KESTEVEN AND SLEAFORD HIGH SCHOOL

Design and Technology Scheme of Learning

Year 11 – Term 1-2/Section 1 - Core Technical Principles/Section 2 – Specialist Technical Principles/Section 3 – Designing and making Principles

Intent Rationale: Specification AQA Design and Technology 8552
Core Technical Principles (CTP): Taught through theory and practical application. Including: material categories; sources and origins of materials; properties of materials; modern and smart materials; new and emerging technologies; mechanical devices; electronic systems; energy storage and generation.
Specialist Technical Principles (STP): Taught through Textiles theory and practical lessons. Including: Users needs and contexts; past and present designers; environmental and social issues; design and communication; selection of materials; stock forms; surface treatments and finishes; prototypes; working with materials.
Designing and Making Principles (DMP): Taught through practical application and folder work. **1.Designing Principles: Investigation – primary and secondary data; The work of others; Design Strategies; Communication of design ideas and prototype development** **2. Making Principles: Selection of materials and components; Tolerances and Allowances; Material management and marking out; Specialist Tools, equipment, techniques and processes; Surface Treatments and Finishes**

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
• Y10 Terms 5-6 • Y10 Terms 3-4 • Y10 Terms 1-2 • Y9 Skirt Project • Y8 Topic Textiles - Pyjama Project • Y8 Topic RM – Clocks – Design Movements • Y7 Wall organiser project	• Y11 Terms 3-4 • A Level Design and Technology Fashion and Textiles
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• History – study of different historical eras • Business Studies – manufacture marketing and pricing • Art – Presentation, illustration and design, design movements • Geography – Fair Trade; sustainability; environmental issues; sustainable energy production. • Physics – mechanical devices, energy generation and storage • Chemistry – polymers • Mathematics – GCSE maths skills – area; geometry; trigonometry; volume etc.	• Problem solving; independence; resilience; encouraging creativity; communication skills; confidence; organisation (GB4) • Links with social/cultural understanding –. (BV4) (BV5) (C1) (C2) (SP1) (SP2) (SP3) • Moral, social and Environmental topics covered on sustainability and cloth wastage. (C2) (M1) (SO1)
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**
• Independent research • Written instructions • Subject specific vocabulary	• Measuring skills using a ruler and tape measure • Seam allowance of 15mm in construction • Average measurements • Mathematical problem solving • Geometric understanding

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Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?	
Know • How to use research and exploration to identify and understand user needs • How to identify and solve their own design problems and understand how to reformulate problems given to them • How to develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations • Develop an understanding of developments in new materials, systems approach to designing and mechanical devices **Apply** • use a variety of approaches to generate creative ideas and avoid stereotypical responses • User needs and user centred design • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture when appropriate • select from and use a wider, more complex range of materials and components, considering their properties • analyse the work of past and present professionals and others to develop and broaden their understanding • Make detailed plans in order to construct the desired product. **Extend** • test, evaluate and refine their ideas and products against a specification, considering the views of intended users and other interested groups • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions	
What subject specific language will be used and developed in this topic?	**What opportunities are available for assessing the progress of students?**
• Spin dyeing – when colour is added to the spinning solution of a synthetic yarn • Stock dyeing – natural fibres are dyed before being spun into yarn. • Yarn dyeing – dyeing yarn before being made into fabrics • Piece dyeing – dyeing of woven or knitted fabrics • Garment dyeing – garments are dyed as required to meet consumer demand for different colours. • Colour fastness – the strength with which the dye is held in the fibre – washing, rubbing or sunlight may be tested. • Resist dyeing – barriers prevent dye reaching areas of cloth creating patterns on fabric or yarn – tie dyeing / batik • Screen printing – a method of stencilling on a mesh frame – Rotary, flatbed and carousel. • Roller printing – engraved copper rollers are used, one per colour rolled in printing paste and the repeat is the circumference of the roller, expensive, used for long print runs. • Sublimation printing – uses heat to transfer a design which is printed on special paper, the dye becomes a vapour in the heat press and transfers to the fabric – best on synthetic fabrics such as polyester. • Digital printing – CAD is used to design the print which is printed directly onto fabric, fabric is steamed to fix the design. • Teflon – a fluorocarbon stain resistant finish • Scotchgard - a fluorocarbon stain resistant finish • Iterative Design – method of designing based on prototyping, testing, analysing and refining the product. • Freehand sketching – drawing done without the use of rulers or drawing aids. A quick way to express thoughts and ideas. • Rendering – the addition of colour or texture to enhance a sketch to better communicate design intent. • Schematic diagrams or 'flat' working drawing clarifying the technical details of a garment – show top stitching, seams, details such as pockets and a front and back view. Used in manufacturing specifications. • Virtual modelling – photorealistic 3D models can be produced on CAD to help visualise the product before it is made – colourways, different materials and patterns can be modelled saving time and costly prototyping. • Prototype – a model of a product used to evaluate the design, its performance and ability to be manufactured.	**Outcomes & Key work for assessment:** **GCSE NEA Project** AO2 C generating design ideas AO2 D Developing design ideas **Year 11 GCSE Mock Examinations** **Regular marking of class and homework.** **Tracking points.**

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Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
NEA Review and planning Communication of ideas	Understand how to develop innovative and creative ideas, use collaboration to broaden and develop ideas, understand the needs and wants of others, use a systems approach. Understand the use of the iterative approach to design and prevent design fixation.	Develop an understanding of how these design strategies have been used by designers to create innovative products. Recognise the need for analysis and evaluation at every stage of the NEA project with both positive and negative feedback Design ideas are communicated in arrange of media including different view-points.	T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\3.DESIGNING AND MAKING PRINCIPLES\3.4 design strategies Using strategies such as ACCESSFM product analysis Geometry, Nature - Golden Ratio/ Biomimicry, cultural influences to develop design ideas. Communication of ideas 3.5 Design Strategies PP slides 8-14 TB p263 – 288 **H/W independent planning and preparation for NEA tasks.**
NEA Speed designing	To create a range of imaginative ideas linked to the design context.	To generate a large range of imaginative, creative and innovative ideas that reflect research and the design context.	Speed designing, developed ideas from these (with client TMG feedback throughout). Resources – Aliens, context cards and lego figures.
NEA Planning - Designing Initial Developments analysis and evaluation NEA 7 Designing Initial Ideas analysis and evaluation	Imaginative and creative ideas have been generated which mainly avoid design fixation and have adequate consideration of functionality, aesthetics and innovation. Ideas have been generated, considering on-going investigation that is relevant and focused. Good experimentation and communication is evident, using a wide range of techniques. Effective use of different design strategies for different purposes as an approach to designing.	Imaginative, creative and innovative ideas have been generated, fully avoiding design fixation and with full consideration of functionality, aesthetics and innovation. Ideas have been generated, that take full account of on-going investigation that is both fully relevant and focused. Extensive experimentation and excellent communication is evident, using a wide range of techniques. Imaginative use of different design strategies for different purposes and as part of a fully integrated approach to designing	Students start to create a range of initial design ideas developed from speed designing and research. Development of the iterative design process. Client feedback and TMG feedback informs design ideas. Further investigation and research encouraged at all stages of NEA project. **H/W independent planning and preparation for NEA tasks.**
Environmental, social and economic challenge – The Six Rs & Life Cycle Assessment - D&MP Theory linked to NEA – Revision of work covered in Y10 Term 3-4	Students ensure that environmental, social and economic issues are covered at each stage in NEA project – investigation, design development, making and evaluation.	Very detailed investigation and presentation of environmental, social and economic issues throughout NEA project	Link to NEA - research covered including Social Moral and Environmental considerations – revision of Y10 work. Choice of materials and components – Product life cycle analysis – 6Rs Link to NEA consider how 6Rs and LCA link to student's product/solution
NEA 8 Designing Initial Developments analysis and evaluation NEA 9 Testing / Iterative design process– modelling ideas on the stand NEA 10 Testing/ Iterative design process NEA 11 Testing/ Iterative design process - Development of ideas	Imaginative and creative ideas have been generated which mainly avoid design fixation and have adequate consideration of functionality, aesthetics and innovation. Ideas have been generated, considering on-going investigation that is relevant and focused. Good experimentation and communication is evident, using a wide range of techniques. Effective use of different design strategies for different purposes as an approach to designing.	Imaginative, creative and innovative ideas have been generated, fully avoiding design fixation and with full consideration of functionality, aesthetics and innovation. Ideas have been generated, that take full account of on-going investigation that is both fully relevant and focused. Extensive experimentation and excellent communication is evident, using a wide range of techniques. Imaginative use of different design strategies for different purposes and as part of a fully integrated approach to designing	Independent development of iterative design process. **H/W independent planning and preparation for NEA tasks.**
Properties of materials and modification of properties for specific purposes – D&MP Theory linked to NEA Revision of work covered in Y10 Term 3-4	Revision of how to shape and form materials, their properties and modifications for specific purposes. Linked to NEA with reference to the selection of materials, components, construction and surface decoration techniques.	Information is used to develop intensive and detailed investigations into selection of materials, components, construction and surface decoration techniques.	T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\2.SPECIALIST TECHNICAL PRINCIPLES\2.5 using mats PP 4 Working with Textiles + ws/ PP 6 Specialist techniques and processes. Safety; finishing; fire retardant finishes; sportswear; microfibres/ Coolmax; Goretex; Kevlar; Nomex; end products. TB p133-140 TB 202-204
NEA 12 Testing/ Iterative design process - Development of ideas NEA 13 Testing/ Iterative design process - Development of ideas NEA 14 Testing/ Iterative design process - Development of ideas NEA 15 Testing/ Iterative design process - Development of ideas	Good development work is evident, using a range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Good modelling which uses a variety of methods to test their design ideas, largely meeting requirements. Materials/components selected are mostly appropriate with good research into their working properties and availability.	Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Excellent modelling, using a wide variety of methods to test their design ideas, fully meeting all requirements. Fully appropriate materials/components selected with extensive research into their working properties and availability.	Independent development of iterative design process. **H/W independent planning and preparation for NEA tasks.**
Surface Treatments and Finishes	Understand the range of finishes available, how materials are prepared, how finishes can improve aesthetic qualities and performance of materials.	A wide range of relevant sampling in included within the development process, written up in detail and evaluated.	T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\2.SPECIALIST TECHNICAL PRINCIPLES\2.9 surface treat PP7 + ws TB P218-220

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NEA 16 Final idea drawn up in detail NEA 17 Final idea drawn up in detail	Good development work is evident, using a range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Final design idea meets most of the points in the design specification and clients wants and needs. Fully evaluated with third party feedback.	Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Final design idea meets the majority of points in the design specification and fully incorporates the clients wants and needs. Fully in detail evaluated with third party feedback.	Independent development of iterative design process. **H/W independent planning and preparation for NEA tasks.**
End of Term 1			
NEA Review Planning Manufacturing specification/ catch up NEA 18 Evaluation of final design Manufacturing specification	Largely detailed manufacturing specification is produced with good justification to inform manufacture. Demonstrating an understanding of materials and components, costing, planning, working drawing, tolerances, construction methods and techniques.	Fully detailed manufacturing specification is produced with comprehensive justification to inform manufacture.	Independent development of manufacturing specification. **H/W REVISION**
NEA 19 Realising design ideas - Pattern cutting NEA 20 Realising design ideas - Pattern cutting	Students understand how 2D patterns can be made into 3D products to fit the body using bust dart manipulation	Students develop and modify design ideas by practical application and modelling on the stand.	Independent development of pattern templates based on design work. Pattern cutting is documented and modifications noted. **H/W REVISION**
Revision **Revision** **Revision** **Revision**	Students gain an understanding of the exam paper and content.	Students gain an understanding of the exam paper and content.	Revision of Product Analysis; Core Technical Principles and Specialist Technical Principles. **H/W REVISION**
Mock GCSE Examination week			
Mock GCSE Examination week			
Go over mock GCSE Examination			
NEA 21 Realising design ideas - Pattern cutting NEA 22 Realising design ideas - Pattern Cutting	Students understand how 2D patterns can be made into 3D products to fit the body using bust dart manipulation	Students develop and modify design ideas by practical application and modelling on the stand.	Independent development of pattern templates based on design work. Pattern cutting is documented and modifications noted.
NEA 23 Realising design ideas - Cutting NEA 24 Realising design ideas - Making NEA 25 Realising design ideas - Making	The correct tools, materials and equipment (including CAM where appropriate) have been used or operated safely with an adequate level of skill. Some quality control is evident through measurement and testing. Prototype shows an adequate level of making/finishing skills that are mostly appropriate to the desired outcome. A prototype of sufficient quality has been produced that may have potential to be commercially viable, although further developments would be required, and only partially meets the needs of the client/user.	The correct tools, materials and equipment (including CAM where appropriate) have been consistently used or operated safely with an exceptionally high level of skill. A high level of quality control is evident to ensure the prototype is accurate by consistently applying very close tolerances. Prototype shows an exceptionally high level of making/finishing skills that are fully consistent and appropriate to the desired outcome. An exceptionally high-quality prototype that has the potential to be commercially viable has been produced and fully meets the needs of the client/user.	Independent development of prototype. Progress is documented and modifications noted. **H/W Diary of Manufacture – to include method, modifications, risk assessment, industrial methods, Quality Control and photographs.**
END OF TERM 2			