

Design & Technology

"The best ideas start as conversations." – Jonathan Ive

Year 7

The Rationale

Design and Technology allows all students to demonstrate their individual creative flair, problem solving abilities and practical skills within a range of subject disciplines. Students build upon their prior experience, and acquire new knowledge, skills and attributes, applying these independently and collaboratively to a range of contexts, activities, tasks, and projects.

Through the evaluation of past and present design and technology, the subject will equip students with the necessary skills to meet their own and the needs of others in an ever changing and unpredictable world. Through new, emerging, and digital technologies but also using traditional techniques and processes, all students will learn how to take risks, becoming resourceful, innovative and enterprising, and develop an understanding of its impact on our daily lives and the wider world.

Students are taught in four specific subject areas: Food & Nutrition, CAD/CAM 3D Printing, Textiles and Timbers. Projects are 10 weeks long and delivered on a carousel, where students rotate four times throughout the academic year.

	Food & Nutrition: Healthy Eating	CAD/CAM 3D Printing: Cookie Cutter	Textiles: Felt Monster	Timbers: Toy Vehicle
Curriculum Knowledge	<ul style="list-style-type: none"> • Safe & hygienic procedures • Step by step cooking methods • Use of basic tools, equipment, electrical appliances. • Healthy eating guidelines • Physical and chemical properties of ingredients. • Consumer & users views & preferences. 	<ul style="list-style-type: none"> • Computer Aided Design (CAD) • Computer Aided Manufacturing (CAM) • Product Analysis • 3D Printed prototypes • Working drawings • Product Analysis • Create imaginative design ideas • Development & modelling • ICT skills 	<ul style="list-style-type: none"> • Introduction to technical & creative textiles • Safe working procedures in the textiles area • Hand sewing techniques • Natural and manmade fabrics and their properties. 	<ul style="list-style-type: none"> • Introduction to technical & creative woodwork • Safe working procedures in the D&T workshops • Softwoods, hardwoods and their properties. • Woodwork finishes enhancing the quality of a product.

Subject Skills	<ul style="list-style-type: none"> ● Practical's: Fruit Salad, Fruity Cake Slice, Sausage Pasta Pot, Fruit Crumble, Pizza Swirl, Soup, Swiss Roll, Salad. ● Knife skills ● Use of cooker ● Eatwell plate ● Temperature control ● Safe handling of meat ● Macro & micro nutrients ● Pastry skills ● Safe use of electrical equipment ● Evaluate final outcome 	<ul style="list-style-type: none"> ● Understanding of new technologies, such as 3D Printing ● Sustainable bioplastics; Polylactic Acid (PLA) ● Evaluate final outcome 	<ul style="list-style-type: none"> ● Product Analysis ● Create imaginative design ideas ● Development of chosen idea ● Paper patterns, pinning pattern paper, running stitch, blanket stitch, sewing applique and buttons ● Hand sewing manufacturing techniques ● Evaluate final outcome 	<ul style="list-style-type: none"> ● Product Analysis ● Create imaginative design ideas ● Development & modelling ● Understanding of woodwork tools, equipment & machinery in a workshop environment. ● Evaluate final outcome
Tier 3 Vocabulary	<p>Nutrients Maintenance Macronutrients Micronutrients Cholesterol Contaminate Bacteria Food poisoning Dormant Binary fission Danger zone Conduction Convection Radiation Seasoning Simmering Boiling Raising agent Aeration Carbohydrate Protein Vitamins Minerals</p>	<p>Biodegradable Prototype Thermoplastic Thermoset Aesthetic Polymer Environmental Impact Orthographic Plant fibre Starch Filament Polyethylene terephthalate Sustainable Synthetic Monomer Isometric</p>	<p>Aesthetics Applique Blanket stitch Brief Carded Fibre Non-renewable fossil fuels Polymers Polyester Running stitch Shaun Specification Sustainable Synthetic felt Yarn</p>	<p>Aesthetics Axle Bench Hook Brief Chuck Coniferous Coping Saw Deciduous Dowel Drill Bit Forstner Bit Glass Paper Marking Gauge Orthographic Parallel Perpendicular Rasp Specification Softwood Steel Rule Sustainability Tenon Saw Vice</p>

	Folding High biological value High risk foods			
How can you help your child engage with the content?	Encourage your son/daughter to help during meal times in the kitchen to prepare, cook and bake food products, and also to wash up and tidy away afterwards. Encourage your son/daughter to make healthier choices when it comes to meal planning in the home.	Tinkercad is a web based computer aided design program, easily accessed from home using a laptop/tablet. Students can practise their CAD skills at home, using the starters & tutorials on Tinkercad, to help improve their knowledge & skills.	Encourage your son/daughter to sew by hand or with a sewing machine at home, to repair clothing, sew buttons, etc.	Look at wood products around the home and in our natural environment; identify coniferous and deciduous trees whilst walking in The Lakes, or in your local area. Identify softwoods and hardwoods used for particular products and understand their properties and characteristics.
Curriculum Opportunities	GCSE Food Preparation & Nutrition is taught in Year 10 & 11. Food commodities are used to cover a broad range of practical skills and knowledge essential for life skills and successful completion of NEA1 & NEA2 and final written exam.	CAD/CAM 3D Printing is taught as part of the GCSE in Design & Technology and used frequently at KS4 in Years 10 & 11.	Textiles is also taught in Year 8, where students progress to using computerised sewing machines to create a cushion cover.	GCSE D&T is taught in Year 10 & 11, where timbers & boards are used predominantly to create final products as part of the NEA coursework, which students complete during Year 11.
Career Links	Dietician, Nutritionist, Chef, Food Technologist	GCSE D&T, A Level Product Design, CAD/CAM Designer	Textiles Designer, Fashion Designer, Sewing Machinist, etc.	Joinery, all aspects of Engineering & Product Designer

Year 8

The Rationale

Students are taught in four specific subject areas: Food & Nutrition, Timbers, Textiles and Mechanical Devices & Structures. Projects are 10 weeks long and delivered on a carousel, where students rotate four times throughout the academic year.

	Food & Nutrition: Sustainability	Timbers: Picture frame	Textiles: Fleece Cushion Cover	Mechanical Devices & Structures: Bridge Building
Curriculum content	<ul style="list-style-type: none"> Safe and hygienic procedures whilst working in a food preparation area Step by step methods used to help produce high quality final products 	<ul style="list-style-type: none"> Hardwoods and softwoods and their key differences How to use workshop equipment safely. Selection of appropriate hand tools and equipment to 	<ul style="list-style-type: none"> Introduce the use of the sewing machine Develop investigative skills using textile materials 	<ul style="list-style-type: none"> Understand the properties of materials and how they can be used to advantage Understand the performance of structural elements to achieve functioning solutions

	<ul style="list-style-type: none"> ● Use of basic tools, equipment, electrical appliances. ● Combine foods to create and change food products ● Healthy eating guidelines ● Physical and chemical properties of materials or ingredients. ● Recognise consumer views ● Combine, shape and form food products accurately with due regard to the avoidance of waste 	<p>manufacture products effectively.</p> <ul style="list-style-type: none"> ● 2-point perspective drawing technique used to present design ideas. 	<ul style="list-style-type: none"> ● Different types of fabric and their use ● Basic principles of pattern drafting ● Joining techniques - both permanent and semi-permanent ● Reinforcing & decorating fabrics ● Methods of fastenings ● Graphic communication techniques and presentation skills ● Develop an understanding of materials, their properties and effective care ● Develop an awareness of industrial processes 	<ul style="list-style-type: none"> ● Understand how more advanced mechanical systems used in their products enable changes in movement and force ● How to classify materials by structure; hardwoods, softwoods, ferrous, non-ferrous, thermoplastic, thermosetting plastics ● Know the physical properties of materials; grain, brittleness, flexibility, elasticity, malleability, thermal ● How to construct and use simple, and compound gear trains to drive mechanical systems from a high revving motor
Key Skills	<ul style="list-style-type: none"> ● Practical's: Muffins, Pasta Bake, Scones, Spring rolls, Jam tarts, Risotto, Chilli, Cheesecake ● Sustainability ● Fairtrade food products ● Sustainable fish sources ● Food ethics ● Dietary issues - obesity ● Food waste ● British seasonal food products ● Food security and growing your own produce ● Vegetarian dishes ● Local produce 	<ul style="list-style-type: none"> ● Product Analysis – use of ACCESS FM ● Create imaginative design ideas ● Develop mood board as a point of interest for design ideas inspiration ● Development of chosen idea ● Understanding of wood work tools, equipment and machinery in a workshop environment ● Evaluate final outcome 	<ul style="list-style-type: none"> ● Product Analysis – use of ACCESS FM ● Create imaginative design ideas ● Development of chosen idea ● Basic functions of a computerised sewing machine ● How to thread a computerised sewing machine ● Paper patterns, pinning pattern paper, running stitch, zig zag stitch, 	<ul style="list-style-type: none"> ● What are the four different types of movement? ● What is linear motion? What is rotary motion? What is reciprocating motion? What is oscillating motion? ● What is a reverse motion linkage? What is a parallel motion (push pull) linkage? What is a bell crank linkage? ● What is a spur gear and gear train? ● What is a driver gear and idler gear? ● How do you calculate gear ratio? Velocity ratio? ● What is a pulley system? ● What is a fixed pulley? Block and tackle pulley? Drive belt pulley?

			sewing applique and buttons <ul style="list-style-type: none"> Evaluate final outcome 	<ul style="list-style-type: none"> What are cams and followers? What is a rack and pinion? What is a first order lever? Second order lever? Third order lever? What is mechanical advantage? What do fulcrum, effort and load mean in relation to levers?
Tier 3 Vocabulary	Mandatory Reference intake Food provenance Intensive farming Sustainable Food miles Al dente Environment Primary processing Secondary processing Cuisine Free range farming Health conditions Healthy diet Heart disease Natural fertiliser Obesity Saturated fats Roux Stiff peak stage Type 2 diabetes Traffic light label Unsaturated fat	Coniferous Deciduous Sublimation Laser Image Transfer Letter Mark Brand Mark Combination Mark Two point Perspective Vanishing point Projection lines Certified	Applique Bonded fabric Design theme Drafting paper Knitted fabrics Natural fibres Pattern lay Polar fleece Regenerated fibres Seam Shears Synthetic fibres Rolled hem Warp Weft Woven fabric Yarn	Types of movement, linear motion, rotary motion, reciprocating motion, oscillating motion, reverse motion linkage, parallel motion (push pull) linkage, bell crank linkage, spur gear, gear train, driver gear, idler gear, gear ratio, velocity ratio, pulley system, fixed pulley, block and tackle pulley, drive belt pulley, cams and followers, pear shaped cam, eccentric cam, circular cam, snail shaped cam, rack and pinion, first order lever, second order lever, third order lever, mechanical advantage, fulcrum, effort, load
How can you engage with your child?	Encourage your son/daughter to help during meal times in the kitchen to prepare, cook and bake food products, and also to wash up and tidy away afterwards. Encourage your son/daughter to make more sustainable food	Encourage your son/daughter to experiment with household products that can be used to amplify sounds from a mobile phone, for example, a drinking glass or cereal box.	Encourage your son/daughter to sew by hand or with a sewing machine at home to make clothing, create items. Watch the BBC Sewing Bee.	Encourage your son/daughter to have a well-stocked pencil case with the correct drawing & other equipment required for design & technology, for example, pens, pencils, colouring pencils, scissors, glue, ruler, rubber, eraser and compass. Encourage your son/daughter to be creative at home;

	choices when it comes to meal planning in the home.			keep a sketchbook of different doodles, sketches and design ideas.
Curriculum Opportunities	GCSE Food Preparation & Nutrition is taught in Year 10 & 11. Food commodities are used to cover a broad range of practical skills and knowledge essential for life skills and successful completion of NEA1 & NEA2 and final written exam.	GCSE D&T is taught in Year 10 & 11 where students create products using wood, plastics and printed circuit boards as part of the NEA Coursework, which students complete during Year 11.	Textiles is currently not taught in Year 9 or at GCSE level, but textile elements may be incorporated into the Year 11 NEA Coursework.	GCSE D&T is taught in Year 10 & 11, where students create new logo and packaging designs as part of the NEA Coursework in Year 11.
Career Links	Dietician, Nutritionist, Chef, Food Technologist	A Level Product Design, College, Apprenticeships, Electrician, Engineer and CAD/CAM Designer.	Textiles Designer, Fashion Designer, Sewing Machinist, etc.	Engineers, Graphic Designer, Interior Designer, Architect & Product Designer

Year 9

The Rationale

Students are taught in four specific subject areas: Food & Nutrition, CAD/CAM, Manufactured Boards & Electronics, Metals and Electronics & Programming. Projects are 10 weeks long and delivered on a carousel, where students rotate four times throughout the academic year.

	Food & Nutrition: Basic Food Hygiene	CAD/CAM, Manufactured Boards & Electronics: LED Light	Metals: Pewter Casting	Electronics & Programming: Pinball Machine
Curriculum content	<ul style="list-style-type: none"> Develop student's awareness of BFH in order to produce safe food. Develop practical skills and learn to apply the BFH principles to ALL practical work Lay down a foundation of skills and knowledge in food preparation, storage and cooking for life Consider a range of practical dishes inspired by international cuisine Basic Food Hygiene Exam 	<ul style="list-style-type: none"> Design styles and their influence Different types of woods, manufactured boards and their uses Different types of polymers, their sources and varying impacts on our environment. Demonstrate an understanding of CAD/CAM and how this can be incorporated into the design process. Simple circuits and components used in circuits and how they function 	<ul style="list-style-type: none"> Design and manufacture a decorative keyring Understand contexts, users and purposes – develop design specifications that include a wide range of requirements Generate, develop, model and communicate ideas – use 2D CAD & 3D CAD software to model their ideas Plan, use CAD software tools to create a 2D design & 3D product 	<ul style="list-style-type: none"> Understand the properties of materials and how they can be used to advantage Understand the performance of structural elements to achieve functioning solutions Understand how more advanced electronic systems are used in products to sense and create changes in the environment Know the properties and functions of electronic components, including PASSIVE, INPUTS, PROCESSES and OUTPUTS

		<ul style="list-style-type: none"> Hand tools and equipment to manufacture products effectively. 	<ul style="list-style-type: none"> Use CAM equipment to laser cut final product design 	
Key Skills	<ul style="list-style-type: none"> Practical's: Pizza, American cookies, Chicken supreme, Banoffee pie, Indian samosa, Lasagne, Sticky toffee pudding, Paella. Food safety & responsibility of food workers Personal hygiene Contamination and use of colour codes Food poisoning bacteria Use of temperature probes Food allergens Food hazards Chemical contamination 	<ul style="list-style-type: none"> Product Analysis – use of ACCESS FM Create imaginative design ideas Develop mood board as a point of interest for design ideas inspiration Development of chosen idea Understanding of woodwork tools, equipment and machinery in a workshop environment. Soldering of electronic LED strip with USB lead Evaluate final outcome 	<ul style="list-style-type: none"> Introduction to Metals Introduction to Ferrous & Non-Ferrous Metals Introduction to Alloys Introduction to Pewter Casting Introduction to 2D Design CAD Software Introduction to 3D CAD Software - Onshape 	<ul style="list-style-type: none"> Understand how electronic systems are used in products to sense and create changes in the environment Know about electrical power Know that electrical systems have an input, process and output How can electrical impulses be used to sense and control the environment? How can we give an inert component a 'brain'?
Tier 3 Vocabulary	Allergen Anaphylaxis Allergic reaction Bacteria Biological Caramelisation Chemical Coagulation Coeliac disease Commodities Contaminate Core temperature Danger zone Diarrhoea Dormant Elasticity Food intolerance Food poisoning Food borne disease Gelatinisation	Light Emitting Diode (LED) Printed Circuit Board (PCB) Fluorescent edge Soldering Art Deco Bauhaus Pop Art Manmade Board Coniferous Deciduous Veneer Thermoforming Thermosetting Finite Non finite Fractional Distillation Polymers Polymerisation Acrylic diffuser Bio Plastic	Metal, Abrasive, Pewter, Aesthetic, Ore, Cast, Edge-polish, Ferrous, Non-ferrous, Molten, Alloy, Malleable, Design movement, Computer aided design, Computer aided manufacture, Hacksaw, Coping Saw, Aluminium, Brass, Copper, Mild steel, Carbon steel, Steel, Manufactured board, Three dimensional, Batch production, Quality control, quality assurance, production plan, pattern, template, moulds, moulding, jigs, crucible, molten, clamp, sprue, release agent, pressure, force, solid, solidify,	3.5 mm jack, circuit, current, electrical, electronics, flowchart, flying leads, input, integrated circuit, laser cutting, light dependent resistor (LDR), light emitting diode (LED), microcontroller, micro switch, output, piezo sounder, printed circuit board, process, programming, resistor, sensor, short circuit, solder, soldering, soldering iron, switch, systems block diagram, USB lead, variable resistor, voltage

	<p>Gluten Hot holding Infective dose Knead Nausea Mise en place Physical Salmonella Sanitiser Staphylococcus Temperature probe Vehicle of contamination</p>	<p>Series Circuit Parallel Circuit Resistor Surface Mount (SM) Engrave</p>	<p>batch and volume, melting point, production, standard components, wastage, production line</p>	
How can you engage with your child?	<p>Encourage your son/daughter to carry out much more independent food practical work at home. Learning to confidently adapt recipes to personal likes of family or eating styles. Learning to apply all the Basic Food Hygiene rules covered in Year 9 course to ensure food is always safe and hygienic to eat.</p>	<p>Encourage your son/daughter to look at LED lighting & electronic products around the home. Look at the Instructables.com website for mini LED projects and ideas.</p>	<p>Encourage your son/daughter to visit modern art galleries and museums. Look up famous Designers and their work using the Internet. Use social media to follow Design accounts.</p>	<p>Encourage your son/daughter to look at electronic and electrical products at home and in the world around us.</p>
Curriculum Opportunities	<p>Completion of Year 9 Basic food hygiene course will enable students to work in part time jobs in food industry and will give them an initial qualification as a foundation course to introduce GCSE.</p>	<p>GCSE D&T is taught in Year 10 & 11 where students create products using wood, plastics and printed circuit boards as part of the NEA Coursework which students complete during Year 11</p>	<p>GCSE D&T is taught in Year 10 & 11, where logo, brand & packaging design and the launch of new products is key when students complete the NEA Coursework in Year 11.</p>	<p>GCSE D&T is taught in Year 10 & 11, where electronics is taught as a specialist technical principle and can be incorporated into products such as specific desk lights, electronic games, and gadgets, etc. as part of the NEA Coursework, which students complete during Year 11.</p>
Career Links	<p>Good food and nutrition knowledge can lead to careers in the following areas: Dietician, Nutritionist, Chef, Food Technologist, Sports careers, primary teachers, nursing courses.</p>	<p>GCSE Electronics, A Level Product Design, College, Apprenticeships, Electrician, Engineer and CAD/CAM Designer.</p>	<p>Graphic Designer, Interior Designer, Architect & Product Designer</p>	<p>Electrician, Electrical Engineer, all aspects of Engineering & Product Design</p>