

What will students learn in each year?

In all years of Design & Technology, students learn how to use information and how to present ideas. They learn how to use drawing skills, materials/ingredients, tools and machines to make functional products, incl. properly prepared food. Knowledge and Skills with textiles are taught by the Art department.

Students learn how technology and food choices influence our lives. They learn how good design and food choices can make a positive difference. Each project is completed by following steps of the design cycle or cooking methods to produce high quality outcomes with commercial potential. In years 7 and 8, topics are taught in rotation.

Year 7 Design & Technology – 1 hr/week. Students design and make products / dishes for themselves.	
Intro	All students will sit a diagnostic test. You will learn organisational skills and about Health and Safety.
Topic 1	Welcome to D&T You will design and make a Nails and String artefact to learn basic skills with marking equipment, hand tools and a pillar drill. You will need to work neatly and will learn to use lots of key vocabulary. You will learn to use CAD software to draw an ornament to match a theme to do with the time in the year. The product will be cut out with the laser cutter. You will use rules of symmetry to create a tidy product. These topics link with Art and Maths.
Topic 2	Let's make some noise - Make a Clacker You will make a noisy rattle according to given instructions. You will learn to use more hand tools and use the pillar drill with more confidence. You will customise your Clacker with a laser cut decoration using more CAD skills. You will learn about type of timbers and you will need to work with accuracy to ensure a good fit. This topic links to Science, History and Religious Education
Topic 3	Wriggle - Wobble toy You will research, design and make a wooden toy with moving parts, inspired by animal skeletons. You will learn how design often mimics nature. You will use hand tools and machines to shape timber. You will apply surface finishing techniques to resemble your chosen animal. This topic links to Science.
Topic 4	Pull and Pop-up – Moving picture frame You will create a framed picture where, when you pull a string, something pops out the top or side. You will learn how directions of movement can be changed with linkages. You will design and model this first, to perfect your idea before making it from aluminium strip and clear plastic. This topic links to Science and Engineering.
Topic 5	Welcome to the kitchen! – Introduction to Food Technology. You will learn about the importance of healthy and varied diet. You will learn to use basic food preparation tools and equipment. You will learn to make healthy snacks and small dishes and start using the hob and the oven. This topic is linked to Business Studies and Biology.
Topic 6	Great British food. You will learn about the importance of energy balance and how to use nutritional information. You will extend your skills and you will use the hob and oven to prepare traditional British dishes.

	This topic is linked to Business Studies and Biology.
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Year 8 Design & Technology - 1 hr/week. - Students design and make products for their own social groups.	
Topic 1 – One term	<p>Smooth 'n' Shiny - Enameling bugs</p> <p>You will design and make a decorative bug reflecting your research. You will cut and shape copper plate and apply enameling powder. You will learn to recognise and describe different 'design movements' and learn about the use of enameling and copper in industry.</p> <p>This topic links to Science and Art</p>
Topic 2 – One term	<p>Night light - Edge lit plastics</p> <p>You will learn to use basic electronic components to create a light that comes on automatically when it goes dark. You will learn to recognise and draw electronic components. You will learn how to solder safely and you will use computer modelling to develop what you learnt about circuits in primary school. You will also use the laser cutter and you will cut wood joints to make a box to keep your circuit board safely inside. The light will come out of the side of a flat piece of plastics that you will design and make with the laser cutter.</p> <p>This topic links to Science and Electronic Engineering.</p>
Topic 2 – Two terms	<p>It's blowing in the wind - Whirligigs and wind turbines</p> <p>You will research and learn about forms of sustainable energy and especially wind turbines, since they are close to our school. You will research, design and make a whirligig. That's a fun product for in the garden that has a propeller linked to a crank to make something move up and down. You will need to work with precision and be ready to do some problem solving.</p> <p>This topic links to Art, Science and Engineering.</p>
Topic 3 – Two Terms	<p>Junior chef!</p> <p>You will learn to produce dishes that are influenced by availability, season, need and cost. You will learn about and produce dishes that reflect different cultures and religions. You will design, plan and create your own savoury dishes that consider dietary needs.</p> <p>This topic is linked to Business Studies and Biology.</p>

Year 9 Design & Technology - 2 hrs/week – Students design and make for commerce.	
Term 1	<p>3part mystery puzzle You will create a 3 part puzzle that seems impossible to take apart or put together. You will create blister packaging so that the product can be sold in shops or online. You will work as a production cell to ensure high quality outcomes. You will learn about industrial processes and about quality assurance & quality control. This topic is linked to Business Studies.</p>
Term 2	<p>Now ... you can see me - Programmable wearable electronics You will learn to programme a microprocessor using input, processing and outcome command to create a circuit board that can be worn on clothing/bags so that you can be seen when you are out and about in the dark. You will learn to create a variety of patterns for different situations. This topic links to Electronic Engineering and Social Sciences.</p>
Term 3	<p>Every part will be the same - From prototype to mass production. You will learn that every product starts as a prototype before it gets produced in volume, with consistent high quality. You will design and make a cookie cutter that will be made with the 3D printer. You will design and make small object of choice (key fob, pendant) that will be injection moulded and cast in metal. This topic links to Business Studies, Manufacturing and Food Technology.</p>
Term 4	<p>Animated toy You will learn how we can use cams, pulleys and gears to generate a range of movement with differing speeds and directions. You will use materials, tools and equipment to shape part appropriate to your design. You will learn how to calculate output velocities and directions from given inputs. This topic is linked to Maths and Mechanical Engineering.</p>
Term 5	<p>Pull the plug? Design for people with handling impairments. You will investigate differences in human hand sizes and will learn what issues some people have with holding everyday objects. Disassemble, investigate and then safely wire-up a common 3-pin electrical plug. Test it in a low voltage circuit. Re-design it to better suit people with handling impairments so that it can be plugged in and pulled it out more easily. These topics are linked to Biology, Social Sciences and Engineering.</p>
Term 6	<p>Wet and Windy – Using pneumatics and hydraulics. You will investigate the use of air pressure and fluid pressure in machines, equipment and vehicles. You will learn to calculate how input force can be multiplied to increase strength when using water. You will design and make hydraulic robot arm to move objects with precision. This topic is linked to Science, Maths and Engineering.</p>

	Year 9 Food Technology - 2 hrs/week
Term 1	Carbohydrates. You will learn about staple foods and the role that carbohydrates have in the diet; different types of carbohydrates and where these foods come from; the function and working properties of sugars and starches. You will learn how to cook with and prepare these ingredients to make Breads, Pastries, Pasta, Sauces Links with science and maths
Term 2	Proteins. You will learn which foods contain protein and why the biological values are important and the role of protein in the diet. You will learn about plant bases and animal based foods and the reasons for dietary choice. You will learn about the effect of heat on protein as you learn to cook these foods including Fish, Meats, Soy, Quorn in a wide range of exciting dishes Links with science, maths and geography
Term 3	Fats. This term you will learn why fats have an important role in a healthy diet and the difference between 'good' and 'bad' fats, and where fats come from both visible and invisible. Fats have many functions and different working properties, and you will learn about these through cooking a variety of dishes using dairy products, oils, etc. Links with science and maths
Term 4	Vitamins and minerals. These micronutrients play an important role in good nutrition and you will learn the foods that are good sources of the main ones. You will learn how to maximise their function by using different styles of cooking and food combinations. Links with science and maths
Term 5	Methods of cooking This term you will explore a wide variety of cooking methods and understand why different methods suit different foods. You will learn about wet and dry methods from grilling to deep fat frying, from baking to boiling on a variety of foods Links with science and maths
Term 6	Food manufacture. Increasingly people are interested or concerned about how the food they eat is produced and during this unit of work you will learn about where your food comes from and how changes make some foods fit to eat by processing or cooking Links with science, maths and geography

Key Stage 4 Design and Technology

Year 10 – 3 hrs/week

Exam Board: WJEC EDUQAS GCSE (9-1) in DESIGN AND TECHNOLOGY - QAN: 603/1121/6

Exam Board: AQA GCSE in Art and Design, Three-Dimensional Design - QAN: 601/8088/2

In Year 10 the Department offers two pathways. The topics students study and the product they make are largely the same but the Design and Technology pathway includes dedicated theory time related to a written examination in Year 11, whilst Three-Dimensional Design has more experimentation without the need to prepare for a written examination. In both pathways students are encouraged to use a wide range of tools and equipment independently. Designs may change as products take form, and students have to evidence reasoned decisions about that. At the end of Term 5, final decisions for the student's pathway in Year 11 will be made.

Term 1	<p>Project: <u>Ornamental metal work.</u> Design, model and create an attractive and functional product from steel strip and sheet metal using hand tools and metal forming equipment. Explore commercial viability.</p> <p>Theory: Ferrous, non-ferrous metals and alloys. Sources, origin, manufacture, working properties, stock forms and surface finishes.</p>
Term 2	<p>Project: <u>Timber side table.</u> Create a side table from a given technical drawing by cutting wood joints and shaping timber using traditional hand tools and some power tools. Customise the table top and apply a suitable surface finish.</p> <p>Theory: Natural and manufactured timbers. Woodworking techniques, adhesives, fixtures and fitting, surface finishes.</p>
Term 3	<p>Project: <u>Adapted (Tooth) brush handle.</u> Using modelling materials, create a (tooth) brush handle that is better suited for people with for people with handling impairments.</p> <p>Theory: Papers and Card. Drawing techniques. Foam modelling techniques. Computer Aided Design. Anthropometrics and Ergonomics. Developments in modern and smart materials, composite materials and technical textiles.</p>
Term 4	<p>Project: <u>Clocks inspired by architecture.</u> Investigate traditional and modern architecture and create a wall /mantle/bedside clock which reflects a design style or movement. Use hand tools, machines and thermoforming equipment to shape thermoplastic polymers</p> <p>Theory: Investigating the work of other designers. Thermosetting and Thermoplastics polymers classification and methods of work.</p>
Term 5	<p>Project: <u>Alarm in a box.</u> Design a box using CAD software and make it using Computer Aided Machinery (laser cutter, CNC mill, 3D printer). Use programmable electronic components to make an alarm circuit and house this in the box.</p> <p>Theory: Electronic circuits and programmable components. Mechanical Components and devices. Determine changes in directions, establish gear ratios and calculate RPM</p>
Term 6	<p>Non-Examined Assessment (NEA) - AO1: <u>Identifying and Investigating Design Possibilities.</u> <u>Developing a Design Brief and specification.</u></p> <p>Theory: The role of the designer. Understanding the user's needs. Collecting and analysing data. Evaluating existing products. Environmental considerations. Social and economic challenges.</p>

Year 11 – 3 hrs/week

Exam Board: WJEC EDUQAS GCSE (9-1) in DESIGN AND TECHNOLOGY – QAN: 603/1121/6

In Year 11, students design, manufacture and test a prototype for a product that addresses a real world need, identified at the end of year 10. This Non-Examined Assessment project is documented in a portfolio and counts as 50 % of their final grade. The other 50% comes from their final examination. For one part of the examination students must revise a chosen material, in-depth.

Term 1	<p>NEA - AO2 Generating and Developing Design Ideas: Create sketches and make models using card, foam and 3D CAD models. Create a technical drawing with a parts list/ Bill of Materials.</p> <p>Theory: The impact of new and emerging technologies on industry and enterprise. New and emerging technologies Vs Design decisions. Energy generation and storage. Planning techniques.</p>
Term 2	<p>NEA- AO2 - Manufacturing a Prototype: Independently manufacture a prototype from selected materials following your own time bound plan with quality checks.</p> <p>Theory: Sources, origin and properties, in depth. Stock forms and sizes. Specialist techniques.</p>
Term 3	<p>NEA- AO2 - Manufacturing a Prototype: Independently manufacture a prototype from selected materials following your own time bound plan with quality checks.</p> <p>Theory: Scales of production. Surface treatment and finishes.</p>
Term 4	<p>NEA - AO3 Analysing and Evaluating Design decisions and prototypes: Testing the performance of your prototype against original expectations. Evaluation of successes/struggles at every stage of the NEA. Proposals for further development of the prototype.</p> <p><i>Final draft of NEA portfolio.</i></p> <p>Exam revision</p>
Term 5	Final examination
Term 6	N/A

Year 11 – 3 hrs/week

Exam Board: AQA GCSE in Art and Design, Three-Dimensional Design - QAN: 601/8088/2

Term 1-3	<p>Component 1: A portfolio that in total shows explicit coverage of the four assessment objectives. This includes a sustained project responding to a given brief that shows a development from exploration to the practical realisation of functional and aesthetically pleasing artefact. This work is a unique piece that reflects the student's interests, views and emotions.</p> <p>Assessment: No time limit - 60% of GCSE. Non-exam assessment (NEA) set and marked by the school and moderated by the exam board during a visit.</p>
Term 3-5	<p>Component 2: A portfolio that is a design and make response that is a justified personal interpretation of a theme set by the exam board, covering all four assessment objectives.</p>

<p>Assessment: Preparatory period followed by 10 hours of supervised time - 40% of GCSE. Non-exam assessment (NEA) set by the exam board, marked by the school and moderated by the exam board during a visit.</p>
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Key Stage 4 Food Preparation and Nutrition

Year 10 – 3hrs/week

Exam Board: WJEC EDUQAS GCSE (9-1) in Food Preparation and Nutrition – QAN: 601/8085/7

Term 1	<p>Learning will be about fruit and vegetables including potatoes. This will include farming and processing. Nutritional values and dietary requirements. You will learn to cook a variety of dishes using these ingredients. These may include Chow Mein, Cottage pie, Carrot cake.</p> <p>Links with Geography and Science</p>
Term 2	<p>This term learning will focus on milk, cheese and yogurt and you will prepare dishes to support knowledge of these commodities. You will understand how these foods are produced and about local versus imported. You will make cheese yogurt and cream and learn the science behind production.</p> <p>Links with Geography and Science</p>
Term 3	<p>Cereals including flours, bread, pasta and breakfast cereal are the commodity this term. You will learn about different grains, how they are grown and how they are different and how to use them. You will learn how to cook a range of dishes such as Samosas, Ravioli, enriched doughs and pastry.</p> <p>Links with Geography, Science</p>
Term 4	<p>The commodities featured this term are meat fish poultry and eggs. You will learn how to cook with these foods and how the structure of protein is changed through making dishes such as meringues, chicken goujons, curry, Thai fish cakes and sweet chilli sauce. Other topics covered will be the moral and religious considerations around meat eating, and dietary requirements.</p> <p>Links with Geography, Science, PSHE</p>
Term 5	<p>Learning this term focuses on butter, Oils, sugars and syrups. You will learn about the properties of different fats and the nutritional values. The empty calories in sugars and syrups. Cooking will include puff pastry, sauces, Swiss roll. There will be a practice NEA research task on one of these products to prepare for year 11</p> <p>Links with Geography, Science, PSHE</p>
Term 6	<p>In a world where food production is changing this term you will learn about soya, tofu, beans, nuts and seeds. You will cover allergies, nutrition, why these products have become more popular and how to cook them including Lentil and Bean bolognaise or Chilli, Tofu curry</p> <p>Links with Geography, Science, PSHE</p>

Year 11 – 3hrs/week	
Exam Board: WJEC EDUQAS GCSE (9-1) in Food Preparation and Nutrition – QAN: 601/8085/7	
Term 1	NEA task is released on 1 st September, this will involve a 3 hour practical exam where you will need to cook 2 dishes plus accompaniments plus of course all background research. This may be subject to change. Dates for practical lessons will be set. The second focus this term will be on food safety and hygiene and food preservation
Term 2	NEA ongoing. Commodities including grains fats and sugars will be covered, you will revise how these foods are produced. The functional and working properties and ways of cooking these foods. The intent is to include practical lessons to help with learning.
Term 3	Protein foods this term both animal and plant based will be re-visited. This will include production, provenance, sustainability, moral and religious considerations. Again there will be cooking to reinforce understanding, particularly regarding the effect of heat on protein and about fruit and vegetables
Term 4	Cooking methods including how heat is transferred: radiation, conduction, convection, dry and wet styles of cooking. Why food is cooked. The most suitable methods for different foods
Term 5	Nutrition, age and activity daily requirements, The role of macro and micro nutrients on the body, Best food sources. Special diets.
Term 6	N/A