# 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 so 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 Bydales is split up into the following categories:
- **Food technology:** Design recipes and create food products while learning about nutrition
- **Textiles:** Learn how to design, develop, manipulate and construct various textiles products
- **Design and Technology:** Work with materials like paper and board, metals, plastic, wood, and use them to make interesting products. Learn how to use 2D and 3D modelling programs to plan and design 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
- 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 the scale of production and precision
- Work independently and as 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 you are able to feed yourself 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; having an awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using your 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
- How to use learning from science and mathematics to help design and manufacture components and products
- How to consider the influence of a range of lifestyle factors and consumer choices when designing and analysing products
- Know and understand additional factors to consider such as ergonomics, anthropometrics or dietary needs
- How to use a variety of approaches, for example biomimicry and user-centred design to generate creative ideas and avoid stereotypical responses
- How to evaluate your work against an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate your product to their own designing and making
- How to evaluate products through disassembly to determine how they are constructed and function and consider the life cycle analysis
- How 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
- How to prepare a repertoire of predominantly savoury dishes in line with the principles of the eatwell guide
- How to feed yourself 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
- How to explore the origin and product of food products and ingredients
- How to consider how seasons may affect the food available
- How to consider the function, nutrient profile and sensory attributes of ingredients
- How to study a range of food commodities eg. cereals, fruits, vegetables, meat, fish, eggs, fats/oils, milk dairy food products
- How to develop a range of preparation, cooking and presentation skills
- How to plan menus for a range of individual and nutritional needs
- How to prepare and cook safely to prevent food poisoning
- How 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 and hone 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 a 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.

**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.

**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 assessment points each year that we term Praising Stars©. In Years 7 to Year 9 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.

The assessment objectives fall into four sections; design, make, evaluate and application of technical knowledge and follow the National Curriculum.

**Assessment Objectives Design and Technology**
Design
- use research and exploration, such as the study of different cultures, to identify and understand user needs
- identify and solve their own design problems and understand how to reformulate problems given to them
- develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations

- use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses
- develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools.

## Make
- select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture
- select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties.

## Evaluate
- analyse the work of past and present professionals and others to develop and broaden their understanding
- investigate new and emerging technologies
- test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups
- understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists.

## Technical Knowledge
- understand and use the properties of materials and the performance of structural elements to achieve functioning solutions
- understand how more advanced mechanical systems used in their products enable changes in movement and force
- understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]
- apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].

## Assessment Objectives Food and Nutrition
As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:
- 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 [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes]
- understand the source, seasonality and characteristics of a broad range of ingredients.

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

We offer the study of GCSE courses and encourage your continued study in this fantastic subject. Whether you continue to study a discipline of design technology or not, you will have gained access to this wide, enriching subject and 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, textiles, 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 and 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 endless as the study of design technology opens up a world of opportunities.

# DESIGN TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW - OUTWOOD ACADEMY BYDALES

| | YEAR 7 | YEAR 8 | YEAR 9 |
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| | Students will work through all three disciplines (Engineering, Textiles and Catering) during an academic year. This will depend on room and staff allocation and will be revised on a yearly basis. | Students will work through all three disciplines (Engineering, Textiles and Catering) during an academic year. This will depend on room and staff allocation and will be revised on a yearly basis. | Students will work through all three disciplines (Engineering, Textiles and Catering) during an academic year. This will depend on room and staff allocation and will be revised on a yearly basis. |
| Design and Technology | **Block Bot**<br>The focus of the project is to introduce the students to Design Technology and health and safety in the workshop.<br><br>● The students use iterative design principals that will be used in Design Technology in KS4<br>● Knowledge of other designers is used for inspiration and the differences in hard and soft wood will enable students to make informed decisions about products<br>● The students will extend their application of sketching and prototyping using more refined skills (scoring, building and accurate measuring)<br>● Health and safety in a workshop including risk assessments<br>● The students will use drawing skills for third angle orthographic projection that will be used in Engineering in KS4 using CAD<br>● The students will also cover basic connective systems including assembly and disassembly<br>● The students will design, make and evaluate their own Block Bot<br>● The students will produce an evaluation in comparison to a given brief. | **Wooden Litter Picker**<br>The focus of this project is to develop woodwork skills through the application of hand tools, machines and using CAD 2D design and the laser cutter.<br><br>● The students will use iterative design principals that will be used in Design Technology in KS4<br>● The students will analyse a brief and break down the task in terms of function, form, material requirements etc<br>● The students will extend their application of sketching and prototyping using more refined skills (scoring, building and accurate measuring)<br>● The students will use a mixture of hand tools, machinery and CAD/CAM and build a product that has been adapted<br>● The students will produce a detailed evaluation in comparison to a given brief. | **LED Light Project**<br>The focus of this project is to explore how products can be designed and produced for batch or mass production.<br><br>● The students will apply knowledge of the iterative design principles to select materials and components in response to the design brief<br>● The student will select specialist tools and equipment with the consideration of quality assurance and tolerances<br>● The students will design, make and evaluate their own LED light<br>● The students will produce a detailed evaluation in comparison to a given brief. |

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| **Food Technology** | **Introduction to Principles of Food & Nutrition**<br>● The students will cover health and safety in the kitchen. Introducing classroom routines, equipment, measuring out and washing up<br>● Introduction to bacteria through storage and temperatures<br>● Learning knife skills and demonstrating them by following health and safety<br>● Food provenance - fruit and vegetables<br>● Basic food and nutrition<br>● Students will learn cooking methods and develop them by making fruit crumble, biscuits and bread. | **Influences of Food Choices**<br>● Recapping health and safety and reinforcing classroom routines<br>● Understanding food poisoning, the 4 C's. Carrying out risk assessments and HACCP. Undertaking a practical exercise to demonstrate these skills<br>● Developing food and nutrition knowledge to be able to consider the impact of lifestage and specialist diets<br>● Develop understanding of food provenance and make savoury meals using a range of components. Using staple ingredients - wheat and rice<br>● Adapting recipes to suit individual needs<br>● Students will learn cooking methods and develop them by making Mediterranean vegetables and potato wedges, bruschetta, pasta carbonara and a dessert (brownie). | **World Cuisine**<br>● Building on health and safety knowledge to look at how food is produced and kept safe in the commercial industry<br>● Contaminants<br>● Quality assurance/controls<br>● Safe storage<br>● Cuisines from around the world and the cultural factors that influence them<br>● Culture/religion<br>● Availability<br>● Students will learn cooking methods and develop them by making a traditional British product, a nutritious bread product and produce nutritionally balanced snacks which could be served on a street food market in less than 40 minutes. |
| **Textiles** | **Emoji Pillow**<br>● The focus of the project is to introduce the students to Design Technology and health and safety in the textiles workshop<br>● Students learn about types of fibres, weave techniques, the design process, stitching, reducing waste material and time management<br>● The students will research existing products in order to inform their project<br>● The students will design, make and evaluate their own bespoke emoji pillow<br>● The project develops skills in a practical environment and links to progression routes in Art and Design, Engineering and Catering. | **Textile Wall Hanging**<br>● The focus of this project is for students to develop designing and sewing skills in which they will produce a final product for a target audience<br>● The focus of the project is to introduce students to different ways a designer will develop ideas to fit a textile brief<br>● Students will analyse a brief to make a wall hanging<br>● Students will begin with a research task to fully understand the theme they have chosen<br>● Students will complete a product analysis in terms of ACCESS FM and study a customer profile<br>● Students will learn how to use and safely and understand health and safety rules associated with a vinyl cutter, and stitching methods (hand and machine)<br>● The students will further extend their application of designing and Textile decoration methods. | **Upcycling - Tote Bag**<br>● The focus of this project is for students to be able to recycle old clothing and materials in which they will produce a final product which has been personalised for a target audience<br>● Students will develop and apply the knowledge, understanding and skills specified in themes relevant to textiles and art<br>● The students will research the design process and create a textile art final outcome<br>● The students will learn about 'fast fashion' paper patterns, using different stitches for different purposes, aids that can be used and how to increase product value<br>● The students evaluate the processes and develop a suitable final response<br>● The project develops skills in a practical environment and links to progression routes in Art and Design and DT. |