



DESIGN TECHNOLOGY

Design Technology

Why is the study of Design and Technology important?

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

The subject at Outwood Academy Riverside is split up into the following categories:

- **Food technology:** Design recipes and create food products while learning about nutrition.
- **Resistant materials technology:** Work with materials like 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.

- Understand and apply the principles of nutrition and health.
- Cook a repertoire of sweet and 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 manufacture products with reference to their materials 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 evaluate their work against an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their product to their own designing and making.
- To evaluate products through disassembly to determine how they are constructed and function and consider the life cycle analysis.
- To competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment.
- 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 consider how seasons may affect the food available.
- To consider the function, nutrient profile and sensory attributes of ingredients.
- To study a range of food commodities eg. cereals, fruits, vegetables, meat, fish, eggs, fats/oils, milk dairy food products.
- To develop a range of preparation, cooking and presentation skills.
- To plan menus for a range of individual and nutritional needs.
- To prepare and cook safely to prevent 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 your study of other subjects, as so many of the skills you will acquire in Design Technology are transferable. Design Technology disciplines will develop your focus, resilience, self-expression, teamwork, mathematical skills and problem solving and communication skills, which will help you in **all** of your other subjects. It will give you an opportunity for creative expression and practical thinking and encourage you to think about how to improve home designs and encourage healthy eating etc. 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 your work in lessons, there will be times when we explore the professional workplace and wider design practices and materials. This will deepen your understanding of professional work and introduce you to new techniques and ideas.

You will also have the opportunity to deepen your understanding of Design Technology disciplines through extracurricular opportunities, where you can continue to develop your creative ideas, or work on specific design projects. During enrichment clubs, you will have the opportunity to meet food enthusiasts from other year groups, where you can share ideas, critique each other's work and continue to develop your technique.

There may also be an opportunity to participate in trips as well as exhibiting your own work within the Academy. Occasionally, there will be opportunities to enter national or Trust competitions to gain additional audiences and recognition for your work.

How are you assessed in Design Technology?

Throughout the 5 years in Design Technology you are assessed using the following assessment objectives which ensure that you can cumulatively build your subject understanding in preparation for future study both in and after Academy life. 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 GCSE 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 judgement from our holistic assessments based on our subject mapping of expectation across the Design Technology curriculum.

Assessment Objectives Design and Technology

	Design	Make	Evaluate	Technical Knowledge
Y8	<p>Use research and begin to explore, such as the study of different cultures, to identify and begin to understand 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>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>Select appropriate methods to evaluate their products in use and modify them to improve performance.</p> <p>Produce shorts 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</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>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 digital presentations and computer-based tools.</p> <p>Consider additional factors such as ergonomics and anthropometrics.</p>	<p>Make independent choices when selecting and using 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>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>Understand the properties of materials, including smart materials, and how they can be used to advantage.</p>
Y7	<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 models for their ideas.</p>	<p>Produce ordered sequences and schedules for manufacturing products they design detailing resources required.</p> <p>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>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>How to classify materials by structure e.g hard woods, soft wood, ferrous and non-ferrous, thermoplastics and thermosetting plastics.</p> <p>Consider the physical properties of materials. E.g brittleness malleability.</p> <p>How to use simple electronic circuits incorporating inputs and outputs.</p> <p>Consider textile fibre sources eg. natural and synthetic.</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>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 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 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.</p> <p>Understand the properties of materials, including smart materials, and how they can be used to advantage.</p>
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Assessment Objectives Cooking and Nutrition

KS3 Programmes of Study for cooking and nutrition Key messages, advice and explanatory notes (1-8) for schools	AO1: Understand health and safety relating to food and cookery (Explanatory note 2)	AO2: Understand and apply the principles of nutrition and health (Explanatory notes 1 &4)	AO3: Understand the source, seasonality and characteristics of a broad range of ingredients (Explanatory notes 5,7&8)	AO4: Understand factors relating to food choice (so that they are able to feed themselves and others a healthy and varied diet). (Explanatory note 3 &6)	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) (Explanatory note 2)
Year 9	Know and understand the factors that affect bacterial growth and their control (including temperatures) Know and understand the main causes of food contamination and the steps that need to be taken to prevent food poisoning.	Know and understand the causes and effects of an unbalanced diet Know and understand how to amend and develop a recipe to suit nutritional needs of individuals.	Know and understand how processing affects the physical, sensory and nutritional properties of foods.	Know and understand how economic factors determine food choices and nutritional health: High and low budgets effects of food poverty Know how to make informed choices about food from packaging and labelling.	Learners continue to develop their food preparation and cooking skills making complex dishes that meet the needs of users They are able to follow recipes independently. They are developing presentation and styling techniques.

<p>Year 8</p>	<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</p> <p>Vegetarian/vegan</p> <p>Fair trade</p> <p>Animal welfare</p> <p>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"> -Making/shaping doughs -Sauce making - Blending - Frying -Whisking -Seasoning -Test for readiness
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<p>Year 7</p>	<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"> -Weighing/measuring -Knife skills (bridge/ claw) -Peeling - Segmenting -Boiling/ simmering -Rubbing in -Creaming/ all-in-one - Melting - Folding - Baking
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How can Design Technology support your future?

Whether you have continued to study a discipline of Design Technology into GCSE or not you will have gained access to this wide enriching subject and its study of the various disciplines will have taught you 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 you have been able to study creative thinking, problem solving, planning and design principles will help your 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
- Illustrator
- Web design
- Town planning
- Teaching
- Jeweller
- Prop maker
- Animator
- Game designer
- Photographer

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

**DESIGN TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW OUTWOOD
ACADEMY RIVERSIDE**

	YEAR 7	YEAR 8	YEAR 9
	<p align="center">Year 7 D&T</p> <p>Students will have one hour of D&T a week which will be split between D&T and Cooking and Nutrition (theory and practical) to ensure a broad curriculum is achieved where the key focus is learning about core materials. Students operate on a carousel system throughout the academic year.</p>	<p align="center">Year 8 D&T</p> <p>Students will have one hour of D&T a week which will be split between D&T and Cooking and Nutrition (theory and practical) to ensure a broad curriculum is achieved where the key focus is developing design and manufacturing proficiency whilst building on their technical knowledge. Students operate on a carousel system throughout the academic year.</p>	<p align="center">Year 9 D&T</p> <p>Students will have one hour of D&T a week which will be split between D&T, Graphics and Cooking and Nutrition (theory and practical) to ensure a broad curriculum is achieved where the key focus is developing design and manufacturing proficiency whilst building on their technical knowledge. Students operate on a carousel system throughout the academic year.</p>
Resistant Materials	<p><u>Mobile Phone Holder Project</u></p> <ul style="list-style-type: none"> ● Health and Safety in a workshop - Knowledge and practical. ● Polymers and their properties ● Working with polymers to produce phone holder ● Timbers and their properties ● Working with manufactured board to produce sides ● Sustainability ● Evaluating designs 	<p><u>Decorative Lantern Project</u></p> <ul style="list-style-type: none"> ● Health and Safety in a workshop - Knowledge and practical. ● Product Analysis ● Working with timbers to produce wooden frame using dowel joints. ● Surface finishes for timbers ● Working with polymers to produce inside of lantern ● Isometric and Orthographic drawing ● Joining techniques to manufacture frame 	<p><u>Timber box and Lego project</u></p> <ul style="list-style-type: none"> ● Health and Safety in a workshop - Knowledge and practical. ● Product Analysis ● Working with timbers to produce wooden boxes using different dowel joints. ● Surface finishes for timbers ● Working with acrylic plastics ● Isometric and Orthographic drawing ● Joining techniques to manufacture boxes ● Vacuum former to shape acrylic.

	<p>Demonstrating the following skills;</p> <ul style="list-style-type: none"> ● Designing and design techniques ● Accurate Marking out ● Safe use of Coping Saws ● Safe use of Pillar Drills ● Safe use of Line Benders ● Identification of Man-Made, Hardwood and Softwood timber ● Safe use of Tenon Saw ● Safe use of Fret Saw ● Safe use of Belt Sander ● Introduction to CAD/CAM and laser cutter ● Wasting techniques ● Finishing techniques 	<ul style="list-style-type: none"> ● Line bending to shape acrylic. ● Electrical components and simple electronic circuits ● Evaluating designs <p>Demonstrating the following skills;</p> <ul style="list-style-type: none"> ● Designing and design techniques ● Accurate Marking out ● Critical thinking of existing products ● Technical drawing techniques ● Safe use of Coping Saws ● Safe use of Pillar Drills ● Safe use of Line Benders ● Safe use of Tenon Saw ● Safe use of Fret Saw ● Safe use of Vacuum Former ● Wasting techniques ● Finishing techniques ● CAD/CAM, 2D Design and laser cutter ● Safe use of Belt Sander ● Electronic components and circuits 	<ul style="list-style-type: none"> ● Graphic techniques for packaging ● 2D design computer programme ● Evaluating designs <p>Demonstrating the following skills;</p> <ul style="list-style-type: none"> ● Designing and design techniques ● Accurate Marking out ● Critical thinking of existing products ● Technical drawing techniques ● Safe use of Coping Saws ● Safe use of Pillar Drills ● Safe use of Line Benders ● Safe use of Tenon Saw ● Safe use of Fret Saw ● Safe use of Vacuum Former ● Wasting techniques ● Finishing techniques ● CAD/CAM, 2D Design and laser cutter ● Safe use of Belt Sander ● Electronic components and circuits
<p>- Cooking and Nutritio n</p>	<ul style="list-style-type: none"> ● Health, Safety and Hygiene in Food - Knowledge and Practical. ● Balanced Diets- The Eatwell Guide and 8 Tips. ● Understanding the main food groups. ● Know where our food comes from. ● Social and Environmental factors in food choices- Seasonality, Food Miles, Organic product and Food waste. 	<ul style="list-style-type: none"> ● Energy Balance- Nutrition and Exercise. ● Understanding how nutritional requirements differ for different people. ● Allergies and intolerances. ● Religious dietary needs. ● Packaging and recycling. ● Advertising and Marketing. ● Traffic light labelling. ● Understanding the sensory, nutritional and physical functions of ingredients. 	<ul style="list-style-type: none"> ● Energy Balance- Nutrition and Exercise. ● Understanding how nutritional requirements differ for different people. ● Allergies and intolerances. ● Religious dietary needs. ● Packaging and recycling. ● Advertising and Marketing. ● Traffic light labelling. ● Understanding the sensory, nutritional and physical functions of ingredients.

	<ul style="list-style-type: none"> • Vegan, Vegetarian and Pescetarian diets. • Know how raw ingredients are processed to create food products. • Use by and best before dates. • Safe Storage, cooking and reheating foods. <p>Demonstrating the following skills;</p> <ul style="list-style-type: none"> • Weighing/ Measuring • Knife Skills • Oven/ Grill management • Coating • Peeling • Boiling • Frying • Shaping • Simmering • Rubbing in • Baking • Blending • Segmenting • Test for readiness 	<ul style="list-style-type: none"> • Food poisoning. • Fair trade and Animal welfare. <p>Demonstrating the following skills;</p> <ul style="list-style-type: none"> • Creaming • All in One • Melting • Folding • Baking • Making/ Shaping dough • Sauce making • Whisking • Seasoning 	<ul style="list-style-type: none"> • Food poisoning. • Fair trade and Animal welfare. <p>Demonstrating the following skills;</p> <ul style="list-style-type: none"> • Creaming • All in One • Melting • Folding • Baking • Making/ Shaping dough • Sauce making • Whisking • Seasoning
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