce a functioning and high-quality prototype. ➤ 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.	➤ KPI 11.6: Section E: Realising design ideas ➤ KPI 11.7: Section F: Analysing & evaluating

Year	Knowledge (Topics /Contexts) What pupils will 'know' .	Skills acquired What pupils will be able to 'do' .	Concepts developed What pupils will 'understand' .	Assessment (KPIs)
			➤ The need to evaluate a prototype and suggest improvements.	
11 Term 3	➤ The internally moderated mark for their NEA.	Theory: ➤ New and emerging technologies: Impact on industry, production, society & the environment revisit ➤ Answer exam questions with confidence using correct subject terminology ➤ Answer exam questions with the correct amount of detail to be awarded highest marks available	➤ The requirements for answering exam questions in relation to multiple choice, short answers, mid-length answers and extended answers	

Year	Knowledge (Topics / contexts) What pupils will 'know' .	Skills acquired What pupils will be able to 'do' .	Concepts developed What pupils will 'understand' .	Assessment
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 associated processing and finishing techniques. ➤ The theory of Composites, smart and modern materials and associated processing and finishing techniques.	➤ Be able to 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, using not only one strategy or process but a variety.	➤ 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. ➤ Sub-assembly as a separate line of manufacture for certain parts of a product.	➤ Level of engagement with written and practical tasks set within lessons. ➤ Regular Q&A sessions to check understanding and to address misconceptions. ➤ Actions taken by pupils in the light of verbal feedback. ➤ Quality of homework tasks designed to check for understanding of topics covered.

Year	Knowledge (Topics / contexts) What pupils will 'know'.	Skills acquired What pupils will be able to 'do'.	Concepts developed What pupils will 'understand'.	Assessment
	➤ 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	➤ 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. ➤ Discuss how socio-economic influences and major developments in technology have helped shape product design and manufacture. ➤ 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 waste and ensure manufacturing is within tolerance.	➤ 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. 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.	➤ Performance in end of topic tests. ➤ Performance in Yr12 exam against good progress target. ➤ Attendance at revision sessions and success in mark-worthy completion of practise questions. Detailed feedback: ➤ Topic feedback sheet at the end of each topic covered. ➤ End of topic test feedback ➤ Joints exercise, Styrofoam modelling, ➤ Yr12 examination feedback
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 ➤ Critical analysis and evaluation			
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 their NEA projects and the implications of designing a product for a real-life client. ➤ Deadlines in relation to the completion of each NEA section.	NEA: ➤ 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.		

Year	Knowledge (Topics / contexts) What pupils will 'know'.	Skills acquired What pupils will be able to 'do'.	Concepts developed What pupils will 'understand'.	Assessment
	➤ That the design process is iterative rather than linear.	➤ 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.		
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 suitable. ➤ How surface treatments and finishes are applied to enhance aesthetics, functionality and durability of products.	➤ 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. ➤ Use specialist techniques and processes. ➤ Design and develop prototypes in response to client needs and wants.	➤ The importance of considering the needs and wants of a client when designing for them. ➤ The need to develop a specification that gives details of the constraints on a design project. ➤ The need to consider a wide range of design ideas and possibilities, avoiding design fixation. ➤ The need to research materials, components, joining and finishing methods before finalising design ideas. ➤ The need for accuracy in manufacture in order to produce a functioning and high-quality prototype. ➤ 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.	➤ Level of engagement with NEA sections. ➤ Regular Q&A sessions to check understanding and to address misconceptions. ➤ Actions taken by pupils in the light of verbal feedback. ➤ Quality of homework tasks designed to check for understanding of topics covered. ➤ Performance in Yr13 mock exam against good progress target. ➤ Deadline meeting for each section of the NEA completed in Yr13 and the overall mark and grade achieved prior to external moderation. ➤ Attendance at revision sessions and success in mark-worthy completion of practise questions. Detailed feedback: ➤ Feedback after the marking of each NEA section ➤ Yr13 mock feedback
13Term 2	➤ How to evaluate their prototypes fully using client feedback and testing to suggest improvements.			
13 Term 3	➤ The internally moderated mark for their NEA.			