

Design and Technology
Essential Characteristics:
We want our children to develop:

- Significant levels of originality and the willingness to take creative risks to produce innovative ideas and prototypes.
- An excellent attitude to learning and independent working.
- The ability to use time efficiently and work constructively and productively with others.
- The ability to carry out thorough research, show initiative and ask questions to develop an exceptionally detailed knowledge of users' needs.
- The ability to act as responsible designers and makers, working ethically, using finite materials carefully and working safely.
- A thorough knowledge of which tools, equipment and materials to use to make their products.
- The ability to apply mathematical knowledge.
- The ability to manage risks exceptionally well to manufacture products safely and hygienically.
- A passion for the subject and knowledge of, up-to-date technological innovations in materials, products and systems.

Our main learning objectives (our essentials for progress) are:

- To master practical skills
 - To design, make, evaluate and improve
- To take inspiration from design throughout history

The children will have these opportunities (curriculum content):

Key Stage 1 (Years 1 and 2)	Key Stage 2 (Years 3,4,5,6)
<p>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, such as the home and school, gardens and playgrounds, the local community, industry and the wider environment.</p> <p>When designing and making, pupils should be taught to:</p> <p>Design</p> <ul style="list-style-type: none"> • 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. <p>Make</p> <ul style="list-style-type: none"> • select from and use a range of tools and equipment to perform practical tasks such as cutting, shaping, joining and finishing. • select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. 	<p>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, such as the home, school, leisure, culture, enterprise, industry and the wider environment.</p> <p>When designing and making, pupils should be taught to:</p> <p>Design</p> <ul style="list-style-type: none"> • 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. <p>Make</p> <ul style="list-style-type: none"> • select from and use a wider range of tools and equipment to perform practical tasks, such as cutting, shaping, joining and finishing, accurately. • select from and use a wider range of materials and components, including construction materials, textiles and

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, such as levers, sliders, wheels and axles, in their products.

Cooking and nutrition

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

ingredients, according to their functional properties and aesthetic qualities.

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, such as gears, pulleys, cams, levers and linkages.
- understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs, buzzers and motors.
- apply their understanding of computing to programme, monitor and control their products.

Cooking and nutrition

- understand and apply the principles of a healthy and varied diet.
- prepare and cook a variety of predominantly savoury dishes

	<p>using a range of cooking techniques.</p> <ul style="list-style-type: none">• understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.
--	---

The progression of skills Years 1-6

	Milestone 1 (Years 1 and 2)	Milestone 2 (Years 3 and 4)	Milestone 3 (Years 5 and 6)
Master Practical Techniques	<p>Materials: Cut materials safely using tools provided. Measure and mark out to the nearest centimetre. Demonstrate a range of cutting and shaping techniques (such as tearing, cutting, folding and curling). Demonstrate a range of joining techniques (such as gluing, using hinges or combining materials to strengthen).</p> <p>Structures: Practise drilling, screwing, gluing and nailing materials to make and strengthen products.</p> <p>Mechanisms: Create products using levers, wheels and winding mechanisms.</p> <p>Food and nutrition: Cut, peel and grate ingredients safely and hygienically. Measure or weigh using measuring cups or electronic scales. Assemble and cook ingredients.</p>	<p>Materials: Cut materials accurately and safely by selecting appropriate tools. Measure and mark out to the nearest millimetre. Apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs). Select appropriate joining techniques. Electrics and computing</p> <p>Create products with series and parallel circuits.</p> <p>Control and monitor models using apps designed for this purpose.</p> <p>Mechanisms: Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as linked levers or pneumatics).</p> <p>Structures: Choose suitable techniques to construct products or to repair items. Strengthen materials using suitable techniques.</p> <p>Food and nutrition: Prepare ingredients hygienically using appropriate utensils.</p>	<p>Materials: Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or using a more precise scissor cut after roughly cutting out a shape). Show an understanding of the qualities of materials in order to choose appropriate tools to cut and shape (e.g. the nature of fabric may require sharper scissors than would be used to cut paper).</p> <p>Electrics and computing: Create products using electronics kits that employ a number of components (such as LEDs and resistors). Write code to control and monitor models or products. Structures</p> <p>Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filing and sanding). Mechanisms: Convert rotary motion to linear using cams. Use innovative combinations of electronics (or computing) and mechanics in product designs.</p> <p>Food and nutrition: Understand the</p>

		<p>Measure ingredients accurately to the nearest gram. Follow a recipe. Assemble and cook ingredients (controlling the temperature of the hob, if cooking).</p>	<p>importance of correct storage and handling of ingredients (using knowledge of micro-organisms). Measure accurately and calculate ratios of ingredients to scale up or down from a recipe. Demonstrate a range of baking and cooking techniques. Create and refine recipes, including ingredients, methods, cooking times and temperatures.</p>
<p>Take Inspiration from Design</p>	<p>Explore objects and designs to identify likes and dislikes. Suggest improvements to existing designs. Explore how products have been created.</p>	<p>Identify some of the great designers in all of the areas of study (including pioneers in horticultural techniques) to generate ideas for designs. Improve upon existing designs, giving reasons for choices. Disassemble products to understand how they work</p>	<p>Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices. Create innovative designs that improve upon existing products. Evaluate the design of products so as to suggest improvements to the user experience.</p>
<p>Design, Make, Evaluate and Improve</p>	<p>Design products that have a clear purpose and an intended user. Make products, refining the design as work progresses. Use software to design.</p>	<p>Design with purpose by identifying opportunities to design. Make products by working efficiently (such as by carefully selecting materials). Refine work and techniques as work progresses, continually evaluating the product design. Use apps to design and represent product designs</p>	<p>Design with the user in mind, motivated by the service a product will offer (rather than simply for profit). Make products through stages of prototypes, making continual refinements. Ensure products have a high-quality finish, using art skills where appropriate. Use prototypes, cross-sectional diagrams and computer-aided designs to represent designs.</p>

Impact:

Assessment:

Through the explicit teaching of the Design skills, both the teachers and the pupils assess their learning continuously throughout the lesson. At the end of the unit, pupils reflect on their knowledge and understanding. Our assessment systems enable teachers to make informed judgements about the depth of their learning and the progress they have made over time.

Pupil Voice: To follow