Design and Technology

Curriculum

Design and Technology

Purpose of study

Design and technology is an inspiring, rigorous, and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- Critique, evaluate and test their ideas and products and the work of others
- Understand and apply the principles of nutrition and learn how to cook.

Subject content

Key stage 1

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment]. When designing and making, pupils should be taught to:

Design

Design purposeful, functional, appealing products for themselves and other users based on design criteria

- Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.

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Make

- Select from and use a range of tools and equipment to perform practical tasks
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics

Evaluate

- Explore and evaluate a range of existing products
- Evaluate their ideas and products against design criteria

Technical knowledge

- Build structures, exploring how they can be made stronger, stiffer and more stable
- Explore and use mechanisms in their products.

Key stage 2

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [. When designing and making, pupils should be taught to:

Design

- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- Select from and use a wider range of tools and equipment to perform practical tasks accurately
- Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

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Evaluate

- Investigate and analyse a range of existing products
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- Understand how key events and individuals in design and technology have helped shape the world.

Technical knowledge

- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- Understand and use mechanical systems in their products
- Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- Apply their understanding of computing to program, monitor and control their products.

Cooking 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:

Key stage 1

- Use the basic principles of a healthy and varied diet to prepare dishes
- Understand where food comes from.

Key stage 2

- Understand and apply the principles of a healthy and varied diet
- Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques
- Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

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HCAT Design & Technology Disciplines

The HCAT Design & Technology Curriculum has been designed upon three main disciplines: food technology, textiles, and resistant materials. The HCAT Design & Technology Curriculum outlines the progressive curriculum content to be taught within each of these disciplines through the key concepts listed below, these key concepts are revisited between key stages to support children in knowing and remembering more, developing their substantive knowledge, and having opportunities to apply disciplinary understanding. At Upperwood Academy we teach all three disciplines every academic year and objectives are covered for each phase of school over a two-year-cycle these. Design & Technology objectives may be taught and evidenced discretely or as part of wider curricular subjects or opportunities.

HCAT Design & Technology Disciplines		
Food Technology	**Textiles**	**Resistant Materials**
Food Preparation	Design	Design
Cooking	Make	Make
Nutrition	Evaluate	Evaluate
		Technical Knowledge

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Food Technology	EYFS	KS1		LKS2		KS2	
		Cycle A	Cycle B	Cycle A	Cycle B	Cycle A	Cycle B
Food Preparation	I understand that I must wash my hands when preparing food.	I know how to prepare food safely and hygienically and can describe what this means. I know how to accurately weigh and measure my ingredients.	I know how to work in a safe and hygienic way. I know how to select ingredients for my food product. I know how to measure my ingredients by weight or quantity, using scales where appropriate.	I know how to produce a food product which uses a selection of ingredients to meet an identified need (e.g. lunchtime healthy snack healthy sandwich, low gluten). I know that different foods require storing in different ways.	I know how to select ingredients that complement one another as part of a recipe.	I know how a recipe can be adapted to change the appearance, taste, texture, and aroma.	I know how to use ratio and proportion to produce recipes of my food product, scaling up and down for different quantities.
Cooking	I know how to use a mixing bowl to prepare a mixture.	I know how to describe my food product using its properties: taste, smell, texture, and consistency. I know how to use techniques such as cutting, peeling, and grating. I know how to prepare simple dishes safely and hygienically without the use of a heat source.	I know how to describe my food product in terms of taste, flavour, texture and relate this to the intended purpose of the food. I know how to use techniques such as cutting, peeling, grating, spreading, and mixing. I know how to prepare simple dishes safely and hygienically without the use of a heat source.	I know how to use a range of techniques including peeling, chopping, slicing, grating, mixing, spreading, kneading, and baking. I know how to present my food product to impress the intended user. I know how to prepare and cook a variety of dishes safely and hygienically using a heat source (where appropriate).	I know how to create a product that has been cooked or chilled to change the nature of the raw ingredients. I know how to use a range of techniques including peeling, chopping, slicing, grating, mixing, spreading, kneading, and baking. I know how to prepare and cook a variety of dishes safely and hygienically using a heat source (where appropriate).	I know how to use my science knowledge of irreversible changes to create food products that combine to make a new material, that I know how to then describe using its sensory qualities. I know how to prepare and cook a variety of dishes safely and hygienically using a heat source (where appropriate).	I know how to prepare and cook a variety of dishes safely and hygienically using a heat source (where appropriate).
Nutrition	I know that some foods are healthy.	I know how to name and sort foods into the five groups (fruit & vegetables, starchy food, dairy, protein, and fat).	I know that everyone should eat at least five portions of fruit and vegetables per day.	I know that a healthy diet is made up from a variety and balance of different food and drink.	I know that to be healthy, food and drink are needed to provide energy to the body.	I know that different food and drink contain different substances – nutrients, water, and fibre – that are needed for health.	I know that different foods have different nutritional values (kcals, fat, carbs, protein).

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Textiles	EYFS	KS1	LKS2	KS2
Design	I know how to describe textiles by the way they feel.	I know that textiles have different properties such as touch, insulation, texture and waterproofing. I know that the texture and properties of materials affect my choice. I know how to select the appropriate textile(s) for my product. I know how to use a simple design criteria to develop my ideas.	I know how to consider my design brief and target audience when designing my product. I consider the suitability of materials when designing my product. I know how to select appropriate textiles when considering my designs. I can consider what additional materials may be used to improve the aesthetic qualities of my design.	I know how to work from my own detailed plans, modifying them where appropriate. My products have an awareness of commercial appeal. I know how to explain my material choices in relation to functional and aesthetic qualities. I know how to experiment with a range of materials until I find the right mix of affordability, appeal, and appropriateness for the job.
Make	I know how to measure, mark out and cut fabric. I know how to join fabric using glue. I know how to alter a textile to make it stronger.	I know how to make accurate measurements in cm. I know how to mark textiles in preparation for cutting. I can select the tools appropriate for the task. I know how to use scissors accurately to cut textiles (straight & curved cuts). I know how to join textiles using glue, staples, tying or a simple stitch. I know how to combine materials to add strength or visual appeal.	I know how to make accurate measurements with mm precision. I know how to use textiles skills such as stitching to help create a product that is sturdy and fit for purpose. I know how to ensure my textile products include structural changes such as plaiting or weaving to create new products such as rope, belts, bracelets. I know how to use a running stitch and back stitch within my work. I know how to modify threads and fabric such as: knotting, fraying, fringing, pulling, twisting, and plaiting. I know that threads and fabrics may need to be modified when considering their purpose.	I know how to use a cross stitch in embroidery. I know how to use techniques such as: printing, dyeing, weaving, and stitching to create different textural effects. I know how to join textiles using art skills of stitching, embroidering, and plaiting to make a durable and desirable product. I know how to purposefully modify threads and fabric such as: knotting, fraying, fringing, pulling, twisting, and plaiting. I know how to consider the finishing qualities of my product. I know how to use appliqué or decorative stitching.
Evaluate	I can discuss what I like and dislike about a product.	I can discuss my design ideas and any changes I have made. I know how to evaluate my product against my design criteria. I know how make suggestions of how my product can be improved.	I can discuss the impact of the changes I have made whilst making my product. I know how to evaluate the success of my product in meeting the specifications outlined in the design criteria. I know how to make suggestions of how my product can be improved (design, techniques used and quality of finishing).	I can identify strengths and weakness of my product. I know where changes to my design were required and the impact that these had on the making process (changes made during or in hindsight). I know how to evaluate my product against the design brief and can make suggestions for the amendments required to improve the outcome.

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Resistant Materials	EYFS	KS1	LKS2	KS2
Design	Create co-operatively sharing ideas, resources, and skills.	I know the intended audience for my product. I know how to design a product to meet the needs of its intended user. I know how to use simple design criteria to develop ideas. I know how to develop and communicate my ideas through drawn diagrams and plans. I know how to model ideas by exploring materials and components by making templates and mock-ups. I know how to use information and communication technology where appropriate to develop and communicate ideas. I know how to select materials that are suitable (e.g. strong, malleable, conductible).	I know how to design a product and can indicate the design features of my product that will appeal to intended users. I know how to design a product based upon the requirements or design brief of the intended user. I know how to model my ideas using prototypes and pattern pieces. I know how annotated sketches and cross-sectional drawings can be used to communicate ideas and designs. I know how to use basic computer-aided design to generate ideas. I know how to make design decisions taking into consideration the availability of resources.	I know how to design a product to meet the requirements of a generic design brief. I know how to conduct market research to ensure that my products meet the requirements of the intended user. I know how to develop a simple design specification to guide my designs. I know how to communicate my ideas when demonstrating how particular parts pf my product work. I know how to model my ideas using refined prototypes. I know how to use cross-sectional drawings and exploded diagrams to develop and communicate ideas. I know how to use computer-aided design to communicate my ideas. I know how constraints such as time, resources and costs may impact my designs.
Make	Use a range of small tools including scissors. Join different materials and explore textures.	I know how to measure and mark out materials with care and use safe ways of cutting it, including using a junior hacksaw. I know how to modify materials using appropriate tools. I know how to join materials to make products using both permanent and temporary fastenings. I know how to select materials that are appropriate for the intended outcome and support my product to function as planned. I know how to shape my product carefully, using techniques and tools that lead to a high-quality finish. I know how to assemble, join, and combine materials.	I know how to measure using mm and score or fold shape materials accurately. I know how to mark out materials with accuracy before making cuts. I know how to make cuts (scissors, snips, saw) accurately and reject pieces that are not accurate. I know how to create joins which are strong and stable, giving extra strength to my products. I know how to apply a high-quality finish to my product (e.g. using carving, paint, glaze, varnish, or other finishes).	I know how to make very careful and precise measurements so that it joins, holes and openings are in exactly the right place. I know how to ensure that edges are finished by sometimes adding other materials (e.g. edging strips). I know how to use a range of joins dependent on the requirements of the product. I know how to carefully hide some joins for aesthetic effect. I know how to accurately apply finishing techniques to ensure my product appeals to its user (sanding, waxing etc).
Evaluate	Share their creations, explaining the processes they have used.	I know how to discuss design ideas and make simple judgements. I know how to evaluate my products against my design criteria. I know how to suggest how my product may be improved.	I know how to identify and discuss the strengths and areas for development in my designs and products. I know how to consider the views of others, including the intended users to improve my work. I know how to use my design criteria to evaluate my completed products.	I know how to critically evaluate the quality of the design, manufacture, and fitness for purpose of my product and designs. I know how to evaluate my product against the original design specification. I know how to evaluate a product based upon how well the product was designed, made, the construction techniques used and project costs.

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Technical Knowledge		I know how to make structures stronger by folding, joining or by shape (e.g. columns or triangles). I know how to use scoring and folding to shape materials accurately. I know how to make accurate cuts (scissors, snips, saw). I know how to accurately make holes (punch, drill). I know how a freestanding structure can be made stronger, stiffer, and more stable.	I know that products have both functional and aesthetic qualities. I know how mechanical systems such as levers and linkages or pneumatic systems create movement. I know how simple electrical circuits and components can be used to create functional products. I know how to make strong, stiff shell structures.	I know how mechanical systems such as cams, pulleys or gears create movement. I know how more complex electrical circuits and components can create functional products. I know how to reinforce and strengthen a 3D framework. I know how a computer or program can be used to control products.

Upperwood Design and technology curriculum

	Cycle A			Cycle B		
	Food Technology 	Textiles 	Resistant Materials 	Food Technology 	Textiles 	Resistant Materials 
KS1	Health Fruit Salad	Design it, make it, sell it Hand puppets	Bridge building	Fruit Smoothies	collage	Va Va Vroom (Buggys)
LKS2	Mince Pies	Festival fever	Picture perfect	Christmas Bake Off: Bread	Fabric friendship	Spring Watch !
UKS2	The Great British Starter	Memory Tapestry	Weathering the storm	Hot Chocolate & Waffles	fashionista	Mysterious mechanisms + HEPP DT workshop

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