

Early KS3 – Units of Work Learning Focus Mainly Designing

Textiles	Food	Product Design	Systems and Control
E3.MD.T Learning to look – 4 hours Overview How do we generate and communicate design ideas in textiles? How does nature influence design? In this unit students look at communication on paper using different methods and how to use annotation effectively. It then considers biomimicry as a means of solving design problems, the use of CAD software to manipulate images to make colourways and appropriate printing methods. Key Learning: • Communication of design ideas • Further development of ideas using CAD/CAM Skills: • Sketching rough ideas • Developing them using CAD and producing fabrics using CAM Learning objectives DB1 Use 2D CAD packages to model their ideas DB7 Use a variety of approaches, for example biomimicry and user-centred design, to generate creative ideas and avoid stereotypical responses DB9 Develop and communicate design ideas using annotated sketches	E3.MD.F Catering for needs – 2 hours Overview Generating food products to meet the needs of the consumer. This considers consumer needs and choices and how to plan diets for children, teenagers, the elderly, vegetarians, and medical and religious needs. It considers adapting recipes using alternative ingredients. In the practical session students are asked to adapt a lasagne to meet the needs of a vegetarian consumer. Key Learning: • Identifying the needs of the consumer • Factors effecting individual consumer choice Skills: • Adapting existing recipes to meet a need • Applying knowledge of safe working practice Learning objectives DA8 Consider the influence of a range of life style factors and consumers' choices when designing products TK21 How to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment CNA4 That people choose different types of food and that this may be influenced by availability, season, need, cost, where food is produced, culture and religion CNB3 How to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values CNB5 The importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight CNB7 How to use a broader range of preparation techniques and methods when cooking, e.g. stir frying, steaming, blending CNB10 How to store, prepare and cook food safely and hygienically CNB15 How to use taste, texture and smell to decide how to season dishes and combine ingredients CNB16 How to adapt and use their own recipes	E3.MD.PD Core skills – 2 hours Overview Learning to develop basic design communication skills including sketching, drawing controlled lines, 3D sketching, annotation, emphasising key points and knowing which points to highlight to get the design ideas across. Key Learning: • Use of basic graphical skills • Develop basic sketching skills • Develop knowledge of key terminology Skills: • Developing freehand sketching skills • Learning how to sketch in 3D • Annotation of work Learning objectives DB9 Develop and communicate design ideas using annotated sketches DB10 Produce 3D models to develop and communicate ideas	E3.MD.SC On the level – 5 hours Overview Designing a casing design for a digital product which uses a number of components, concentrating on its form and function. How would it be developed for different users and markets? The unit includes sections on communicating ideas, using ergonomic and anthropometric data when designing, use of CAD software to capture and make changes to a design and an awareness of modelling and production techniques. Key Learning: • Communication of design ideas • Use of annotation for evaluation • Use of CAD/CAM for ideas development Skills: • Use of drawing and rendering skills • Use of a range of product examples for design idea generation • Use of card modelling to communicate their ideas Learning objectives DA1 Develop detailed design specifications to guide their thinking DA9 Take creative risks when making design decisions DA10 Consider additional factors such as ergonomics, anthropometrics or dietary needs DB1 Use 2D and begin to use 3D CAD packages to model their ideas DB9 Develop and communicate design ideas using annotated sketches TK3 Know more advanced electrical and electronic systems can be powered and used in their products

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E3.MM.T Understanding fibres and fabrics – 8 hours Overview What are the properties of fabrics used today and why is it important to understand this? How do we add print and stitch to our fabrics to make them more interesting? How do practising designers achieve this? This unit considers the origins of natural and man-made fibres, the methods of construction and properties of these and how they are adapted by adding colour and decoration, with examples from current textiles designers. Key Learning: • Properties of natural and manmade fibres and how to identify them • Methods of creating fabric • Methods of adding colour and stitch to fabrics • Use of the sewing machine • How current textile designers work in the commercial world Skills: • Safe practice using textiles equipment and processes • How to make fabric. • How to dye and print different fabrics • How to operate a sewing machine Learning objectives MB3 Use CAD/CAM to produce and apply surface finishing techniques, for example using dye sublimation MB4 Investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dyeing and appliqué MB7 Follow procedures for safety and hygiene and understand the process of risk assessment MB8 Use a wider, more complex range of materials, components (and ingredients), taking into account their properties MB9 Use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely EC1 Know about an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing and making TK5 About textile fibre sources e.g. natural and synthetic and fabrics e.g. plain and woven TK8 How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines	E3.MM.F Practical skills building – 8 hours Overview This covers the introduction to the kitchen environment, food safety and safe working, establishing routines and building basic culinary skills. It considers at food safety through personal hygiene and the 4 Cs, as well as healthy eating principles. Practical lessons have students making baked beans on toast, a fruit salad, ratatouille and bolognaise. Key Learning: • Principles of food safety: the 4Cs and basic bacteriology • Principles and application of health and safety in a kitchen environment • Introduction to equipment and utensils • Healthy eating: the Eatwell Guide and eight tips Skills: • Knife handling skills: bridge hold and claw grip • Use of hob, grill and oven. • Heat control, simmering, dry frying • Dough making Learning objectives MB7 Follow procedures for safety and hygiene and understand the process for Risk Assessment EA2 Actively involve others in the testing of products TK21 How to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment CNB1 The importance of a healthy and varied diet as depicted in the Eatwell Guide and eight tips for healthy eating CNB9 The principles of cleaning, preventing cross-contamination, chilling, cooking food thoroughly and reheating food until it is steaming hot CNB10 How to store, prepare and cook food safely and hygienically CNB12 How to select and prepare ingredients CNB13 How to use utensils and electrical equipment	E3.MM.PD Signs – 4 hours Overview A large local store has asked students to manufacture their signage. Use a digital image to then laser cut the existing sign. Improve on this using a specification developed with the client and make a prototype to send to company. Includes understanding of signage and logos to develop brands and convey visual messages. Key Learning : • Use of CAD/CAM in design • Design of logos and typography • Making models to communicate ideas Skills: • Understand how to develop design on CAD package • Use of basic CAD/CAM tools • How to set up and use a laser Learning objectives DB1 Use 2D and begin to use 3D CAD packages to model their ideas MB7 Follow procedures for safety and hygiene and understand the process of risk assessment MB9 Use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely EA5 Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups TK1 How to classify materials by structure e.g. hard words, soft woods, ferrous and non-ferrous, thermoplastic and thermosetting	E3.MM.SC Dusk – lights on – 5 hours Overview Designing with a transistor sensing circuit, which could be used in a variety of different settings. The circuit is made using a standard PCB, but one which allows for the learner to customise its operation to suit their particular requirements. Students consider a range of components and systems to design a system that will turn on a light (LED or bulb) when it gets dark. Key Learning: • Recognition of basic electronic components. • Use of soldering • Recognition of input, process and output components Skills: • Basic soldering techniques and safety • Use of basic electronic tools safely • How to read a circuit diagram Learning objectives MA7 Select appropriately from specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture MB2 Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives MB7 Follow procedures for safety and hygiene and understand the process of risk assessment TK4 How to use simple electronic circuits incorporating inputs and outputs

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Blank	E3.DM.F Design for health – 5 hours Overview Producing a healthier meal aimed at teenagers. Students investigate factors affecting food choices before designing and making a meal suitable for a teenager. They consider factors such as the importance of a balanced diet, cost, availability, cultural and religious practices and health concerns. Practical lessons include making a stir fry, a curry and kofta before working independently on their final choice of meal. Key Learning: - Identifying needs of the consumer - Factors effecting individual consumer choice - Variety of cooking methods - Basic nutritional analysis Skills: - Following existing recipes - Use of a variety of ingredients and equipment - Applying knowledge of safe working practice Learning objectives EA5 Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups TK21 How to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment CNB1 The importance of a healthy and varied diet as depicted in the Eatwell Guide and eight tips for healthy eating CNB3 How to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values CNB5 The importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight CNB10 How to store, prepare and cook food safely and hygienically CNB15 How to use taste, texture and smell to decide how to season dishes and combine ingredients CNB16 How to adapt and use their own recipes CNB17 How to cook a repertoire of predominantly savoury dishes to feed themselves and others a healthy and varied diet	E3.DM.PD Jewellery design – 8 hours Overview Design and make pewter cast jewellery to a given theme. In this students research and develop a brief, develop a specification and from this generate ideas for designs. Using CAD software they model and test their designs, and produce a mould before casting and finishing their designed product. Key Learning: - Learn to develop a base of research - Develop a brief and specification - Factors that affect design Skills: - Sketches out designs and select appropriate proposal - Transfer design onto CAD programme - Cut out moulds using CAM available - Cast and finish jewellery Learning objectives DA2 Use research including the study of different cultures, to identify and understand user needs DA9 Take creative risks when making design decisions DB2 Produce models of their ideas using CAM to test out their ideas DB4 Use CAD and related software packages to validate their designs in advance of manufacture DB5 Use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations DB9 Develop and communicate design ideas using annotated sketches MA7 Select appropriately from specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture MB11 Apply a range of finishing techniques, including those from art and design, to a broad range of materials including textiles, metals, polymers and woods TK7 How materials can be cast in moulds TK8 How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines	E3.DM.SC Touch torch – 12 hours Overview Design and make a product for the 21st Century, using LED(s) and with NO moving parts - touch operated. Students should disassemble and analyse a product to see what it is made of and how assembled, its form and function and whether parts can be recycled. They then design and make a torch using a circuit, having understanding of circuit diagrams, PCBs and the components. They must make the circuit, casing using CAD, and model it before evaluation. Key Learning: - Analyse a product by disassembly - Create a simple circuit using inputs, process and outputs - Create a PCB design using CAD - Use of CAD/CAM for casing design Skills: - Produce a PCB - Design a casing using CAD - Making a casing made using a range of methods - Apply surface finishes to the casing using a range of methods Learning objectives MB2 How to use simple electronic circuits incorporating inputs and outputs Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives MB3 Use CAD/CAM to produce and apply surface finishing techniques, for example using dye sublimation TK4 Products through disassembly to determine how they are constructed and function

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E3.TIS.T The wider use of textiles in our society – 1-2 hours Overview How are textiles used in today's society? How has conductive thread and fabric, use of composite textiles in the automotive industry and the use of textiles in medicine had an impact on our world? Using this, students should understand the wider role of textiles in everyday lives, beyond fashion and furnishing. They should investigate technical textiles for specific uses and demonstrate an understanding of the wider use of textiles. Examples from a range of industries are used to illustrate different uses and applications. Key Learning: - Textiles isn't about just sewing clothes and cushions - Technical textiles are hugely important to us and the way we live Learning objectives EB3 Evaluate products that they are less familiar with using themselves EB7 Evaluate new and emerging technologies	E3.TIS.F Future food – 1-2 hours Overview This unit considers how we might feed the world population in the future using lab-grown meat or insects as an alternative food source by investigating new and emerging technologies and investigating alternative food production methods. Key Learning - Alternative food production; making synthetic protein in the laboratory - Exploring the feasibility of eating insects as an alternative protein source Learning objectives EB3 Evaluate products that they are less familiar with using themselves EB7 Evaluate new and emerging technologies	E3.TIS.PD Eco design 1-2 hours Overview This introduces the concept of designing with the environment in mind, using examples from a range of familiar products, re-thought in keeping with the Six Rs principles. It discusses a product's life cycle and the 'cradle to the grave' concept. Using waste materials students are asked to design and make a new product prototype reusing waste items. Key Learning: - Understanding implications of designing product in the real world - Environmental issues affecting every product being produced Learning objectives DA11 Analyse where human values may conflict and compromise has to be achieved EB5 How products can be developed considering the concept of 'cradle to grave'	E3.TIS.SC Mobile phone – 2 hours Overview How a modern product has developed over time, what change has there been to their form and function during that time? What developments have taken place in electronics that have driven the development of the mobile phone? Key Learning: - Know and understand that electronics play a massive part in our everyday lives - Know how the development of electronics has contributed to the development of current every day products Learning objectives EB3 Evaluate products that they are less familiar with using themselves EB7 Evaluate new and emerging technologies EC1 Know about an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing and making

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M3.MD.T Dual purpose textiles – 5 hours Overview How can technology be included into textiles products to give them added value? Can this improve the quality of people's lives? This introduces students to the Portable Light project which combines a traditional textiles product with solar power. They produce ideas for a design of a dual purpose product and develop the design with annotated drawings using a 2D CAD package. Key Learning: - Importance of maintaining traditional skills as part of a culture/country's heritage - How this can be combined with current technology to improve the quality of life for people - To take creative risks when designing Skills: - Designing within a context for a chosen user group and identifying their needs - Developing 2D ideas into 3D models - Using CAD to generate patterns Learning objectives DA1 Develop detailed design specifications to guide their thinking DA2 Use research including the study of different cultures, to identify and understand users' needs DA3 Identify and solve their own design problems DA7 Work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacturing, construction, food, energy, agriculture and fashion DA8 Consider the influence of a range of lifestyle factors and consumer choices when designing products DB1 Use 2D and begin to use 3D CAD packages to model their ideas DB2 Produce models of their ideas using CAM to test out their ideas DB7 Use a variety of approaches, for example biomimicry and user-centred design, to generate creative ideas and avoid stereotypical responses TK6 How to select and modify patterns and use in textile construction TK18 Understand the properties of materials, including smart materials and how they can be used to advantage	M3.MD.F Multicultural meals for mates – 2 hours Overview In this unit students will investigate designing multicultural meals that are suitable for teenagers. They will develop and understanding of different needs and wants and demonstrate an understanding of the need for a healthier ethnic dish using different research methods, then generate possible design solutions including costs. Key learning: - Considering individual likes and dislikes to develop a suitable savoury food product - Adapting standard recipes to meet the need of the consumer Skills: - Costing a recipe using a spreadsheet - Applying knowledge and understanding of cookery methods - Applying knowledge of basic nutrition Learning objectives DA2 Use research including the study of different cultures to identify and understand users' needs DA8 consider the influence of a range of lifestyle factors and consumer choice MA2 Produce costings using spreadsheets for products they design and make TK21 How to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment CNA1 How to compare the cost of food when planning to eat out or cook at home CNB3 How to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values CNB10 how to store, prepare and cook food safely CNB17 How to cook a repertoire of predominantly savoury dishes to feed themselves and others a healthy and varied diet	M3.MD.PD Analyse that – 2 hours Overview Analysis of famous or household products to help learn about products and inspire for own design work. Students consider a number of products and use the analysis to help them develop their own design specification for a new product. Key Learning: - Learn how to analyse products - How existing product can be a rich source of information Skills - Develop designs based around the product as inspiration and new specification - Use of drawing rendering and modelling to communicate designs Learning objectives DA1 Develop detailed design specifications to guide their thinking DB5 Use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations DB6 Combine ideas from a variety of sources DB9 Develop and communicate design ideas using annotated sketches EA2 Actively involve others in the testing of their products	M3.MD.SC Electronic musical toy – 7 hours Overview Casing design for a toy musical device, which uses a new music chip specifically designed for use in toys and related products. This can be used in a range of ways that allow a wide range of 'instruments' to be created, with suitable casings for the target market of young children. Students will need to investigate circuits and manufacturing methods, applying a design brief and specification, as well as using CAD to make 3D models of their designs and presenting their ideas. Key Learning: - Know what a design brief means and what a context is in relation to the brief - Apply design strategies in order to generate innovative design ideas that meet the brief - Creation of a design specification using a design context and brief Skills: - Use a circuit simulator software to investigate/ test circuit ideas - Identify construction methods, components and materials by disassembly of a product - Use 3D software to create and make 3D models and/or components - Present their ideas to others clearly and suggest improvements Learning objectives DA4 Develop design specifications that include a wider range of requirements such as environmental, aesthetic, cost, maintenance, quality and safety DB2 Produce models of their ideas using CAM to test out their ideas DB10 Produce 3D models to develop and communicate ideas DB12 Give oral and digital presentations and use computer-based tools EB1 Products through disassembly to determine how they are constructed and function TK17 Use learning from mathematics to help design and make products that work

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Blank	M3.MM.F Protein foods – 4 hours Overview In this students will be developing a range of preparation and cookery methods whilst making protein rich dishes. They will list the sources and function of protein in the diet, describe the consequences of a diet lacking in protein and explain the different needs for protein at different life stages. They will then prepare a selection of ingredients for a range of dishes, following recipes and demonstrating safe use of equipment. Key learning: - Understand the source of and function of protein in the diet - Identify and cooking with a variety of protein ingredients Skills: - Sauce making - Heat control using hob - Use of high risk ingredients - Key temperature controls Learning objectives EA2 Actively involve others in the testing of their products CNB2 That food provides energy and nutrients in different amounts; that they have important functions in the body; and that people require different amounts during their life CNB7 How to use a broader range of preparation techniques and methods when cooking CNB10 How to store, prepare and cook food safely and hygienically CNB12 How to select and prepare ingredients CNB14 How to apply heat in different ways CNB15 How to use taste, texture and smell to decide how to season dishes and combine ingredients CNB17 How to cook a repertoire of predominantly savoury dishes to feed themselves and others a healthy and varied diet	M3.MM.PD Salad servers – 2-3 hours Overview Students develop an understanding for a basic product: salad servers and explore how design can improve the product. They investigate a range of options before producing a specification, making examples and considering finishing techniques. Key learning - Understand the different needs to the client using the product - Develop design that show understanding through making Skills - Manufacture using appropriate tools and equipment - Develop a successful product that relates to the client's needs Learning objectives DA1 Develop detailed design specifications to guide their thinking MB2 Use a broad range of material joining techniques including stitching MB7 Follow procedures for safety and hygiene and understand the process of risk assessment MB9 Use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely MB11 Apply a range of finishing techniques, including those from art and design, to a broad range of materials including textiles, metals, polymers and woods TK2 About the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal	M3.MM.SC Moody lights – 8 hours Overview Students manufacture a mood light using an RGB LED or one or more Red, Green, Blue LEDs that will respond to the environment where it's located, using such sensors as heat, light, movement/ vibration. Following an introduction to 'softwired' microcontroller circuits and different the sensors and outputs, students go on to create a circuit diagram and programme from a range of options before planning the production and testing of the boards. Key Learning: - Know what components are needed for a sensing circuit to operate - Make use of sensor systems to affect the operation of a system - LED series resistor calculations - Create suitable controlling software to operate the mood light in an appropriate manner - Know how to power a circuit using a number of power supply options Skills: - Use circuit simulator software to investigate/test circuit ideas - Creation of a PCB from a circuit diagram - Develop a program that solves a particular problem - Develop a program that uses a sensor as an analogue input. - Relevant testing of prototypes Learning objectives TK3 How more advanced electrical and electronic systems can be powered and used in their products TK9 How to apply computing and use electronics to embed intelligence in products that respond to inputs TK10 Make use of sensors to detect heat, light, sound and movement such as thermistors and light dependant resistors TK11 How to apply the concepts of feedback in systems TK12 How to control outputs such as actuators and motors TK16 Use learning from science to help design and make products that work

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M3.DM.T Textile entrepreneurs – 7 hours Overview Design and make a simple product that could be made in small quantities to sell in an independent gift shop. How is making one product different from making a number of identical ones? Students are asked to design and make a textile product that could be made in small quantities to be sold in a gift shop. They must research the customers and products and choose appropriate equipment, techniques and materials for their product. Working in teams they will devise production plans and look at cost considerations before manufacturing and testing their products. Key Learning: • Generation and development of design ideas for a very simple product – as part of a team • Understand the need for planning making before practical work begins • Be able to communicate as a team how this will happen • Understand how to cost a product Skills: • How to work as part of a team • Safe and effective use of textiles equipment and processes • Relevant testing of prototypes • Presentation of prototype to an audience This project could be done as a business enterprise idea with the students working towards selling their products at the end e.g. charity event. Learning objectives DA1 Develop detailed design specifications to guide their thinking DA4 Develop design specifications that include a wider range of requirements such as environmental, aesthetic, cost, maintenance, quality and safety DB5 Use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations DB6 Combine ideas from a variety of sources MA1 Produce ordered sequences and schedules for manufacturing products they design, detailing the resources required MA2 Produce costings using spreadsheets for products they design and make MA4 Make simple use of planning tools, for instance Gant charts MA6 Match and select suitable materials considering their fitness for purpose MA7 Select appropriately from specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture MA8 Select appropriately from a wider, more complex range of materials, components and ingredients, taking into account their properties such as water resistance and stiffness MB1 Make use of specialist equipment to mark out materials MB2 Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives MB 4 Investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dying and appliqué EA2 Actively involve others in the testing of their products	M3.DM.F Design and make your school lunch – 8 hours Overview Working within national constraints of the School Food Standards students will design an appropriate main meal for school lunches. They will know how to plan, prepare, adapt and cook a suitable meal for a given need, understanding the requirements for it to be nutritious and healthy. Practical sessions include adapting, preparing and evaluating their dishes against set criteria. They will also understand the benefits of a balanced school lunch and suggest further recipe ideas compared to the Eatwell Guide group of foods. Key Learning: • Understanding the constraints associated with production of school meals • Understanding of a wider range of ingredients and cookery methods • Costing and nutritional analysis of recipes Skills: • Preparation and cooking of a variety of ingredients • Application of good food safety practices • Use of a wider range of equipment • Research and trialling of suitable dishes • Handling high risk food Learning objectives DA8 Consider the influences of a range of lifestyle factors and consumer choices MA2 Produce costings using spreadsheets for products they design and make EA1 Evaluate their products against their original specification and identify ways of improving them TK21 How to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment CNB1 The importance of a healthy and varied diet as depicted in the Eatwell Guide and eight tips for healthy eating CNB5 The importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight CNB10 How to store, prepare and cook food safely and hygienically CNB15 How to use taste, texture and smell to decide how to season dishes and combine ingredients CNB16 How to adapt and use their own recipes CNB17 How to cook a repertoire of predominantly savoury dishes to feed themselves and others a healthy and varied diet	M3.DM.PD Lanterns 6-8 hours Overview Design and manufacture a small batch of identical lanterns based around a theme. Students work in groups to design and manufacture lanterns to help them understand manufacturing processes including batch and scales of production. Key Learning: • Understanding how batch production works • Generating ideas and developing into a product within a team • Basic ordering of processes to construct a product Skills • How to manufacture identical lanterns • Working as team • Sketches out design • Development of logo/typography • Manufacture of lanterns using production lines • Evaluation of product as a class Learning objectives DA3 Identify and solve their own design problems DB5 Use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations DB8 Decide which design criteria clash and determine which should take priority DB9 Develop and communicate design ideas using annotated sketches DB10 Produce 3D models to develop and communicate ideas	M3.DM.SC Smart board game – 12 hours Overview Design and manufacture a prototype interactive board game. The board has to be able to sense and respond to the player's pieces and then create random effects such as lighting and sound. The board may also include an embedded dice using an appropriate display system. Students will develop design strategies to develop ideas that meet a design brief, use CAD to develop as basic design and develop an appropriate program. They will need to be aware of costs and processes in manufacture, present their ideas and evaluate their proposed solution. Key Learning: • Apply design strategies in order to generate innovative design ideas that meet the brief • Use of programmable components as the controller to the system in a manner suitable for its intended application • Creation of a cost profile for the prototype and is able to indicate the likely costs in mass manufacture Skills: • Development of control software • Use of CAD/CAM, laser cutting and 3D printing to manufacture component parts • Know that there is a cost incurred in producing any product and understand how to work this out • To present their ideas to others clearly and suggest improvements • Be able to evaluate their solution against the original specification and justify changes that have been made to the solution Learning objectives DA3 Identify and solve their own design problems DB3 Use 3D CAD to model, develop and present their ideas DB11 Use mathematical modelling to indicate likely performance before using physical materials and components, for instance when developing circuits or gearing systems MA1 Produce ordered sequences and schedules for manufacturing products they design, detailing resources required produce costings using spreadsheets for products they design and make MA2 Produce costings using spreadsheets for products they design and make MA7 Select appropriately from specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture MB1 Make use of specialist equipment to mark out materials EA1 Evaluate their products against their original specification and identify ways of improving them EA2 Actively involve others in the testing of their products

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M3.TIS.T The true cost of textile technology – 1 hour Overview What are the positive and negative impacts that technology has had within textiles? In this unit students look at how technology and cost considerations have affected the production of textiles, the emergence of ‘eco fashion’ and what consumers can do to promote eco friendly fashion. Key Learning: - Examine our throw-away mentality within the textiles industry - What are the environmental issues that have resulted? - What are the alternatives? Learning objectives EB2 Evaluate the positive and negative impact that products can have in the wider world EB4 Evaluate products considering life cycle analysis	M3.TIS.F The appliance of science – 1 hour Overview Students will investigate new and emerging technologies used in the production of food including an understanding of the key terms associated with molecular biology. They will understand that food can be altered to look and taste differently and how it might be presented. The work of a number of inventive chefs is featured. Key Learning Investigating Molecular Gastronomy, key terms and techniques used by chefs in industry to create new taste and textures Learning objectives EB3 Evaluate products that they are less familiar with using themselves EB7 Evaluate new and emerging technologies EC1 Know about an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing	M3.TIS.PD Floating garden challenge – 1-2 hours Overview Develop an awareness and understanding about how design can solve real problems in parts of the world where natural disasters occur. Students consider images of flooding and drought and the impact this can have. They are introduced to Practical Action and the work they do in developing countries including Bangladesh where floating gardens help crops survive floods. Students then design and build a model raft of a floating garden and test it using weights. Key learning: - Develop an understanding about the way people live and their needs - Learn about natural disaster and the problems that are faced by people dealing them - How design helps all around the world and its different implications Learning objectives DA2 Use research including the study of different cultures, to identify and understand user need DA11 Analyse where human values may conflict and compromise has to be achieved TK16 Use learning from science to help design and make products that work	M3.TIS.SC Music players – 2 hours Overview During the last 40 years the way we store and listen to music has change beyond recognition, from vinyl to chip. What is the science behind how we stored music on vinyl discs, tape, compact discs, DVDs and chips? Key Learning: - Know and understand that electronics play a massive part in our everyday lives as demonstrated the development of music players - Know how the development of electronics has contributed to the development of the music players and other related products - Show knowledge of the scientific principles that underpin the way music is stored and replayed - vinyl, tape, disc, and chip Learning objectives EB3 Evaluate products that they are less familiar with using themselves EB7 Evaluate new and emerging technologies TK 16 Use learning from science to help design and make products that work TK 18 Understand the properties of materials, including smart materials, and how they can be used to advantage

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L3.MD.T Para-triathlete design challenge – 2 hours Overview How do para-athletes customise their sportswear to accommodate their needs? Students develop a design specification from research into the restrictions para-athletes face. Working as part of a team they must develop designs in creative ways and present these, giving reasons for their final choices. Key Learning: - Understand and apply the needs of others when designing for a specified end use - Know that fabric properties are crucial to maximise performance of athletes Skills: - Product analysis and reformulation of existing products - Consider measurements, ease and fit and how fabric choice will affect decisions - Work collaboratively as a team to arrive at a final proposal Learning objectives DA4 Develop design specifications that include a wider range of requirements such as environmental, aesthetic, cost, maintenance, quality and safety DA5 Research the health and wellbeing, cultural, religious and socio-economic contexts of their intended users DA6 Understand how to reformulate design problems given to them DA9 Take creative risks when making design decisions DA10 Consider additional factors such as ergonomics, anthropometrics or dietary needs DA11 Analyse where human values may conflict and compromise has to be achieved DB5 Use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations DB6 Combine ideas from a variety of sources decide which design criteria clash and determine which should take priority DB12 Give oral and digital presentations and use computer-based tools	L3.MD.F Standards for food – 2 hours Overview This unit looks at national quality assurance standards for assuring quality food in the UK and asks students to consider factors that ensure food is of the necessary quality through the use of ingredients that are sustainable and meet ethical and moral standards. It includes a practical session cooking their chosen dish. Key Learning: - Be aware of and understand the need for quality assurance schemes to ensure food standards - Understand how to select and use ethically sourced ingredients Skills: - Recipe research - Application of a variety of practical skills - Knowledge and understanding of food safety Learning objectives CNA3 That food is produced, processed and sold in different ways, e.g. conventional and organic farming, fair trade CNB3 How to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values CNB10 How to store, prepare and cook food safely CNB12 How to select and prepare ingredients CNB16 How to adapt and use their own recipes CNB17 How to cook a repertoire of predominantly savoury dishes to feed themselves and others a healthy and varied diet	L3.MD.PD Advanced modelling – 2 hours Overview Developing skills in CAD/CAM to help communication and modelling. Students explore modelling and advanced modelling using CAD/CAM and 3D printing before producing an electronic portfolio and using CAD software to produce a model of their choice. Key Learning: - Learn to use a CAD Modelling software - Understand how CAD/CAM is affecting design and the world we live in Skills - Make use a variety of tools in chosen software - Develop a portfolio to evidence skills Learning objectives DB1 Use 2D and begin to use 3D CAD packages to model their ideas DB10 Produce 3D models to develop and communicate ideas	L3.MD.SC Activity toy – 7 hours Overview Here students design a prototype electronic system that could be embedded in to a young child's activity toy that uses a number of inputs and outputs. The toy will need to match the age of the child and take into account the environment in which it is expected to function. The focus is to adapt a design problem to a particular use and create a specification based on the design brief that results in an appealing, functional and innovative product. Students must also present their ideas and refine their design ideas based on feedback. Key Learning: - Generation and development of design ideas for a product – as part of a team - Creation of a design specification base upon a design brief - Explain their design solution using a verbal presentation illustrated with a presentation - Refine design ideas based upon testing and the views of others - Ability to convert a design specification into an innovative, functional, appealing product Skills: - Make use of circuit simulation software to model the proposed systems - Use 2D/3D software to create possible visualisations of the prototype - Test and evaluate their designs and produce a 'pitch' presentation to a toy manufacturer Learning objectives DA4 Develop design specifications that include a wider range of requirements such as environmental, aesthetic, cost, maintenance, quality and safety DA6 Understand how to reformulate design problems given to them DB5 Use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations DB12 Give oral and digital presentations and use computer-based tools EA5 Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups

Late KS3 – Units of Work Learning Focus Mainly Making

Textiles	Food	Product Design	Systems and Control
Blank	L3.MM.F Chilled ready meals – 4 hours Overview This unit looks at national quality assurance standards for assuring quality food in the UK and asks students to consider factors that ensure food is of the necessary quality through the use of ingredients that are sustainable and meet ethical and moral standards. It includes a practical session cooking their chosen dish. Key Learning: - Nutritional analysis and profiling of dishes - Costing of recipes - Trialling appropriate dishes - Labelling requirements for ready meals Skills: - Adaptation of existing recipes - Independent application of a variety of cookery skills to produce a meal - Application of food safety good practice Learning objectives DA4 Develop design specifications that include a wider range of requirements CNA2 About the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour CNB3 How to taste and cook a broader range of ingredients and healthier recipes, accounting for a range of needs, wants and values CNB6 How to use nutrition information and allergy advice panels on food labels to help make informed food choices CNB7 How to use a broader range of preparation techniques and methods when cooking CNB10 How to store, prepare and cook food safely and hygienically CNB15 How to use taste, texture and smell to decide how to season dishes and combine ingredients CNB17 How to cook a repertoire of predominantly savoury dishes to feed themselves and others a healthy and varied diet	L3.MM.PD Does it connect? – 2 hours Overview Working on a group project to manufacture pieces accurately to produce a large scale model of an animal or product using jigs and templates. Students learn about jigs, former patterns and moulds before a practical session to manufacture a model. Key Learning: - Know how to select correct manufacturing tools and equipment - The importance of accuracy and teamwork - Understand use of templates and jigs Skills: - Use equipment and tools safely - Learn to work accurately and problem solve Learning objectives DB8 Decide which design criteria clash and determine which should take priority MA7 Select appropriately from specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture MB1 Make use of specialist equipment to mark out materials MB2 Use a broad range of material joining techniques including stitching MB7 Follow procedures for safety and hygiene and understand the process of risk assessment TK1 How to classify materials by structure e.g. hard woods, soft woods, ferrous and non-ferrous, thermoplastic and thermosetting TK2 About the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal TK19 Understand the performance of structural elements to achieve functioning solutions	L3.MM.SC Rescue me! – 7 hours Overview In this unit students are asked to manufacture a prototype rescue aid for walkers, climbers etc, using POV (Persistence of Vision) to display one or more messages, that would help rescuers locate them in case of an emergency. They should create a production schedule, select the appropriate materials and method for manufacture and use CAD/CAM in the development of the product. Key Learning: - Creation of a production schedule using a Gantt chart for the development of a new product - Selection of suitable components and materials for the development and manufacture of a prototype product - Use of programmable components as the controller in a system - Development of control software for an intended application Skills: - How to work as part of a team - Record and annotate design and making plans - Adapt the method of manufacture following new ideas or information - Identify and acquire a new skill, knowledge or technique is required to complete a task - Use of CAD/CAM in the development and manufacture of a prototype product Learning objectives MA3 Create production schedules that inform their own and others' roles in the manufacturing of products they design MA4 Make simple use of planning tools, for instance Gantt charts MA5 Communicate their plans clearly so that others can implement them MA6 Match and select suitable materials considering their fitness for purpose MB5 Adapt their methods of manufacture to changing circumstances MB6 Recognise when it is necessary to develop a new skill or technique MB10 Exploit the use of CAD/CAM equipment to manufacture products, increasing standards of quality, scale of production and precision

Late KS3 – Units of Work Learning Focus Design and Make

Textiles	Food	Product Design	Systems and Control
L3.DM.T Festival headgear – 8 hours Overview Head gear is a popular feature at many types of festivals – why is this and how is it used? Choose a festival and create designs to be worn. What happens when a client changes the design brief part-way through a project? Adapting designs to be made within a given time and resource constraints. Evaluate prototypes and suggest modifications for a circular economy approach. Although this is a Designing and Make unit – there is deliberately a considerable emphasis on evaluation within the whole process. The assessment objectives reflect this. Key Learning: - Take creative risks when designing for a given context - Be flexible and able to adapt ideas to changing circumstances - Evaluation is a constant process throughout designing and making - Understand the issues surrounding ‘cradle to grave’ approach to textile goods and how a ‘circular economy’ approach might be adopted Skills: - To be adaptable and open to new ideas when designing - Choose correct fabrics and textile processes to make their product - Know the importance of modelling before actual manufacture commences - Be able to critically evaluate design ideas, chosen processes and final prototype and act on their findings - Apply ‘new’ concepts to their own products Learning objectives DB4 Use CAD and related software packages to validate their designs in advance of manufacture MB5 Adapt their methods of manufacture to changing circumstances MB6 Recognise when it is necessary to develop a new skill or technique MB10 Exploit the use of CAD/CAM equipment to manufacture products, increasing standards of quality, scale of production and precision MB11 Apply a range of finishing techniques, including those from art and design, to a broad range of materials including textiles, metals, polymers and woods EA3 Select appropriate methods to evaluate their products in use and modify them to improve performance EA4 Produce short reports, making suggestions for improvements EA5 Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups EB4 Evaluate products considering life cycle analysis EB5 Evaluate how products can be developed considering the concept of ‘cradle to grave’ EB6 Evaluate the concept of circular economy approaches in relation to product development and consumption	L3.DM.F Event food – 6 hours Overview Investigating the breadth and variety of food served at festivals and events. Students determine what needs to be considered when considering food provision, including preparing suitable dishes and considering environmental issues. Key learning: - Determining what the consumer wants and needs from food at a festival/ event - Working out costs and profitability - Environmental considerations of serving food and minimising waste at a festival Skills: - Adapting existing recipes to meet a need - Application of safe working practices - Analysis of nutritional content of a dish - Use of a wider range of equipment and ingredients to independently produce a savoury main dish with accompaniments Learning objectives DA3 Identify and solve their own design problems DA8 Consider the influences of a range of lifestyle factors and consumer choices TK21 How to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment CNB3 How to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values CNB4 How to actively minimise food waste such as composting fruit and vegetable peelings and recycling food packaging CNB5 The importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight CNB9 The principles of cleaning, preventing cross-contamination, chilling, cooking food thoroughly and reheating food until it is steaming hot CNB10 How to store, prepare and cook food safely and hygienically CNB16 How to adapt and use their own recipes CNB17 How to cook a repertoire of predominantly savoury dishes to feed themselves and others a healthy and varied diet	L3.DM.PD Learning to learn – 6-8 hours Overview Students design and make and educational product for a child, identifying a ‘client’ (child between 0-5) and understanding her needs, wants and interests; conducting product analysis, generating ideas and a specification, prototyping and planning production, manufacturing and evaluating the product. Key learning: - Developing a brief and planning out a project - Researching needs of a client - Use of appropriate tools and materials - Evaluation as a tool to progress in design Skills - Applying skills learnt throughout projects of planning design and manufacture - Selecting tools and equipment appropriately to manufacture a successful prototype - Evaluating and testing product and suggesting improvements in relation to developed criteria Learning objectives DA8 Consider the influence of a range of lifestyle factors and consumer choices when designing products DA9 Take creative risks when making design decisions DB5 Use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations DB7 Use a variety of approaches, for example biomimicry and user-centred design, to generate creative ideas and avoid stereotypical responses DB9 Develop and communicate design ideas using annotated sketches MA3 Create production schedules that inform their own and others’ roles in the manufacturing of products they design MA7 Select appropriately from specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture MA8 Select appropriately from a wider, more complex range of materials, components and ingredients, taking into account their properties such as water resistance and stiffness MB7 Follow procedures for safety and hygiene and understand the process of risk assessment MB9 Use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely MB10 Exploit the use of CAD/CAM equipment to manufacture products, increasing standards of quality, scale of production and precision MB11 Apply a range of finishing techniques, including those from art and design, to a broad range of materials including textiles, metals, polymers and woods EA5 Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups EB3 Products that they are less familiar with using themselves	L3.DM.SC Animatronic creature – 13 hours Overview Students will design and manufacture of a small scale prototype Animatronic prop for either a stage show or television programme. This unit of work is the culmination of the KS3 work in Systems & Control; it also draws upon the other areas of Design and Technology in a multimedia way to solve a design and make task. It requires students to create a control system, apply mechanisms to control movement and use CAD/CAM to make a working prototype. Key Learning: - Develop independent working individually or as a group - Take creative risks when designing for a given context - Use of electric motors to provide motion, mechanical systems to cause movement and speed reduction - Use feedback to control the way a system operates - Evaluation is a constant process throughout designing and making Skills: - Know the importance of modelling before actual manufacture commences - Apply ‘new’ concepts to their own products - Create a control system (program & circuit) to operate a system - Apply mechanisms to achieve and control movement in system - Use CAD/CAM in the creation of a working prototype - Be able to critically evaluate design ideas, chosen processes and final prototype and act on their findings - Make use of other materials that might be required to act as skin, clothing etc - Document a system such that others can create copies or other versions Learning objectives DB4 Use CAD and related software packages to validate their designs in advance of manufacture EA3 Select appropriate methods to evaluate their products in use and modify them to improve performance EA4 Produce short reports, making suggestions for improvements TK9 How to apply computing and use electronics to embed intelligence in products that respond to inputs TK11 How to apply the concepts of feedback in systems TK12 How to control outputs such as actuators and motors TK13 How to use software and hardware to develop programmes and transfer these to programmable components for example, microcontrollers TK14 How to make use of microcontrollers in products they design and manufacture themselves TK15 How to construct and use simple and compound gear trains to drive mechanical systems from a high revving motor TK20 Understand how more advanced mechanical systems used in their products enable changes in movement and force

Late KS3 – Units of Work Learning Focus Technology in Society

Textiles	Food	Product Design	Systems and Control
L3.TIS.T Wearable technology 1-2 hours Overview What is wearable tech? Is it a gimmick? How is it currently used? Consider aesthetic vs performance enhancing properties. What would you design? This asks students to evaluate existing wearable technology products and generate ideas for garments that include light, sensors temperature control and which are controlled by smart phones. Key Learning: - Evaluate existing products and identify their purpose and methods of achieving this - Who are making these products? Look at companies e.g. Cute Circuit Skills: - Take creative risks and apply existing practice to develop new inventive design ideas Learning objectives DA8 Consider the influence of a range of lifestyle factors and consumer choices when designing products DA11 Analyse where human values may conflict and compromise has to be achieved EB3 Evaluate products that they are less familiar with using themselves EB7 Evaluate new and emerging technologies	L3.TIS.F Hydroponics – working water – 1 hour Overview Investigating alternative food production methods to ensure food production. Students investigate and discuss the benefits and drawbacks of using hydroponics systems to grow plant-based foods. Key Learning: - Understanding the term hydroponics - Explore the methods used and key terms - Be aware of the applications throughout the world - Knowledge of the advantages and disadvantages of producing food using hydroponic techniques Learning objectives EB7 Evaluate new and emerging technologies TK16 Use learning from science to help design and make products that work CNA3 That food is produced, processed and sold in different ways, e.g. conventional and organic farming and fair trade	L3.TIS.PD Evolution and the future – 2 hours Overview Through evaluating products that have changed e.g. can openers, mobile phones, irons, vacuum cleaners etc. students gain an understanding of evolution and what factors make products change. Using the concept of biomimicry they design the next generation of their chosen product for the future. Key learning: - Understand how and why product change - Know about biomimicry in the designs of the future Learning objectives DA9 Take creative risks when making design decisions DB9 Develop and communicate design ideas using annotated sketches EB2 The positive and negative impact that products can have in the wider world EB3 Products that they are less familiar with using themselves EB7 New and emerging technologies EC1 About an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing and making	L3.TIS.SC Knight Rider - computerised cars – 3 hours Overview Exploring technology that a few years ago was only seen in movies or was considered science fiction. How close are some of these features nearing reality today and why? Focusing on computerised cars this helps students understand the role of electronics and new technologies in developing products that we use every day. Key Learning: - Know and understand that electronics play a massive part in our everyday lives as demonstrated by the development of electronics and computer control in cars - Know how the development of electronics has contributed to the development of the computerised car - Understand how and why cars have become computerised - and filled with electronics - Demonstrate an understanding of the positive and negative impact of automotive vehicles Learning objectives EB2 The positive and negative impact that products can have in the wider world EB3 Evaluate products that they are less familiar with using themselves EB7 Evaluate new and emerging technologies