Design and Technology

Through our Design Technology curriculum, we aim to give opportunities for our pupils to design and make products to solve real and relevant problems.

Our curriculum is designed to help pupils to:

- Develop and draw upon their technical skills, building on their prior knowledge and understanding.
- Design, make and evaluate products in response to design briefs, exploring their own and others ideas.
- Create and test prototypes using practical skills and understanding.
- Use creativity and imagination to solve problems, evaluating their designs and developing a sense of pride in their finished work.
- Relate their learning to the wider world, evaluating past and present work and understanding its impact on the world.

<table>
<tr><th colspan="4">Reception</th></tr>
<tr><td colspan="4">Designing:
- Generate ideas through talking with others, looking at images and handling objects
- Follow simple adult instructions, involving several ideas or actions, to support their constructions</td></tr>
<tr><td></td><th>Autumn</th><th>Spring</th><th>Summer</th></tr>
<tr><td>Key Learning</td><td>Materials
Uses a range of small tools including scissors and paint brushes; practise cutting skills with different tools
Glues, sticks and joins different materials in different ways

Food Technology
Make a savoury sandwich for a picnic</td><td>Construction & Mechanics
Make models using different materials; decorate and join in different ways
Investigate the mechanism of a pop-up book
Investigate how things works including those with batteries or electricity
Explore turning objects on and off

Computing
Use IT to draw simple designs of their products</td><td>Textiles, Electricals & Electronics
Join textiles to make a simple puppet; add embellishment/decoration

Food Technology
Talk about everyday food e.g. fruit, vegetables, and how they are grown
Explore different types of fruit and make an appealing fruit dish (eg fruit face or kebab)</td></tr>
<tr><td>Key Vocabulary</td><td>Decoration
Savoury</td><td>Design
Construction
Tools
Battery
Electricity</td><td>Safety
Cut
Join</td></tr>
<tr><td colspan="4">Evaluating: Children should be given the opportunity to:
- Evaluate a range of existing products as a means of comparison to their own finished product
- Evaluate their own design against their original design brief through demonstration, explanation or discussion</td></tr>
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<table>
<tr><th colspan="4">Year 1</th></tr>
<tr><td colspan="4">Designing:
- Generate, develop, model and communicate simple ideas through talking, drawing, and IT to present a design brief
- Design functional products for themselves and others</td></tr>
<tr><th></th><th>Autumn</th><th>Spring</th><th>Summer</th></tr>
<tr><td>Key Learning</td><td>Materials
Cut materials safely with increasing accuracy using different tools
Use tools for different purposes: cutting, sticking, curling, bending, joining, etc.
Measure and mark out

Food Technology
Handle ingredients and equipment safely and hygienically and use simple measures (eg cups) to weigh
Follow instructions to prepare a mixture ready for cooking
Understand where the ingredients they use for cooking come from

Computing
Use IT to plan a design image</td><td>Materials
Select and use a range of materials and components (paper, card, plastic, wood) according to their characteristics
Build structures by selecting appropriate materials and investigating ways to strengthen them

Construction & Mechanics
Use materials to practice drilling, screwing, gluing materials to strengthen a product
Create products using levers and wheels
Use a range of tools and equipment such as cutting and joining to allow movement</td><td>Technical Knowledge
Build structures, exploring how they can be made strong, stiffer and more stable
Explore the use of mechanisms eg for winding, in products

Textiles, Electricals & Electronics
Use textile templates to create an object
Thread and use a needle safely; join material using a simple running stitch
Diagnose faults in battery operated devices such low battery strength</td></tr>
<tr><td>Key Vocabular</td><td>Measure
Design Brief</td><td>Strengthen
Drill
Mechanism</td><td>Levers
Textile
Running stitch</td></tr>
<tr><td colspan="4">Evaluating: Pupils should be given the opportunity to:
- Evaluate a range of existing products as a means of comparison to their own finished product
- Evaluate their own design against their original design brief through demonstration, explanation or discussion</td></tr>
</table>

Year 1 Designers should be able to
▪ Handle ingredients and associated equipment safely and hygienically ▪ Describe how something works ▪ Make a product which moves ▪ Make a model stronger ▪ Explain to someone else how they want to make their product ▪ Choose appropriate resources and tools ▪ Make a simple plan before making something and record this using IT

In Design Technology Year 1 <u>greater depth</u> pupils will…
▪ Confidently work using the skills, techniques and materials taught at KS1 ▪ Work methodically, following instructions and being confident to solve a design problem ▪ Be able draw up a design, choose appropriate materials and techniques to fulfil the design ▪ Be able to skilfully choose and use a range of different tools and techniques to design and create objects that are fit for purpose ▪ To explain design, choice of material and equipment, techniques and reasons for success ▪ To be able to suggest reasonable ways to overcome a design fault

<table>
<tr><th colspan="4">Year 2</th></tr>
<tr><td colspan="4">Designing:
- Generate, develop, model and communicate ideas through talking, drawing, and IT to present a design brief
- Design functional, purposeful, appealing products for themselves and others</td></tr>
<tr><th></th><th>Autumn</th><th>Spring</th><th>Summer</th></tr>
<tr><td>Key Learning</td><td>Materials
Select from a range of tools and equipment to perform practical tasks including different ways of cutting safely
Measure and mark out to the nearest centimetre

Technical Knowledge
Build structures, exploring how they can be made strong, stiffer and more stable
Explore the use of mechanisms eg for winding, in products

Food Technology
Plan and prepare a savoury dish of nutritional value using electronic scales to weigh ingredients
To use and be aware of a range of methods to prepare food: peeling, chopping, boiling, steaming etc.
Understand where the food comes from</td><td>Textiles
Shape textiles using self-chosen templates
Use simple sewing stiches to decorate textiles; thread and use a needle safely</td><td>Construction & Mechanics
Use materials to practice drilling, screwing, gluing and nailing materials to strengthen a product

Electricals & Electronics
Diagnose faults in battery operated devices such as water damage or battery terminal damage

Computing
Use IT to explore and present ideas for products</td></tr>
<tr><td>Key Vocabular</td><td>Design Brief
Pulley
Nutrition
Savoury</td><td>Design Brief
Template
Types of stitch eg running, cross</td><td>Design Brief
Hinge</td></tr>
<tr><td colspan="4">Evaluating: Pupils should be given the opportunity to:
- Evaluate a range of existing products as a means of comparison to their own finished product
- Evaluate their own design against their original design brief through demonstration, explanation or discussion</td></tr>
</table>

Year 2 Designers should be able to
▪ Think of an idea, present it to share with others and plan what to do next ▪ Choose tools and materials and explain why they have chosen them ▪ Join materials and components in different ways ▪ Explain what went well with their work ▪ Explain why they have chosen specific textiles, ingredients, materials, etc. ▪ Measure materials to use in a model or structure ▪ Describe where the ingredients they use come from

In Design Technology Year 2 greater depth pupils will…
▪ Confidently work using the skills, techniques and materials taught at KS1 ▪ Demonstrate methodical thinking and problem solving in their work ▪ Be able draw up a design, make it and modify to ensure the end product matches the design brief ▪ Be able to skilfully choose and use a range of different tools and techniques to design and create objects that are fit for purpose ▪ To recognise the work of designers in their everyday surroundings and offer a personal opinion about the effectiveness of the designs

Year 3			
Designing: - Use research to develop a design that is innovative, functional and fit for purpose - Generates, develops and models ideas through discussion, annotated sketches, prototypes, cross-sectional, exploded diagrams and computer-aided designs			
	Autumn	**Spring**	**Summer**
Key Learning	**Construction & Mechanics** Use knowledge of transference of force to construct a product using a lever mechanism Use a range of tools and equipment such as cutting and joining to allow movement **Food Technology** Understand the components of a healthy diet Measure and prepare ingredients accurately and hygienically using appropriate utensils Assemble and cook ingredients of a savoury dish controlling the temperature **Computing** Use IT to explore and present a product design	**Textiles** Join textiles with appropriate stitching Combine different materials in different ways to make a new object Select the most appropriate techniques to decorate textiles **Materials** Cut materials accurately and safely using a wider range of different tools Measure and mark out to the accurately using different units of measurement Apply appropriate cutting and shaping techniques	**Construction & Mechanics** Use materials, such a wood, as a frame for a construction; use different tools and joining techniques to strengthen the structure and add stability Begin to use joints such as a Butt or Mitre joint to join materials **Electricals & Electronics** Research using an electrical circuits in products that include lights, buzzers, etc. **Technical Knowledge** Use knowledge of how to reinforce more complex structures using different joining techniques Understand how they can use different techniques (circuits, mechanical systems) in their designs
Key Vocabulary	**Hygienic** **Temperature** **Lever**	**Textile** **Stitch names: running, back, cross**	**Prototype** **Electrical circuit** **Joints: Butt, Mitre** **Cross section** **Annotate**

Evaluating: Pupils should be given the opportunity to:
- Investigate and analyse a range of existing products
- Receive feedback on their designs and consider how this could help them make improvements
- Understand how key events and people in Design and Technology have helped shape the world

Year 3 Designers should be able to

- Prove that their design meets some pre-set criteria
- Follow a step-by-step plan, choosing the most appropriate equipment and materials
- Design a product and make sure that it works for the given purpose
- Select the most appropriate tools and techniques for a given task
- Make a product which uses mechanical components
- Work accurately to measure, make cuts, holes and join materials
- Describe how food ingredients come together and have knowledge of where all the ingredients originated

In Design Technology Year 3 greater depth pupils will…

- Confidently follow a plan or pre-set criteria which results in the end product closely matching the original design
- Demonstrate methodical thinking as they work through a project, anticipating problems and taking steps to overcome these
- Be able create a design and use appropriate tools and materials to ensure it meets the design brief and any per-set criteria fully
- Skilfully select and use a range of tools and equipment safely and efficiently
- To suggest appropriate modifications or improvements to a product as it is being executed to improve the overall outcome
- To support peers with clear explanations and instructions of how to use tool safely and efficiently
- Start to recognise different types of design in their everyday world and have personal opinions on the quality of the designs

Year 4			
Designing: - Use research to develop a design that is innovative, functional, appealing and fit for purpose for a specific group of people - Generates, develops and models ideas through discussion, annotated sketches, prototypes, cross-sectional, exploded diagrams and computer-aided designs			
	Autumn	**Spring**	**Summer**
Key Learning	**Food Technology** Understand and apply the principles of a healthy and varied diet Accurately measure and hygienically prepare ingredients using appropriate utensils Prepare and cook savoury dishes using a range of cooking techniques e.g. baking, boiling, steaming, grilling, etc. Understand seasonality and know where and how a variety of ingredients are reared, grown, caught and processed **Computing** Use IT to control and monitor models using software	**Construction & Mechanics** Use wood or a similar material to create a sturdy frame for a model (armature); use different tools and joining techniques to strengthen the structure and add stability Use joints (such as a Butt or Mitre) to join materials Use knowledge of transference of force to choose an appropriate mechanism for a construction eg pulley/gears/cams etc Incorporate an electrical and mechanical element into a construction	**Materials** Cut materials accurately to the nearest millimetre and safely using a wide range of different tools Apply appropriate cutting and shaping techniques that include cuts such as slots and cut outs Use a range of joining techniques dependent on the material **Electricals & Electronics** Create series and parallel circuits Include an electrical element (light, buzzer, etc) in a construction **Technical Knowledge** Use knowledge of how to reinforce more complex structures using different joining techniques Understand how they can use different techniques (mechanical systems – cams, gears, pulleys) in their construction Understand how to incorporate electrical circuits (buzzers, switches, lights) into their construction

Key Vocabulary			
	Seasonality **Components** **Modify**	**Three-dimensional** **Armature** **Aesthetics**	**Parallel circuit** **Cams, gears, pulleys**

Evaluating: Pupils should be given the opportunity to:

- Analyse their finished product against their design brief and summarise their successes and areas to improve
- Receive feedback on their designs and consider how this could help them make improvements
- Understand how key events and people in Design and Technology have helped shape the world

Year 4 Designers should be able to

- Use ideas and feedback from other people when they are designing
- Use IT to produce a plan and explore different variables (size, shape, materials, etc)
- Measure and prepare ingredients and materials with accuracy
- Know how to be both hygienic and safe when using preparing and cooking food
- Know how different cooking techniques will affect how food tastes and looks
- Understand how seasons affect the availability of fresh produce and the journey from field to table for a range of ingredients
- Make a construction with a build base that has both an electrical and mechanical element

In Design Technology Year 4 <u>greater depth</u> pupils will…

- Confidently follow a plan or pre-set criteria which results in the end product accurately matching the original design
- Anticipate possible design weaknesses at the outset and adjust plans to ensure these do not occur
- Independently work from a design brief, choosing and using appropriate tools and equipment safely and efficiently
- Use prior knowledge to ensure projects are successful
- Identify some iconic structures in the world and use knowledge to explain how they were formed

Year 5			
Designing: -Use research to develop a design that is innovative, functional, appealing and fit for purpose for a specific individuals or groups -Generates, develops and models ideas through discussion, annotated sketches, prototypes, cross-sectional, pattern pieces and computer-aided designs			
	Autumn	**Spring**	**Summer**
Key Learning	**Food Technology** Understand importance of correct storage and handling of ingredients Create and refine recipes for a savoury dish including ingredients, preparation methods, cooking method and times and temperature Explain choices of ingredients with reference to seasonality and suitability **Computing** Write code to control and monitor models of products	**Construction & Mechanics** Use wood or a similar material to create a 3D structure that has multiple joints, different angled joints, triangular supports Use practical skills such as cutting, drilling, screwing, nailing, gluing and sanding **Textiles & Materials** Choose appropriate tools to cut and shape a range of materials Cut materials with precision and refine the finish with appropriate tools eg sanding wood after cutting Show an understanding of the quality of different materials and explain choices **Technical Knowledge** Use knowledge to design and construct a sturdy 3D model with different joints for different purposes	**Electricals & Electronics** Create circuits that include a number of components eg buzzers, switches, lights, etc Include an electrical element (light, buzzer, etc) in a construction **Technical Knowledge** Understand and successfully use electronics in a construction (lights, buzzers, switches, etc) **Construction & Mechanics** Use combinations of electronics or computing and mechanics in products
Key Vocabulary	**Nutrition** **Centigrade v Farenheit** **Gas/electric equivalence when cooking**	**Three-dimensional** **Fastener** **Pattern pieces** **Back, cross, blanket stitch etc** **Angled joints**	**Electronics** **Mechanical engineering** **Circuits**

		Engineer **Hacksaw** **Triangular support**	

Evaluating: Pupils should be given the opportunity to:

- Investigate and analyse a range of existing products; use this information for their own designs
- Learn about a key person who has influenced design and technology e.g. Dyson

Year 5 Designers should be able to

- Come up with a range of ideas after collecting information from different sources
- Produce a detailed, step-by-step plan and / or template for a model or an object
- Explain how a product will appeal to a specific audience
- Evaluate appearance and function against original criteria
- Use a range of tools and equipment competently and produce a finished product with multiple electronic and mechanical elements
- Show that they can be both hygienic and safe in the kitchen
- Understand the source of ingredients and how to store them safely

In Design Technology Year 5 greater depth pupils will…

- Independently carry out research to inform a detailed design brief that matches the needs of an identified target audience
- Follow the design brief closely to produce a fully functioning product with multiple working components using a range of different equipment efficiently and safely
- Use knowledge and skills to competently prepare food stuffs ensuring
- Show knowledge of a range of culinary skills and where different food originates and how it should be stored to ensure it is safe and hygienic

Year 6

Designing:

- Use market research to develop a design that is innovative, functional, appealing and fit for purpose and communicates nutritional information
- Generates, develops and models ideas through discussion, annotated sketches, prototypes, cross-sectional, pattern pieces

	Autumn	Spring	Summer
Key Learning	**Food Technology** When storing and handling ingredients use knowledge of micro-organisms Create and refine recipes for a savoury dish including ingredients, preparation methods, cooking method and times and temperature; adjust quantities to scale up /down for specific purposes Understand how to calculate nutritional information of a product	**Construction & Mechanics** Use practical skills such as cutting, drilling, screwing, nailing, gluing and sanding to create products Use combinations of electronics or computing and mechanics in products Convert rotary motion to linear motion using cams Show an understanding of the quality of different materials and explain choices	**Textiles** Select different qualities of materials to create suitable and tactile effects when using textiles eg soft decoration for comfort Join textiles with a combination of stitching techniques appropriate to the purpose (eg back stitch for seams, running stitch to attach decoration) **Technical Knowledge** Use knowledge to design and construct a sturdy 3D model with different joints for different purposes **Technical Knowledge** Understand how to plan and draw a template that has a seam allowance and a flap for a fastener
Key Vocabulary	**Market research** **Environment, climate, Innovation** **Micro-organism**	**Ratios – scale up/down**	**Tactile** **Seam allowance** **Precision** **Rough-cut**

Evaluating: Pupils should be given the opportunity to:

- Investigate and analyse a range of commercial products; use this information for their own designs
- Learn about a key person who has influenced design and technology e.g. Lloyd Wright, Hadid

Year 6 Designers should be able to
▪ Use market research to inform their plans and ideas and be able to work within a set of given parameters ▪ Follow, refine and justify their plans in a convincing way ▪ Show that they consider culture and society in their plans and designs ▪ Show that they can test and evaluate their products against a set of clear criteria ▪ Explain how products should be stored and give their reasons ▪ Understand how to adjust a recipe for different purposes eg different numbers, less spicy, more nutritional value, etc.

In Design Technology Year 6 <u>greater depth</u> pupils will…
▪ Understand and explain clearly how their market research has informed their product design with considerations to environmental factors eg local society, culture, target audience, etc ▪ Independently produce a detailed design brief that they carry out and refine as needed to ensure the end product matches the brief precisely ▪ Evaluate the success of the end product against the design brief in detail ▪ Support peers to execute their designs by explaining how refinements will ensure success