

## DESIGN AND TECHNOLOGY SKILLS COVERAGE AND PROGRESSION

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, 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 [for example, 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 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 [for example, gears, pulleys, cams, levers and linkages]
- 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.

Design and technology – key stages 1 and 2

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.

**Intent:** It is the intent of Higher Bebington Junior School for Design Technology to be taught in all year groups through at least one topic per term, which includes one topic relating to food. Design Technology projects are often made cross curricular - linking to other subjects taught.

**Implementation:**

- Clear and comprehensive scheme of work in line with the National Curriculum. The Design Technology National Curriculum is covered in full within the school curriculum. We make sure that children learn additional skills, knowledge and understanding and supplement our curriculum as and when necessary.
- Basic skills -English, Maths and ICT skills are taught during discrete lessons but are revisited in Design Technology so children can apply and embed the skills they have learnt in a purposeful context.
- Language - The promotion of a language rich Design Technology curriculum is essential to the successful acquisition of knowledge and understanding in Design Technology. The promotion and use of an accurate and rich vocabulary throughout school is planned in Design Technology.
- Independent learning: In design technology children may well be asked to solve problems and develop their learning independently. This allows the children to have ownership over their curriculum and lead their own learning in Design Technology.

**Impact:**

Children will know more, understand more and remember more about Design Technology. Our aim is that the large majority of children will achieve age related expectations in Design Technology. As designers children at Higher Bebington Junior School will develop skills and attributes they can use beyond school and into adulthood.

**Each year group learns about and bakes bread. Children are able to understand how the baking of bread has adapted through history and why, looking at the availability of ingredients, tools and equipment during the time period in focus.**

	<b>YEAR 3</b>	<b>YEAR 4</b>	<b>YEAR 5</b>	<b>YEAR 6</b>
<b>Topic</b>	<b>Autumn:</b> Passport to Europe <b>Spring:</b> Set in Stone <b>Summer:</b> Rotten Romans	<b>Autumn:</b> Invaders <b>Spring:</b> Secrets of the Tomb <b>Summer:</b> Why is Liverpool Such an awesome place to live?	<b>Autumn:</b> Gifts from the Greeks <b>Spring:</b> Welcome to the Americas <b>Summer:</b> Victorious Victorians	<b>Autumn:</b> Bombs, Battles and Bravery <b>Spring:</b> Out of Africa <b>Summer:</b> The Great Outdoors
<b>Designers and Innovators</b>	<b>Spring: Joshua Lionel</b>	<b>Spring:Percy Spencer</b>	<b>Autumn: Ergotimos</b>	<b>Autumn: Harry Brearley</b>

	<p><b>Cowen</b></p> <p><b>Summer: Bill Bowman</b></p>	<p><b>Summer: Norman Foster or Walter Aubrey Thomas</b></p>	<p><b>Summer: Thomas Edison and Joseph Swan</b></p>	<p><b>Summer: Charles Mackintosh</b></p>
<p><b>Developing, planning and communicating ideas.</b></p>	<ul style="list-style-type: none"> <li>• With growing confidence generate ideas for an item, considering its purpose.</li> <li>• Start to order the main stages of making a product.</li> <li>• Identify a purpose and establish criteria for a successful product.</li> <li>• Understand how well products have been designed, made, what materials have been used and the construction techniques.</li> <li>• learn about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products.</li> <li>• Start to understand whether products can be recycled or reused.</li> <li>• Know to make drawings with labels when designing.</li> <li>• When planning explain their choice of materials and components including function and aesthetics.</li> </ul>	<ul style="list-style-type: none"> <li>• Start to generate ideas, considering the purposes for which they are designing – link with maths and science.</li> <li>• Confidently labelled drawings from different views showing specific features.</li> <li>• Develop a clear ideas of what has to be done, planning materials, equipment and processes and suggesting alternative methods of making if the first attempt fails.</li> <li>• Identify the strengths and areas for development in their ideas and products.</li> <li>• When planning consider the views of others, including intended users, to improve their work.</li> <li>• Learn about inventors, designers, engineers, chefs and manufacturers who have developed ground breaking products.</li> <li>• When planning explain their choice of materials and</li> </ul>	<ul style="list-style-type: none"> <li>• Start to generate, develop, model and communicate their ideas through discussion, annotated sketches, cross sectional and exploded diagrams, prototypes, pattern pieces and CAD.</li> <li>• Begin to use research and develop design criteria to inform the design of innovative, functional, appealing products that fit for purpose.</li> <li>• With growing confidence apply a range of finishing techniques, including those from art and design.</li> <li>• Draw up a specification for their design-link with Maths and Science.</li> <li>• With growing confidence select appropriate materials, tools and techniques.</li> </ul>	<ul style="list-style-type: none"> <li>• Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross sectional and exploded diagrams, prototypes, pattern pieces and CAD.</li> <li>• Use research and develop design criteria to inform the design of innovative, functional, appealing products that fit for purpose.</li> <li>• Draw up a specification for their design-link with Maths and Science.</li> <li>• Plan the order of their work, choosing appropriate materials, tools and techniques. Suggest alternative methods of making if the first attempt fails.</li> <li>• Identify the strengths and areas for development in their ideas and products.</li> </ul> <p>Know how much products cost to make, how sustainable and innovative they are and the</p>

		components including function and aesthetics.		impact products have beyond their intended purpose.
<b>Working with tools, equipment, materials and components to make quality products.</b>	<ul style="list-style-type: none"> <li>• Select a wider range of tools and techniques for making their product.</li> <li>• Explain their choice tools and equipment in relation to the skills and techniques they will be using.</li> <li>• Measure, mark out, cut, score and assemble components with more accuracy.</li> <li>• Start to work safely and accurately with a range of simple tools.</li> <li>• Start to think about their ideas as they make progress and be willing to change things if this helps them to improve their work.</li> <li>• Start to measure, tape or pin fabric with some accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>• Select a wider range of tools and techniques for making their product safely.</li> <li>• Know how to measure, mark out, cut and shape a range of materials, using appropriate tools equipment and techniques.</li> <li>• Start to join and combine materials and components accurately in temporary and permanent ways.</li> <li>• Know how mechanical systems such as cams or pulleys or gears create movement.</li> </ul>	<ul style="list-style-type: none"> <li>• Select appropriate tools, materials, components and techniques and use them.</li> <li>• 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.</li> <li>• Understand how mechanical systems such as cams or pulleys or gears create movement.</li> <li>• Know how more complex electrical circuits and components can be used to create functional products.</li> <li>• Begin to measure and mark out more accurately.</li> <li>• Demonstrate how to use skills in using different tools and equipment safely and accurately.</li> <li>• Weigh and measure accurately.</li> </ul>	<ul style="list-style-type: none"> <li>• Confidently select appropriate tools, materials, components and techniques and use them.</li> <li>• Use tool safely and accurately.</li> <li>• Assemble components to make working models.</li> <li>• Aim to make and to achieve a quality product.</li> <li>• With confidence pin, sew and stitch materials together to make a product.</li> <li>• Demonstrate when make modifications as they go along.</li> <li>• Construct products using permanent joining techniques.</li> <li>• Know how to reinforce and strengthen a 3D framework.</li> <li>• Use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT.</li> </ul>

<p><b>Evaluating processes and products</b></p>	<ul style="list-style-type: none"> <li>• Start to evaluate their product against original design criteria.</li> <li>• Begin to disassemble and evaluate familiar products and consider the views of others to improve them.</li> <li>• Evaluate they key designs of individuals in design and technology has helped shape the world.</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate their product carrying out appropriate tests.</li> <li>• Start to evaluate their work both during and at the end of assignment.</li> <li>• Be able to disassemble and evaluate familiar products and consider the views of others to improve them.</li> <li>• Evaluate they key designs of individuals in design and technology has helped shape the world.</li> </ul>	<ul style="list-style-type: none"> <li>• Start to evaluate their products against the original design specification and by carrying out tests.</li> <li>• Evaluate their work both during and at the end of the assignment.</li> <li>• Begin to evaluate it personally and seek evaluation from others.</li> <li>• Evaluate they key designs of individual in design and technology has helped shaped the world.</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate their products, identifying strengths and areas for development, and carrying out appropriate tests.</li> <li>• Evaluate their work both during and at the end of the assignment.</li> <li>• Record their evaluation using drawings with labels.</li> <li>• Evaluate against their original criteria and suggest ways that their product could be improved.</li> <li>• Evaluate the key designs of individual in design and technology has helped shaped the world.</li> </ul>
<p><b>Food and Nutrition</b></p>	<ul style="list-style-type: none"> <li>• Start to know that food is grown, reared and caught in the UK, Europe and the wider world.</li> <li>• Understand how to prepare and cook a variety of predominantly savoury dishes, safely hygienically including where appropriate the use of a heat source.</li> <li>• Start to understand that a healthy diet is made up from a variety and balance of</li> </ul>	<ul style="list-style-type: none"> <li>• Understand how to prepare and cook a variety of predominantly savoury dishes, safely hygienically including where appropriate the use of a heat source.</li> <li>• Know that a healthy diet is made up from a variety and balance of different food and drink as depicted in 'The Eat Well plate.'</li> <li>• Know that to be active and</li> </ul>	<ul style="list-style-type: none"> <li>• Understand that food is grown, reared, caught in the UK, Europe and the wider world.</li> <li>• Begin to understand that seasons may affect the food available.</li> <li>• Understand how food is processed into ingredients that can be eaten or used in cooking.</li> <li>• Know how to prepare and cook a variety of</li> </ul>	<ul style="list-style-type: none"> <li>• Know that food is grown, reared, caught in the UK, Europe and the wider world.</li> <li>• Understand that seasons may affect the food available.</li> <li>• Understand how food is processed into ingredients that can be eaten or used in cooking.</li> <li>• Know how to prepare and cook a variety of predominantly savoury dishes safely and hygienically</li> </ul>

	<p>different food and drink as depicted in 'The Eat Well plate.'</p> <ul style="list-style-type: none"> <li>• Begin to know that to be active and healthy, food and drink are needed to provide energy for the body.</li> </ul>	<p>healthy, food and drink are needed to provide energy for the body.</p>	<p>predominantly savoury dishes safely and hygienically including, where appropriate the use of a heat source.</p> <ul style="list-style-type: none"> <li>• Start to understand how to use a range of techniques such as peeling, chopping, grating, mixing, spreading, kneading and baking.</li> <li>• Begin to understand different food and drink contain different substances – nutrients, water and fibre – that are needed for health.</li> </ul>	<p>including, where appropriate the use of a heat source.</p> <ul style="list-style-type: none"> <li>• Understand how to use a range of techniques such as peeling, chopping, grating, mixing, spreading, kneading and baking.</li> </ul> <p>Know different food and drink contain different substances – nutrients, water and fibre – that are needed for health.</p>
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**Milestones for Progress**

<p align="center"><b>Develop ideas</b> <b>This concept involves understanding how ideas develop through an artistic process.</b></p>	<ul style="list-style-type: none"> <li>• Develop ideas from starting points throughout the curriculum.</li> <li>• Collect information, sketches and resources.</li> <li>• Adapt and refine ideas as they progress.</li> <li>• Explore ideas in a variety of ways.</li> <li>• Comment on artworks using visual language.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and imaginatively extend ideas from starting points throughout the curriculum.</li> <li>• Collect information, sketches and resources and present ideas imaginatively in a sketch book.</li> <li>• Use the qualities of materials to enhance ideas.</li> <li>• Spot the potential in unexpected results as work progresses.</li> <li>• Comment on artworks with a fluent grasp of visual language.</li> </ul>
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**Master Techniques**

<p align="center"><b>Master practical skills</b></p>	<p><b>Food:</b></p> <ul style="list-style-type: none"> <li>• Prepare ingredients hygienically using appropriate utensils.</li> </ul>	<p><b>Food:</b></p> <ul style="list-style-type: none"> <li>• Understand the importance of correct storage and handling of</li> </ul>
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- Measure ingredients to the nearest gram accurately.
- Follow a recipe.
- Assemble or cook ingredients (controlling the temperature of the oven or hob, if cooking).

**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.

**Textiles:**

- Understand the need for a seam allowance.
- Join textiles with appropriate stitching.
- Select the most appropriate techniques to decorate textiles.

**Electronics**

- Create series and parallel circuits.

**Construction**

- Choose suitable techniques to construct products or to repair items.
- Strengthen materials using suitable techniques.

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.

**Materials:**

- Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape).
- 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).

**Textiles:**

- Create objects (such as a cushion) that employ a seam allowance.
- Join textiles with a combination of stitching techniques (such as back stitch for seams and running stitch to attach decoration).

		<ul style="list-style-type: none"> <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> <p><b><u>Electronics</u></b></p> <ul style="list-style-type: none"> <li>• Create circuits using electronic kits that employ a number of components (such as LEDs, resistors, transistors, LEDs and chips).</li> </ul> <p><b><u>Construction</u></b></p> <ul style="list-style-type: none"> <li>• Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filing and sanding).</li> </ul>
<p><b>Design, make, evaluate and improve</b></p> <p>This concept involves developing the process of design thinking and seeing design as a process.</p>	<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>
<p><b>Take inspiration from design throughout history</b></p>	<ul style="list-style-type: none"> <li>• Identify some of the great designers in</li> </ul>	<ul style="list-style-type: none"> <li>• Combine elements of design from a</li> </ul>



<p>This concept involves appreciating the design process that has influenced the products we use in everyday life.</p>	<p>all of the areas of study (including pioneers in horticultural techniques) to generate ideas for designs.</p> <ul style="list-style-type: none"><li>• Improve upon existing designs, giving reasons for choices.</li><li>• Disassemble products to understand how they work.</li></ul>	<p>range of inspirational designers throughout history, giving reasons for choices.</p> <ul style="list-style-type: none"><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>
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