

# Hambrook Primary School

## Design and Technology Curriculum

### Essential characteristics of effective designers:

- ❖ 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.

### Learning Objectives:

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

### 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, such as 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.

#### Make

- select from and use a range of tools and equipment to

### 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, such as the home, school, leisure, culture, enterprise, industry and the wider environment.

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, such as cutting, shaping, joining and finishing, 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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<p>perform practical tasks such as cutting, shaping, joining and finishing.</p> <ul style="list-style-type: none"> <li>• select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.</li> </ul> <p><b>Evaluate</b></p> <ul style="list-style-type: none"> <li>• explore and evaluate a range of existing products.</li> <li>• evaluate their ideas and products against design criteria.</li> </ul> <p><b>Technical knowledge</b></p> <ul style="list-style-type: none"> <li>• build structures, exploring how they can be made stronger, stiffer and more stable.</li> <li>• explore and use mechanisms, such as levers, sliders, wheels and axles, in their products.</li> </ul> <p><b>Cooking and nutrition</b></p> <ul style="list-style-type: none"> <li>• use the basic principles of a healthy and varied diet to prepare dishes.</li> <li>• understand where food comes from.</li> </ul>	<p><b>Evaluate</b></p> <ul style="list-style-type: none"> <li>• investigate and analyse a range of existing products.</li> <li>• evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</li> <li>• understand how key events and individuals in design and technology have helped shape the world</li> </ul> <p><b>Technical knowledge</b></p> <ul style="list-style-type: none"> <li>• apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</li> <li>• understand and use mechanical systems in their products, such as gears, pulleys, cams, levers and linkages.</li> <li>• understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs, buzzers and motors.</li> <li>• apply their understanding of computing to programme, monitor and control their products.</li> </ul> <p><b>Cooking and nutrition</b></p> <ul style="list-style-type: none"> <li>• understand and apply the principles of a healthy and varied diet.</li> <li>• prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.</li> <li>• understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.</li> </ul>
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Learning Objective		Milestone 1	Milestone 2	Milestone 3
To master practical skills	Food	<ul style="list-style-type: none"> <li>• Cut, peel or grate ingredients safely and hygienically.</li> <li>• Measure or weigh using measuring cups or electronic scales.</li> <li>• Assemble or cook ingredients.</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare ingredients hygienically using appropriate utensils.</li> <li>• Measure ingredients to the nearest gram accurately.</li> <li>• Follow a recipe.</li> <li>• Assemble or cook ingredients (controlling the temperature of the oven or hob, if cooking).</li> </ul>	<ul style="list-style-type: none"> <li>• Understand the importance of correct storage and handling of ingredients (using knowledge of micro-organisms).</li> <li>• Measure accurately and calculate ratios of ingredients to scale up or down from a recipe.</li> <li>• Demonstrate a range of baking and cooking techniques.</li> <li>• Create and refine recipes, including ingredients, methods, cooking times and temperatures.</li> </ul>
	Materials	<ul style="list-style-type: none"> <li>• Cut materials safely using tools</li> </ul>	<ul style="list-style-type: none"> <li>• Cut materials accurately and safely</li> </ul>	<ul style="list-style-type: none"> <li>• Cut materials with precision and refine</li> </ul>

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		<p>provided.</p> <ul style="list-style-type: none"> <li>• Measure and mark out to the nearest centimetre.</li> <li>• Demonstrate a range of cutting and shaping techniques (such as tearing, cutting, folding and curling).</li> <li>• Demonstrate a range of joining techniques (such as gluing, hinges or combining materials to strengthen).</li> </ul>	<p>by selecting appropriate tools.</p> <ul style="list-style-type: none"> <li>• Measure and mark out to the nearest millimetre.</li> <li>• Apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs).</li> <li>• Select appropriate joining techniques.</li> </ul>	<p>the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape).</p> <ul style="list-style-type: none"> <li>• Show an understanding of the qualities of materials to choose appropriate tools to cut and shape (such as the nature of fabric may require sharper scissors than would be used to cut paper).</li> </ul>
	Textiles	<ul style="list-style-type: none"> <li>• Shape textiles using templates.</li> <li>• Join textiles using running stitch.</li> <li>• Colour and decorate textiles using a number of techniques (such as dyeing, adding sequins or printing).</li> </ul>	<ul style="list-style-type: none"> <li>• Understand the need for a seam allowance.</li> <li>• Join textiles with appropriate stitching.</li> <li>• Select the most appropriate techniques to decorate textiles.</li> </ul>	<ul style="list-style-type: none"> <li>• Create objects (such as a cushion) that employ a seam allowance.</li> <li>• Join textiles with a combination of stitching techniques (such as back stitch for seams and running stitch to attach decoration).</li> <li>• Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles (such as a soft decoration for comfort on a cushion).</li> </ul>
	Electricals and Electronics	<ul style="list-style-type: none"> <li>• Diagnose faults in battery operated devices (such as low battery, water damage or battery terminal damage).</li> </ul>	<ul style="list-style-type: none"> <li>• Create series and parallel circuits</li> </ul>	<ul style="list-style-type: none"> <li>• Create circuits using electronics kits that employ a number of components (such as LEDs, resistors, transistors and chips).</li> </ul>
	Computing	<ul style="list-style-type: none"> <li>• Model designs using software.</li> </ul>	<ul style="list-style-type: none"> <li>• Control and monitor models using software designed for this purpose.</li> </ul>	<ul style="list-style-type: none"> <li>• Write code to control and monitor models or products.</li> </ul>
	Construction	<ul style="list-style-type: none"> <li>• Use materials to practise drilling, screwing, gluing and nailing materials to make and strengthen products.</li> </ul>	<ul style="list-style-type: none"> <li>• Choose suitable techniques to construct products or to repair items.</li> <li>• Strengthen materials using suitable techniques.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filling and sanding).</li> </ul>
	Mechanics	<ul style="list-style-type: none"> <li>• Create products using levers, wheels and winding mechanisms.</li> </ul>	<ul style="list-style-type: none"> <li>• Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as levers, winding mechanisms, pulleys and gears).</li> </ul>	<ul style="list-style-type: none"> <li>• Convert rotary motion to linear using cams.</li> <li>• Use innovative combinations of electronics (or computing) and mechanics in product designs.</li> </ul>

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To design, make, evaluate and improve		<ul style="list-style-type: none"> <li>• Design products that have a clear purpose and an intended user.</li> <li>• Make products, refining the design as work progresses.</li> <li>• Use software to design.</li> </ul>	<ul style="list-style-type: none"> <li>• Design with purpose by identifying opportunities to design.</li> <li>• Make products by working efficiently (such as by carefully selecting materials).</li> <li>• Refine work and techniques as work progresses, continually evaluating the product design.</li> <li>• Use software to design and represent product designs.</li> </ul>	<ul style="list-style-type: none"> <li>• Design with the user in mind, motivated by the service a product will offer (rather than simply for profit).</li> <li>• Make products through stages of prototypes, making continual refinements.</li> <li>• Ensure products have a high quality finish, using art skills where appropriate.</li> <li>• Use prototypes, cross-sectional diagrams and computer aided designs to represent designs</li> </ul>
To take inspiration from design throughout history		<ul style="list-style-type: none"> <li>• Explore objects and designs to identify likes and dislikes of the designs.</li> <li>• Suggest improvements to existing designs.</li> <li>• Explore how products have been created.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify some of the great designers in all of the areas of study (including pioneers in horticultural techniques) to generate ideas for designs.</li> <li>• Improve upon existing designs, giving reasons for choices.</li> <li>• Disassemble products to understand how they work.</li> </ul>	<ul style="list-style-type: none"> <li>• Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices.</li> <li>• Create innovative designs that improve upon existing products.</li> <li>• Evaluate the design of products so as to suggest improvements to the user experience.</li> </ul>

## Support

### Generic design and technology skills

P4	P5	P6	P7	P8	Early Years
<ul style="list-style-type: none"> <li>• With help, begin to assemble components provided for an activity.</li> <li>• Contribute to activities by coactively grasping and moving simple tools.</li> <li>• Explore options within a limited range of materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Use a basic tool, with support.</li> <li>• Demonstrate preferences for products, materials and ingredients.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise familiar products and explore the different parts they are made from.</li> <li>• Watch others using a basic tool and copy the actions.</li> <li>• Begin to offer responses to making activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Operate familiar products, with support, and explore how they work.</li> <li>• Use basic tools or equipment in simple processes, chosen in negotiation with the teacher.</li> <li>• Begin to communicate preferences in designing and making.</li> </ul>	<ul style="list-style-type: none"> <li>• Explore familiar products and communicate views about them when prompted.</li> <li>• With help, manipulate a range of basic tools in making activities.</li> <li>• Begin to contribute to decisions about what to do and how.</li> </ul>	<ul style="list-style-type: none"> <li>• Manipulate materials to achieve a planned effect.</li> <li>• Construct with purpose in mind, using a variety of resources.</li> <li>• Select appropriate resources and adapt work where necessary.</li> <li>• Select tools and techniques needed to shape, assemble and</li> </ul>

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					join materials. • Create simple representations of events, people and objects.
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## Challenge

**Years 7, 8 and 9**

<b>Design and technology opportunities</b>	<b>Mastering practical skills</b>	<b>Design, making, evaluating and improving</b>	<b>Taking inspiration from design throughout history</b>
<ul style="list-style-type: none"> <li>• Work in a number of fields including:               <ul style="list-style-type: none"> <li>• materials (including textiles)</li> <li>• horticulture</li> <li>• electricals and electronics</li> <li>• construction</li> <li>• mechanics</li> <li>• cooking</li> <li>• emerging areas of design and technology (such as food design, design for disability, and age-related design).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Increase skills, knowledge and competence in using materials, machinery, technique and processes.</li> <li>• Complete common practical, diagnostic, repair and maintenance tasks and multi-stage processes.</li> <li>• Develop well-conceived and well-executed practical solutions.</li> <li>• Select and use complex tools, equipment, machinery and techniques skillfully.</li> <li>• Develop sophisticated practical skills and carry out diagnostic, repair and maintenance tasks in a range of contexts.</li> <li>• Explore materials and technological developments, and experiment with using them.</li> <li>• Understand the importance of nutrition, a balanced diet and about the characteristics of a broad range of ingredients in choosing and preparing food.</li> <li>• Cook a repertoire of savoury meals and become confident in a range of cooking techniques.</li> </ul>	<ul style="list-style-type: none"> <li>• Plan, design, make and evaluate a range of quality products, in a variety of materials, that are fit for purpose.</li> <li>• Communicate ideas and designs skilfully and accurately in 2D and 3D, using a variety of techniques, including computing.</li> </ul>	<ul style="list-style-type: none"> <li>• Analyse the work of others, including iconic designs, to inform work.</li> <li>• Use historical and contextual references to influence and improve work.</li> <li>• Understand developments in design and technology and the responsibilities of designers, including environmental responsibilities.</li> </ul>