



## DESIGN TECHNOLOGY

### **Why is the study of Design and Technology important?**

Design and Technology is a practical and valuable subject. It enables students to actively contribute to the creativity, culture, wealth and well-being of themselves, their community and their nation. It teaches students how to take risks and become more resourceful, innovative, enterprising and capable. Students develop a critical understanding of the impact of design and technology on daily life and the wider world. Additionally, it provides excellent opportunities for students to develop and apply valued judgements of an aesthetic, economic, moral, social, and technical nature both in their own designing and when evaluating the work of others.

The Year 7&8 subjects at Outwood Academy Shafton is split up into the following categories:

- **Food technology:** Develop practical skills with an good understanding of health, safety and hygiene.
- **Graphics:** Learn how to use 2D and 3D modelling programs to design and make a range of products.
- **Resistant materials technology:** Work with materials including metals, plastic, wood, and use them to make interesting products.

### **What skills will the study of Design and Technology teach you?**

Design and Technology applies knowledge, skills and understanding from within the subject itself, and also a wide range of other sources such as science and mathematics. Design and Technology will teach you to:

- Develop resilience by not being afraid of challenges when solving problems, but to break them down and keep trying.
- Be creative in developing solutions to real world problems.
- Use modelling and annotated sketches to develop and communicate ideas.
- How to act responsibly within a practical environment thinking of the safety of yourself and others.
- Identify how to competently use a range of practical techniques across a range of disciplines.
- Apply and use CAD/CAM equipment to design and manufacture a range of products /components considering scale of production and precision.
- Work independently and part of a team to solve complex problems.
- Construct reasoned arguments to ethical, social and moral problems that have arisen due to technology and communicate these effectively.
- Identify links between different materials and contextual references.
- Test, evaluate and refine ideas and products against a specification, taking into account the views of intended users and other interested groups.

### **Food Technology**

- Understand and apply the principles of nutrition and health.
- Cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet.
- Become competent in a range of cooking techniques e.g. selecting and preparing ingredients: using utensils and equipment, applying heat in different ways: awareness of taste, texture and smell to decide how to season dishes and combine ingredients, adapting and using their recipes.
- Understand the source, seasonality and characteristics of a broad range of ingredients

### **What will you know and understand from your study of Design and Technology?**

- How to classify materials and discuss their physical properties.

- How to use simple electronic circuits incorporating inputs and outputs.
- How to manufacture products with reference to their material's physical properties.
- How to use and adjust equipment and machinery depending on the task.
- Use learning from science and mathematics to help design and manufacture components and products.
- To consider the influence of a range of lifestyle factors and consumer choices when designing and analysing products.
- To know and understand additional factors to consider such as ergonomics, anthropometrics or dietary needs.
- To use a variety of approaches, for example biomimicry and user-centred design to generate creative ideas and avoid stereotypical responses.
- to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment.

### **Food Technology**

- the principles of nutrition and health including energy, nutrients, water, fibre, diet and health and nutritional needs throughout life and the risks of an unbalanced diet.
- A repertoire of predominantly savoury dishes in line with the principles of the eatwell guide.
- To feed oneself taking into account personal preference, socio-economic aspects, nutritional and health needs.
- Healthy and varied diets as depicted in the eat-well plate and 8 tips for healthy eating.
- To explore the origin and product of food products and ingredients.
- To study a range of food commodities.
- To develop a range of preparation, cooking and presentation skills.
- To prepare and cook safely, preventing food poisoning.
- To explore the effect of advertising, marketing and packaging on food choice.

### **How does your study of Design Technology support your study in other subjects?**

Design Technology develops a number of skills that will support students' study of other subjects, as so many of the skills they will acquire in Design Technology are transferable. Design Technology disciplines will develop their focus, resilience, self-expression, teamwork, mathematical skills and problem solving and communication skills, which will help students in **all** of their other subjects. It will give students an opportunity for creative expression and practical thinking and encourage them to think about how to improve designs and encourage healthy eating. Some students may take this even further and discover a subject that provides them with a life-long hobby or career that enhances their life for years to come. All students will gain an understanding of healthy diets etc. The ability to think creatively and problem solve are crucial in Engineering, Mathematics and Science. It will foster an interest and skill in cooking and may lead to study of subjects such as catering etc.

### **How can you deepen your understanding of Design Technology?**

To enhance students' work in lessons, there will be times when we explore the professional workplace and wider design practices and materials. This will deepen their understanding of professional work and introduce them to new techniques and ideas. Students will also have the opportunity to deepen their understanding of Design Technology disciplines through extracurricular opportunities, where they can continue to develop their creative ideas, or work on specific design projects. During enrichment clubs, students will have the opportunity to meet enthusiasts from other year groups, where they can share ideas, critique each other's work and continue to develop their technique.

There may also be an opportunity to participate in trips to local restaurants and have visiting speakers from a range of industries relating to technology, as well as exhibiting their own work within the Academy. Occasionally, there will be opportunities to enter national or Trust competitions to gain additional audiences and recognition for their work such as the Rotary club tournament.

### **How are you assessed in Design Technology?**

Throughout the 5 years in Design Technology students are assessed using the following assessment objectives which ensure that they can cumulatively build their subject understanding in preparation for future GCSE and A Level study. There are 6 assessment points each year that we term Praising Stars©. In the lower years before certificated study we assess how students are performing against age related expectation and as students' progress on to Level 1 and 2 courses such as GCSE and BTEC we assess how their current stage of study reflects how they are on track to reach their end of KS4 targets which are formulated on aspirational expectation from their KS2 starting points. For both lower and upper years we make an informed prediction from our holistic assessments based on our subject mapping of expectation across the Design Technology curriculum.

### **How can Design Technology support your future?**

Of course, we offer **GCSE Level courses**, and we encourage students to continue study in this fantastic subject. Yet we know that choice and personal interest are important aspects of worthy study. Whether students have continued their study of a discipline of Design Technology into GCSE or A level or not they will have gained access to this wide enriching subject and its study of the various disciplines will have taught them to think differently and deeply.

Design courses are offered at most prestigious universities and there are many technical and vocational qualifications that can be studied in engineering, product design, graphics, electronics, catering, nutrition etc. as well as routes into apprenticeships etc. The very fact that students have been able to study creative thinking, problem solving, planning and design principles will help their future application be they for colleges, universities, apprenticeships or employment. Careers linked to Design Technology:

- Product Designer, Civil engineer
- Quantity Surveyor, Graphic Designer
- Fashion Designer, Branding designer
- Software Engineer, Catering
- Nutritionist, Food technologist
- Manufacturing Engineer / manager
- Architect, Construction
- Aerospace engineer

The list is infinite as study of Design Technology opens up a world of opportunities.

### KS3 Programmes of Study for Design Technology

Design	Make	Evaluate	Technical Knowledge
<p>Use research and <b>begin to explore</b>, such as the study of different cultures, to identify and <b>begin to understand</b> user needs.</p> <p>To identify and solve issues within a design development task.</p> <p>Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of uses.</p> <p>Use a variety of influences, to generate creative ideas and avoid stereotypical responses.</p> <p>Use 2D and 3D to model and develop their ideas.</p> <p>Use CAD software to validate their designs in advance of manufacture.</p> <p>Develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and</p>	<p>Select from a wider, more complex range of materials and components, taking into account their properties.</p> <p>Make simple use of planning tools for instance Gantt charts, communicate their plans clearly so that others can implement them.</p> <p>Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives.</p> <p>Make independent choices when selecting and using CAD/CAM to manufacture products/components and apply surface finishing techniques to increase the standard of quality.</p> <p>Follow procedures for safety and understand the process of risk assessments.</p> <p>Make independent choices when selecting and using a broad range of manufacturing techniques including hand</p>	<p>Select appropriate methods to evaluate their products in use and modify them to improve performance.</p> <p>Produce short reports making suggestions for improvements.</p> <p>Evaluate products that they are less familiar with using themselves.</p> <p>Evaluate products considering life cycle analysis.</p> <p>Evaluate how products can be developed considering the concept of cradle to grave.</p> <p>Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups.</p> <p>Evaluate new and emerging technologies.</p>	<p>How to apply computing and use electronics to embed intelligence in products that respond to inputs.</p> <p>How to control outputs such as actuators and motors.</p> <p>How to use software and hardware to develop programmes and transfer these programmable components for example, microcontrollers.</p> <p>How to make use of microcontrollers in products they design and manufacture themselves.</p> <p>How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines.</p> <p>Use learning from science and maths to help design and make products that work.</p>

<p>digital presentations and computer-based tools.</p> <p>Consider additional factors such as ergonomics and anthropometrics.</p>	<p>craft skills and machinery to manufacture products precisely.</p> <p>Apply a range of finishing techniques to a broad range of materials.</p>	<p>Evaluate an increasing range of designers, engineers, technologists and manufacturers and be able to relate their products to their own designing and making.</p>	<p>Understand the properties of materials, including smart materials, and how they can be used to advantage.</p>
<p>Use research, such as the study of different cultures, to identify user needs.</p> <p>Be able to outline a simple specification to inform design ideas and guide their thinking.</p> <p>Use 2D packages to model their ideas.</p> <p>Produce models of their ideas using CAM to test ideas.</p> <p>Be able to independently generate creative ideas informed by stimulus using annotations to explain key features relating to brief/specification.</p> <p>Consider additional factors such as ergonomics and anthropometrics.</p>	<p>Produce ordered sequences and schedules for manufacturing products they design detailing resources required. Make use of specialist equipment to mark out materials.</p> <p>Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives.</p> <p>Select and use CAD/CAM to manufacture products/components and apply surface finishing techniques to increase the standard of quality.</p> <p>Investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials.</p> <p>Follow procedures for safety and understand the process of risk assessments.</p> <p>Select and use a broad range of manufacturing techniques including hand craft skills and machinery to manufacture products precisely.</p> <p>Apply a range of finishing techniques to a broad range of materials.</p>	<p>Evaluate their products against their original specification and identify ways to improve them.</p> <p>Actively involve others in the testing of their products.</p> <p>Evaluate products through disassembly to determine how they are constructed and function.</p> <p>Evaluate the positive and negative impact that products can have in the wider world.</p> <p>Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups.</p> <p>Evaluate new and emerging technologies.</p> <p>Evaluate an increasing range of designers, engineers, technologists and manufacturers and be able to relate their products to their own designing and making.</p>	<p>How to classify materials by structure e.g hard words, soft wood, ferrous and non-ferrous, thermoplastics and thermosetting plastics.</p> <p>Consider the physical properties of materials. e.g brittleness and malleability.</p> <p>How to use simple electronic circuits incorporating inputs and outputs.</p> <p>How materials can be cast in moulds.</p> <p>Make use of sensors to detect heat, light etc such as thermistors and light dependent resistors.</p> <p>How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines.</p> <p>Use learning from science and maths to help design and make products that work. Understand the properties of materials, including smart materials, and how they can be used to advantage.</p>

### KS3 Programmes of Study for cooking and nutrition

<b>AO1: Understand health and safety relating to food and cookery</b>	<b>AO2: Understand and apply the principles of nutrition and health</b>	<b>AO3: Understand the source, seasonality and characteristics of a broad range of ingredients</b>	<b>AO4: Understand factors relating to food choice (so that they are able to feed themselves and others a healthy and varied diet).</b>	<b>AO5: Develop practical cooking skills (so that they become competent in a range of cooking techniques and able to cook a repertoire of predominantly savoury dishes)</b>
<p>Know and understand how to identify risks (food poisoning, cross contamination) and minimise hazards in the cooking environment.</p> <p>Know and understand the difference between use by and best before dates)</p> <p>Know and understand the principles of safe storage, cooking and reheating foods.</p>	<p>Know and understand how nutritional requirements differ for specific groups of people (Life stages, allergies and intolerances)</p> <p>To understand how nutritional information and allergy advice on food packaging can be used to help make healthy choices (traffic lights).</p>	<p>Know and understand how ingredients have different effects in a recipe and be able to describe the sensory, nutritional and physical functions of ingredients in recipes.</p>	<p>Know and understand the range of cultural and ethical factors that determine food choices:</p> <p>Religion Vegetarian/vegan Fair trade Animal welfare Advertising/marketing.</p>	<p>Learners will make dishes of increasing complexity that further develop their food preparation and cooking skills and use a range of commodities.</p> <ul style="list-style-type: none"> <li>-Making/shaping doughs</li> <li>-Sauce making</li> <li>- Blending</li> <li>- Frying</li> <li>-Whisking</li> <li>-Seasoning</li> <li>-Test for readiness</li> </ul>

<p>Know and understand safe and hygienic working practices and the practical steps they can take to remain safe and hygienic.</p> <p>Know and understand safe preparation, usage, cleaning and storage of utensils and equipment</p>	<p>Know and understand what is meant by a balanced diet using the current UK dietary recommendations (Eatwell guide and 8 Tips)</p> <p>Know the sources and understand the functions of the nutrients that make up a balanced diet</p> <p>Know and understand the importance of exercise and energy balance in maintaining a healthy weight.</p>	<p>know and understand the main food groups and examples of foods for each group (cereals, fruit, vegetables, meat, fish, eggs, fats/oils, milk/dairy food products)</p> <p>Know and understand that foods come from a range of sources (caught, reared, grown).</p> <p>Know and understand that raw ingredients are processed to create food products (primary, secondary processing)</p>	<p>Know and understand the range of social and environmental factors that determine food choices:</p> <p>Personal/family preference</p> <p>Availability (seasonal/locality)</p> <p>Food miles</p> <p>Organics</p> <p>Food waste</p> <p>Packaging and recycling</p>	<p>Learners will be able to demonstrate a range of basic food preparation and cooking skills using a variety of food commodities</p> <ul style="list-style-type: none"> <li>- Weighing/measuring</li> <li>- Knife skills (bridge/ claw)</li> <li>- Peeling</li> <li>- Segmenting</li> <li>- Boiling</li> <li>- simmering</li> <li>- Rubbing in</li> <li>- Creaming</li> <li>- all-in-one</li> <li>- Melting</li> <li>- Folding</li> <li>- Baking</li> </ul>
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**DESIGN TECHNOLOGY KEY STAGE 3 CURRICULUM PROGRESSION OVERVIEW OUTWOOD ACADEMY SHAFTON**

	<b>YEAR 7</b>	<b>YEAR 8</b>	<b>YEAR 9</b>
	<p><b>Year 7 D&amp;T</b></p> <p>Students will have 1 hour of D&amp;T a week which will be split over the different elements of D&amp;T to ensure a broad curriculum is achieved where the key focus is learning about <b>core materials</b>. Students operate on a carousel system throughout the academic year.</p>	<p><b>Year 8 D&amp;T</b></p> <p>Students will have 2 hours of D&amp;T a week which will be split over the different elements of D&amp;T to ensure a broad curriculum is achieved where the key focus is developing <b>design</b> skills / strategies whilst building on their technical knowledge.</p>	<p><b>Year 9 D&amp;T</b></p> <p><b>Creative :</b> Students will have 1 hour a week on a carousel system studying Hospitality and Catering, Photography and Product Design in preparation for GCSE..</p>
Food Rotation	<p><b>Theory</b> Hygiene and Safety Equipment Eatwell guide Food Poisoning</p> <p><b>Practical Lessons</b> Choco coco truffles danish sausage rolls eatwell guide banana buns Pizza whirls Fruit crumble Flapjack</p>	<p><b>Theory</b> Food Poisoning Bacteria Food Storage Cooking and reheating 8 tips Allergies and intolerances Commodities Food and religion Vegetarianism Fairtrade and animal welfare Advertising</p> <p><b>Practical Lessons</b> Macaroni cheese Dutch apple cake Pear tray bake Spaghetti bolognese Chelsea buns Garlic bread Raspberry buns Savoury scones Millies cookies Tandoori wrap</p>	<p><b>Theory</b> The Hospitality and Catering Industry Accommodation Job Roles Type os services Technology Equipment</p> <p><b>Practical Lessons</b> Burger in a bun Margarita pizza Sausage roll casserole chicken curry Apple gilets Cheesy garlic whirls</p>



		Marmalade buns Pasta bake	
Resistant Materials Rotation	<b>Mirror Project</b> Health and safety Cutting and shaping woods CAD/CAM assembly of mirror Painting Evaluation	<b>Balancing Toy</b> Measuring and marking out wood Cutting, shaping and drilling woods and polymers Assembly techniques Finishing techniques CAD/CAM Evaluation	<b>Bottle Opener</b> Product analysis Designing - ergonomics Modelling Cutting and shaping woods Assembly Evaluation
Graphics Rotation	<b>Chocolate Bar Project</b> Design Specification Sensory Analysis Photoshop Designing Lettering and effects Vacuum forming mould Assembly of final product Evaluation	<b>Memphis Light</b> Design specification Geometric shapes Designing Photoshop 2D design Electronics Assembling light Evaluation	<b>Pop Art Speaker Project</b> Design Brief & Product Analysis Design Specification & Mood Board Design Development CAD Design Electronics Assembling Speaker Evaluation

Please see Hospitality and Catering/Design Technology - Product Design for KS4 subjects.