# KESTEVEN AND SLEAFORD HIGH SCHOOL

## Design and Technology Scheme of Learning

### Year 10 – Term 3-4/Section 1 - Core Technical Principles/Section 2 – Specialist Technical Principles/Section 3 – Designing and making Principles

| Intent Rationale: Specification AQA Design and Technology 8552 |
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| **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.**<br>**1.Designing Principles: Investigation – primary and secondary data; The work of others; Design Strategies; Communication of design ideas and prototype development**<br>**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? |
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| • Y10 Terms 1-2<br>• Y9 Skirt Project<br>• Y8 Topic Textiles - Pyjama Project<br>• Y7 Wall organiser project | • Y10 Term 5-6<br>• Y11 – Design and Technology GCSE<br>• 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<br>• Business Studies – manufacture marketing and pricing<br>• Art – Presentation, illustration and design<br>• Geography – Fair Trade; sustainability; environmental issues; sustainable energy production.<br>• Physics – mechanical devices, energy generation and storage<br>• Chemistry – polymers<br>• Mathematics – GCSE maths skills – area; geometry; trigonometry; volume etc. | • Problem solving; independence; resilience; encouraging creativity; communication skills; confidence; organisation (GB4)<br>• Links with social/cultural understanding –. (BV4) (BV5) (C1) (C2) (SP1) (SP2) (SP3)<br>• 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<br>• Written instructions<br>• Subject specific vocabulary | • Measuring skills using a ruler and tape measure<br>• Seam allowance of 15mm in construction<br>• Average measurements<br>• Mathematical problem solving<br>• 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? | |
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| **Know**<br>• How to use research and exploration to identify and understand user needs<br>• How to identify and solve their own design problems and understand how to reformulate problems given to them<br>• How to develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations<br>• Develop an understanding of developments in new materials, systems approach to designing and mechanical devices<br>**Apply**<br>• use a variety of approaches to generate creative ideas and avoid stereotypical responses<br>• User needs and user centred design<br>• select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture when appropriate<br>• select from and use a wider, more complex range of materials and components, considering their properties<br>• analyse the work of past and present professionals and others to develop and broaden their understanding<br>• Make detailed plans in order to construct the desired product.<br>**Extend**<br>• test, evaluate and refine their ideas and products against a specification, considering the views of intended users and other interested groups<br>• 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?** |
| • Modern Material – a material recently developed for specific applications<br>• Graphene – A very thin 2D material layer of carbon<br>• Teflon – a polymer – polytetrafluoroethylene PTFE which creates a non-stick or stain resistant surface finish<br>• Smart Materials – a material that changes its [properties in response to changes in its environment<br>• Thermochromatic- materials that change colour at specific temperatures<br>• Photochromatic – materials that change colour if the light level changes<br>• Composites a material that combines the properties of the materials that were used to make it<br>• Technical textiles – textile materials and products that are manufactured for their technical and performance properties.<br>• Kevlar – A very strong material which is an Aramid fibre used for products like bullet proof vests<br>• Micro-fibre - a very thin synthetic fibre<br>• Nano-fibre – an extremely tiny particles used to make materials stronger but not increase weight<br>• Micro-encapsulation – very thin fibres hold chemicals in tiny capsules which break with pressure releasing chemicals<br>• System diagram – a diagram that breaks down an operation into three main parts – input – process – output, complex systems may have more that one of these.<br>• Input device – electrical ad mechanical sensors that use signals from the environment & convert them into signals that can be sent to processing devices & components.<br>• Thermistor – temperature sensor<br>• Light Dependant Resistor (LDR) light sensor<br>• Process devices – handle information received and turn on and/or off<br>• Microcontroller – a small computer within a single integrated circuit.<br>• Output – sends out information, heat, light, sound or mechanical movement to the environment the system is operating in.<br>• Mechanism – a device that changes an input motion into a different output motion.<br>• Lever – a mechanism that moves around a fixed point (a pivot).<br>• Fulcrum – the point a load is pivoted<br>• Linkages – mechanisms that transfer force and can change the direction of movement.<br>• Cam – a mechanism with a cam, slide and follower. When the cam rotates the follower moves up and down<br>• Gear Train – a mechanism for transmitting rotary motion or torque<br>• Torque – the turning force that causes rotation. | **Outcomes & Key work for assessment:**<br>**Practical Corset Project**<br>Research; design specification; techniques –batik; silk painting; piping; binding; chennile; reverse applique; printing; embroidery; product analysis; design work; finished product; diary of make; evaluation.<br>**Final Assessment of completed project.**<br><br>**Assessment Test – CTP**<br>**New and Emerging Technologies**<br>**Energy generation and storage**<br>**Materials and their wiorking properties** |

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| • Friction – resistance of motion when one object rubs against another.<br>• Co-efficient of friction – the amount of friction a material has.<br>• Bias – the 45-degree angle of the cross grain of fabric.<br>• Ply – Twist that is added to yarn (2 ply, 3 ply etc).<br>• Prototype – an early sample, model or release of a product built to test a concept or process.<br>• Batch production – when a limited number of the same product is made during a particular period of time<br>• One- off production – when just one complete product is produced<br>• Down time – when a machine has stopped working and no products are being made. This could be maintenance, because the machine has developed a fault or the time taken to set the machine up for a new operation.<br>• Mass production – manufacturing in large quantities over a long period of time. This typically uses a production line.<br>• Continuous production – runs constantly and is highly automated using CAD/ CAM<br>• Batik – uses wax to draw patterns on fabric which is the dyed, layers of wax and dye are added – a resist method of printing<br>• Tie Dye – folding, twisting, crumpling and tying with elastic bands or string to create resist dyed patterns.<br>• Primary research – research you do yourself (interviews, surveys etc)<br>• Secondary research – gathering existing data (books, websites, magazines etc).<br>• Ergonomics – the relationship between people and products and how the use and interact with them<br>• Anthropometrics – the measurements and sizes of humans (height, weight, hand span, waist size).<br>• Human factors – considerations that are concerned with people.<br>• Isometric – means 'equal measure' it is a technique of presenting a design sketch in three dimensions.<br>• Third Angle Orthographic Drawing – a technical drawing that includes a plan view (from above) a side and front view drawn to scale to enable an Isometric drawing to be produced.<br>• De-forestation – large areas of trees cut down, often due to mining, drilling, farming or logging.<br>• FSC – The forest stewardship council<br>• Fairtrade mark – the symbol that identifies products that have been bought fairly. | **Regular marking of class and homework.**<br><br>**Tracking points.** |

## Intent – Concepts

| Lesson title | Learning challenge | Higher level challenge | Suggested activities and resources |
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| Intro to Mock NEA – Corset Project<br>Primary and Secondary Sources | Students gain an understanding of key designers and their work and how it could influence their own work. | Students gain an understanding of key designers and their work and develop their work independently. | Practical project – Top influenced by either Vivienne Westwood or Alexander McQueen for Zara - paperwork in A3 folder in power point format. Core skills and task research - Revision – dyeing and printing methods. Selection of materials and components.<br>**Independent Homework tasks to be completed during term 3 such as:**<br>• **A3 Mood board to inspire sampling**<br>• **A3 Research Vivienne Westwood and Alexander McQueen**<br>• **Research Zara/ fast fashion/ sustainability.**<br>• **Historical/ contemporary corsets** |
| Practical skills – seams<br>Revision of methods to control fulness. | Students understand how to develop a range of construction techniques | Students incorporate a range of construction techniques linked to their research by annotation and initial design work. | Covered in Y9 – Darts, Pleats and Gathers - revsion |
| Energy Generation and Storage | Students develop an understanding of using fossil fuels and alternative energy systems foe energy generation. How energy is stored. | Discussion – Pros and Cons – Would Britain be better off investing in Nuclear energy power station v tidal barrage across the River Severn | T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\1.CORE TECHNICAL PRINCIPLES\Unit 2Energy, materials, systems and devices\1.Energy Generation_storage – PP + Worksheets |
| Practical skills – seams/ binding | Students understand how to develop a range of construction techniques | Students are able to incorporate a range of practical skills to their research by annotation and initial design ideas. | Students produce a range of practical samples and method of making with evaluation and example images in practical work file. |
| Practical skills – binding/ piping | | | |
| Practical skills – quilting/ patchwork | | | |
| Practical skills – patchwork/ frills | | | |
| Smart and Modern Materials | Students develop an understanding of modern and smart materials | Students are able to consider a range of different applications that smart and modern materials could be used for and how existing products could be changed to include smart materials. | T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\1.CORE TECHNICAL PRINCIPLES\Unit 2Energy, materials, systems and devices\3.Modern and smart materials Printed materials A3 + PP + Worksheets Students work as teams to research materials and feedback findings to other groups. |

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| Practical skills - Silk painting<br>Practical skills – Silk Painting/ Batik<br>Practical skills –Batik/ block/ stencil printing<br>Practical skills – Tie dyeing | Students understand how to develop a range of decorative techniques based on a theme inspired by research. | Students are able to link, use and develop practical decorative surface techniques to research and produce creative and innovative design work. | Students produce a range of practical samples and method of making with evaluation and example images in practical work file. |
| Composite and Technical Materials | Students develop an understanding of composite and technical materials | Students are able to consider a range of different applications that composite and technical materials could be used for. | T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\1.CORE TECHNICAL PRINCIPLES\Unit 2Energy, materials, systems and devices\3.Modern and smart materials\compositeTechnical Printed materials A3 + PP + Worksheets Students work as teams to research materials and feedback findings to other groups. Revision of technical fabrics used in Term 1 practical project |
| Practical skills – Chenille work/ reverse applique<br>Practical skills – Chenille work/ reverse applique | Students understand how to develop a range of decorative techniques based on a theme. | Students are able to link, use and develop practical decorative surface techniques to research and produce creative and innovative design work. | Students produce a range of practical samples and method of making with evaluation and example images in practical work file. |
| END OF TERM 3 | | | |
| Practical Skills - Pattern Cutting – skirts revision<br>Practical Skills - Pattern Cutting – skirts revision | Students understand how 2D patterns can be made into 3D products to fit the body | Students are able to develop a range of different patterns ¼ scale incorporating darts, gathers and pleats. | Skirts dart manipulation – using ¼ scale blocks<br>Ergonomics<br>Anthropometrics<br>**H/W Revision** |
| Smart Materials DVD<br>Think do cards Smart and modern | Students develop an understanding of modern and smart materials | Students are able to apply learning to a range of different contexts. | DVD<br>#ThinkDo cards |
| Practical Skills - Pattern Cutting – Bodice block<br>Practical Skills - Pattern Cutting – Bodice block | Students understand how 2D patterns can be made into 3D products to fit the body using bust dart manipulation. | Students are able to develop a range of different patterns ¼ scale incorporating different dart positions darts, gathers and styling problems. | Bodice block dart manipulation – using ¼ scale blocks<br>Ergonomics<br>Anthropometrics<br>**H/W Revision** |
| Mock NEA – Corset top – Specification<br>Initial Ideas | Students create a detailed 15 point design specification for their project based on research, brief and TMG wants and needs. | Students create a detailed 15 point design specification for their project based on research, brief and TMG wants and needs. Fully justified including measurable points. | Design Specification is added to research PP<br>**H/W Revision** |
| Mock NEA – Corset top – Initial Ideas | Students create a range of initial ideas that meet the design brief. | Students create a range of detailed initial ideas that meet the design brief, that include different views and annotation. | Initial ideas are scanned and added to PP |
| Systems Approach to designing<br>Isometric and Orthographic Drawing | Students understand the concept of a systems approach to designing, including input, process and output devices used in electronic products.<br>Revision of simple orthographic and Isometric drawing techniques | Students are able to create and analyse block diagrams and flow diagrams for a range of scenarios, such as automatic opening doors, security light or burglar alarm.<br>Revision of orthographic and Isometric drawing techniques developing a range of more complex shapes. | T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\1.CORE TECHNICAL PRINCIPLES\Unit 2Energy, materials, systems and devices\5.systems approach to design PP + worksheets Practical application using A3 printouts<br>T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\3.DESIGNING AND MAKING PRINCIPLES\3.5 communication\Orthographic PP + worksheets |
| Exam Preparation Revision - Working with Textile Materials. | Students gain an understanding of the exam paper and content. Revision of practical and specialist technical theory covered this year. | Students are able to link PP content to work completed and suggest how the information could be used in an exam question. | T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\2.SPECIALIST TECHNICAL PRINCIPLES\2.5 using mats<br>PP Working with Textiles + ws<br>**H/W Revision** |
| Exam Preparation<br>Scales of Production<br>Product Analysis Clothing | Students gain an understanding of the exam paper and content. How products are produced in different volumes. | Students gain an understanding of the exam paper and content. How products are produced in different volume and why different manufacturing methods are used for different production volumes. Students are able to link this to product analysis. | T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\2.SPECIALIST TECHNICAL PRINCIPLES\2.7 scales of prod PP5 + ws<br>DVD 30 mins<br>Techdoodle product analysis of mass produced clothing. |

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| Exam Preparation – Environmental, social and economic challenge | Understanding how deforestation, carbon dioxide levels leading to potential global warming and the need for fair trade present opportunities and constraints that influence design and making. | Students should suggest 3 products that they feel have successfully considered one of the three topics covered, (global warming, deforestation, Fairtrade) discuss how the designer has addressed these issues. | T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\2.SPECIALIST TECHNICAL PRINCIPLES\2.3Ecological and Social PP3 + ws<br>Environment and Sustainability DVD 30 mins<br>**H/W Revision** |
| Exam Preparation/ Revision<br>Product Analysis - Kettles | Students gain an understanding of the exam paper and content. | Students gain an understanding of the exam paper and content. | Product analysis<br>Exam questions/ Revision cards |
| Mechanical devices - Levers and Linkages | Understanding of different types of movement, what levers and linkages are and what they do, the different orders of lever, how to convert one type of motion to another, changing the magnitude and direction of forces in rotary systems. | Students are able to apply their knowledge by use modelling materials, paper, card, lollipop sticks and split pins to create a range of linkages and identify the different orders of levers in the workroom. | T:\Departments\Curriculum\Design and Technology\DT_Textiles\DT_GCSE\GCSE\1.CORE TECHNICAL PRINCIPLES\Unit 2Energy, materials, systems and devices\6.mechanical devices<br>Printed card/split pins PP + w/s |
| **Y10 Examination Week** | | | |
| END OF TERM 4 | | | |