

## Progression map for Design and Technology

### Intention, Implementation and Impact

Our Primary DT Curriculum aims to equip children with the knowledge, skills and attitudes they need to become successful, innovative young designers and makers.

By building on prior experience, children progressively develop technical skills and practical expertise. They are encouraged to think creatively, imaginatively and be ambitious in their design ideas. They are given opportunities to solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They learn to recognize the importance of design and technology in the real world and its relevance in everyday life. They are given opportunities to learn about and be inspired by designs and designers past and present who have impacted on life across the world.

Through the design, make, evaluate process, children are guided to develop skills of team work, communication, resilience and reflectiveness through problem solving. They learn to use knowledge and understanding from other curriculum areas including mathematical, scientific, computing and art skills, applying them in relevant and practical contexts. In this way, we aspire for our pupils to become articulate, dynamic thinkers able to approaching new challenges with confidence and enthusiasm.

### FOOD

<b>NC subject content</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
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.	To understand the importance of a varied diet and know the 5 areas of the 'eatwell' plate and apply knowledge of healthy eating to plan a balanced meal.  To develop and apply understanding of basic hygiene and how bacteria develops.	To develop an awareness of seasonality and food miles. Use their knowledge of seasonality and food miles to influence their choice of ingredients when designing.  To continue to develop and apply understanding of basic hygiene and how bacteria develops.	To develop an understanding of the dietary needs of individuals and how they differ (athlete, older person, child).  Know how a variety of ingredients are grown, reared, caught and processed.  To develop a deeper understanding of basic	Be able to apply their understanding of individual dietary needs to design a meal for an individual such as an athlete, soldier.  Know how a variety of ingredients are grown, reared, caught and processed.  To develop a deeper understanding of basic

	<p><b><u>Techniques to be taught should include</u></b>            Use both a bridge and a claw technique to cut soft food.</p> <p>Use measuring cups, spoons, and digital scales to measure out ingredients in grams.            Using a jug to measure liquids in ml.</p> <p>Mixing to form a bread dough            Kneading &amp; shaping dough</p> <p>Peeling &amp; grating soft foods e.g. courgette, cheese</p> <p><b><u>Suggested products</u></b>            Bread making – possibly leading to sandwich making</p> <p>Pizza making – pair with a healthy salad</p> <p>Pancake making</p> <p>Smoothies</p>	<p><b><u>Techniques to be taught should include</u></b>            Use both a bridge and a claw technique to cut hard food. Be able to select techniques appropriately.</p> <p>Use measuring cups, spoons, and digital scales to measure out ingredients in grams.            Using a jug to measure liquids in ml.</p> <p>Cracking an egg &amp; beating an egg</p> <p>Peeling &amp; grating soft foods e.g. courgette, cheese</p> <p>Cutting fat into flour and rubbing fat into flour.</p> <p><b><u>Suggested products</u></b>            Cheese scones</p> <p>Fruit crumble</p> <p>Shortcrust pastry – cheese straws</p>	<p>hygiene and how bacteria develops.</p> <p><b><u>Techniques to be taught should include</u></b>            Introduce simple combination of 'Bridge' and 'Claw' e.g. onion</p> <p>Grating harder foods e.g. apple, carrot, parmesan</p> <p>Using the hob with adult supervision e.g. to sweat a soup</p> <p><b><u>Suggested products</u></b>            Making soup or stew</p> <p>Muffins</p>	<p>hygiene and how bacteria develops.</p> <p><b><u>Techniques to be taught should include</u></b>            Rolling pastry</p> <p>Cracking an egg &amp; separating</p> <p>Using a hand mixer or blender</p> <p><b><u>Suggested products</u></b>            WW2 link: humble pie</p> <p>Muffins</p> <p>Choose ingredients with a growing awareness of conservation, sustainability and animal welfare.</p>
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	Cheese scones Fruit crumble Shortcrust pastry – cheese straws			Independently select equipment appropriate to the task. Be able to explain their choices.  Begin to use their time efficiently e.g: wash up or cut toppings whilst waiting for a pie to cook.

## TEXTILES

	LKS2	UKS2
	<p>Learn to weave with a variety of materials.</p> <p>Learn to sew using a range of basic stitches e.g: running stitch, back stitch and over stitch.</p> <p>Make informed choices from the sewing stitches they have learned in order to join fabrics and/or add embellishment and decoration (applique).</p> <p>Learn to thread a needle (large binca type).</p> <p>Learn to tie simple knots.</p> <p>Use patterns and templates. Pinning and cutting with increasing accuracy.</p> <p>Learn about the properties of a small range of fabrics. Choose from a small range of fabrics according to properties, purpose, ease of working, aesthetics.</p> <p><b><u>Suggested Products</u></b>            Binca bookmarks            Link weaving to History (Bronze, Iron age)            Felt Christmas decorations/ winter hangings</p>	<p>Learn to use different ways to join materials, e.g. glue, pins, press studs, Velcro, various stitches, buttons. They choose and apply decoration to their work using buttons, beads, sequins.</p> <p>Learn to make own simple pattern pieces.</p> <p>Use patterns and prototypes to try out ideas.</p> <p>Children are able to join fabrics using a range of stitches with increasing independence including blanket stitch.</p> <p>They make informed choices from the sewing stitches they have learned in order to join fabrics and/or add embellishment and decoration (applique).</p> <p><b><u>Suggested Products</u></b>            Victorian embroidery            Make a bag, purse or wallet.</p>

# PRODUCT DESIGN

## Designing

NC subject content	LKS2	UKS2
	<b>SUBSTANTIVE KNOWLEDGE</b>	
<p>When designing and making, pupils should be taught to:</p> <p><b>Design</b></p> <ul style="list-style-type: none"> <li>· 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</li> <li>· generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design</li> </ul>	<p><b><u>Understanding contexts, users and purposes</u></b></p> <p>Know how to gather information about the needs and wants of particular individuals and groups using surveys, questionnaires, etc</p> <p>Generate ideas by collecting and using information from a number of sources, including ICT based sources to generate design ideas.</p> <p>Disassemble and investigate everyday products to see how they fit their purpose.</p> <p>Work from a given design specification to guide their thinking.</p> <p><b><u>Generating, developing, modelling and communicating ideas</u></b></p> <p>Learn what a prototype is and use pre-made examples of prototypes and patterns</p> <p>Learn to create labelled and annotated sketches of their ideas.</p>	<p><b><u>Understanding contexts, users and purposes</u></b></p> <p>Generate ideas by collecting and using information, from a number of sources, including ICT based sources.</p> <p>Look at mechanical products to see how they function and meet user's needs.</p> <p>Know how to carry out research, using surveys, interviews, questionnaires and web-based resources</p> <p>Learn how to develop their own simple design specification to guide their thinking.</p> <p><b><u>Generating, developing, modelling and communicating ideas</u></b></p> <p>Learn how to create a prototype/pattern to scale</p> <p>Learn to create cross-sectional drawings and exploded diagrams.</p> <p>Learn about the properties and qualities of materials they might use such as cardboard, wood, plastic.</p>

	Learn an increasing range of correct technical vocabulary to use to enable them to explaining	
	<b>DISCIPLINARY KNOWLEDGE</b>	
	<p><b><u>Understanding contexts, users and purposes</u></b> Work confidently within a range of contexts, such as the home, school and leisure.</p> <p>Indicate the design features of their products that will appeal to intended users</p> <p>Describe the purpose of their products and explain how particular parts of their products work</p> <p><b><u>Generating, developing, modelling and communicating ideas</u></b> Use pre-given prototypes to discuss design ideas.</p> <p>Use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas</p> <p>Generate realistic ideas, focusing on the needs of the user</p> <p>Make design decisions that take account of the availability of resources</p>	<p><b><u>Understanding contexts, users and purposes</u></b> Work confidently within an increasing range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment</p> <p>Be able to identify the needs, wants, preferences and values of particular individuals and groups. Take user's views into account when designing.</p> <p>Indicate the design features of their products that will appeal to intended users. Considering safety and reliability.</p> <p>Describe the purpose of their products explain how particular parts of their products work.</p> <p><b><u>Generating, developing, modelling and communicating ideas</u></b> Test their ideas using prototypes and pattern pieces in order to develop and improve their ideas.</p> <p>Communicate design ideas in a variety of ways including verbally, written, using annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas.</p> <p>Use computer-aided design to develop and communicate their ideas</p>

		Make design decisions, taking account of constraints such as time, resources and cost.
<b><u>Making</u></b>		
NC subject content	LKS2	UKS2
	<b>SUBSTANTIVE KNOWLEDGE</b>	
<p><b>Make</b></p> <ul style="list-style-type: none"> <li>· select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately</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> </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 [for example, gears, pulleys, cams, levers and linkages]</li> </ul>	<p><b>Planning</b></p> <p>Know:</p> <ul style="list-style-type: none"> <li>• how to use learning from science to help design and make products that work</li> <li>• how to use learning from mathematics to help design and make products that work</li> <li>• that materials have both functional properties and aesthetic qualities</li> <li>• the correct technical vocabulary for the projects they are undertaking</li> </ul> <p>Know:</p> <ul style="list-style-type: none"> <li>• how mechanical systems such as levers and linkages or pneumatic systems create movement</li> <li>• how simple electrical circuits and components can be used to create functional products</li> <li>• how to program a computer to control products</li> <li>• how to make strong, stiff shell structures</li> </ul> <p><b>Practical skills and techniques</b></p> <p>Learn essential procedures for safety and hygiene when handling materials and tools safely.</p>	<p><b>Planning</b></p> <p>Learn to use a range of tools in order to be able to choose appropriately from them.</p> <p>Know:</p> <ul style="list-style-type: none"> <li>• how to use learning from science to help design and make products that work</li> <li>• how to use learning from mathematics to help design and make products that work</li> <li>• that materials have both functional properties and aesthetic qualities</li> <li>• <i>that materials can be combined and mixed to create more useful characteristics</i></li> <li>• that mechanical and electrical systems have an input, process and output</li> <li>• <i>the correct technical vocabulary for the projects they are undertaking</i></li> </ul> <p>Know:</p> <ul style="list-style-type: none"> <li>• how mechanical systems such as cams or pulleys or gears create movement</li> <li>• how more complex electrical circuits and components can be used to create functional products</li> </ul>

<p>· understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]</p> <p>· apply their understanding of computing to program, monitor and control their products.</p>	<p>Learn skills needed to measure, mark, cut out and shape a range of materials. e.g. using saws and sand paper using cms to measure.</p> <p>Use a wider range of materials and components than KS1, including construction materials and kits, mechanical components and electrical components.</p> <p>Use tools independently with increasing accuracy, control and awareness of conservation e.g. bench hooks and mitre blocks, electric components (such as bulbs and buzzers), wire strippers, staplers, cardboard triangles etc.</p> <p>Learn to use a range of tools with accuracy.</p> <p>Learn how finishing techniques can improve the appearance of their product</p> <p><b><u>Technical knowledge</u></b>  <b><u>Mechanisms and control</u></b></p> <ul style="list-style-type: none"> <li>• Use simple mechanisms, e.g. syringes for pneumatics, levers.</li> <li>• Give a series of commands (Roamer). <ul style="list-style-type: none"> <li>• Use levers and pulleys to create moving parts using split pins, card and string.</li> </ul> </li> </ul> <p><b><u>Structures</u></b></p> <ul style="list-style-type: none"> <li>• Use construction kits to test for strength.</li> <li>• Investigate how structures can fail when loaded, and stabilise structures to withstand greater loads.</li> <li>• Understand different structures types, shell/frame</li> </ul> <p><b><u>Electrical Circuits</u></b></p> <ul style="list-style-type: none"> <li>• Explore batteries and bulbs.</li> </ul>	<ul style="list-style-type: none"> <li>• how to program a computer to monitor changes in the environment and control their products</li> <li>• how to reinforce and strengthen a 3D framework</li> </ul> <p><b><u>Practical skills and techniques</u></b></p> <p>Learn essential procedures for safety and hygiene when handling materials and tools safely.</p> <p>Learn to measure, mark, cut out and shape a range of materials. e.g. using saws and sand paper using cm &amp; mm to measure.</p> <p>Use modelling wire, pliers, wire cutters etc.</p> <p>Be taught how to use techniques that involve a number of steps.</p> <p>Learn how finishing techniques can strengthen and improve the appearance of their product.</p> <p><b><u>Technical knowledge</u></b>  <b><u>Mechanisms and control</u></b></p> <ul style="list-style-type: none"> <li>• Use simple mechanisms, e.g. pulleys, cams, cogs. Attach to motors for electrical control</li> <li>• Begin to use hydraulics.</li> <li>• Design ICT controlled mechanisms- use computer to control programs and equipment. FLOWOL.</li> </ul> <p><b><u>Structures</u></b></p> <ul style="list-style-type: none"> <li>• Construct regular free standing 3D frames - bridges</li> <li>• Use techniques for reinforcing and strengthening structures.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Use simple switches to achieve a functional result</li> </ul>	<ul style="list-style-type: none"> <li>• Use construction kits and building instructions to identify how structures are stabilised and strengthened.</li> </ul> <p><b><u>Electrical Circuits</u></b></p> <ul style="list-style-type: none"> <li>• Switch motors on/off</li> <li>• Control electrical circuits with ICT (e.g. use computer to operate switch – see above)</li> </ul>
<b>DISCIPLINARY KNOWLEDGE</b>		
	<p><b><u>Planning</u></b>  Select tools and equipment suitable for the task  Explain their choice of tools and equipment in relation to the skills and techniques they will be using.</p> <p>explain their choice of materials and components according to functional properties and aesthetic qualities</p> <p>Order the main stages of making</p> <p><b><u>Practical skills and techniques</u></b>  Apply knowledge in order to follow procedures for safety and hygiene.</p> <p>Apply measuring, marking and cutting skills with some accuracy.</p>	<p><b><u>Planning</u></b>  Produce appropriate lists of tools, equipment and materials that they need.</p> <p>Formulate step-by-step plans as a guide to making.</p> <p>Work from a detailed plan.</p> <p><b><u>Practical skills and techniques</u></b>  Apply knowledge in order to follow procedures for safety and hygiene</p> <p>Accurately apply skills to measure, mark out, cut and shape materials and components</p> <p>Accurately assemble, join and combine materials and components</p>

	<p>Assemble, join and combine materials and components with some accuracy.</p> <p>Select the correct tools to use with different materials.</p> <p>Apply a range of finishing techniques, including those from art and design, with some accuracy.</p>	<p>Demonstrate resourcefulness when tackling practical problems. Applying knowledge of materials and tools to solve problems they encounter.</p> <p>Choose appropriate finishing techniques and apply with increasing accuracy, e.g. collage, paint to enhance the appearance of their product.</p>
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## ANALYSING AND EVALUATING

NC subject content	LKS2	UKS2
	<b>SUBSTANTIVE KNOWLEDGE</b>	
<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>Know about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products</p> <p><b><u>Own ideas and products</u></b> Be able to refer to their design criteria as they design and make.</p> <p>Modifying plans as they work and use their design criteria to evaluate their completed products.</p> <p><b><u>Existing products</u></b> Learn to investigate and analyse:</p> <ul style="list-style-type: none"> <li>• how well products have been designed</li> <li>• how well products have been made</li> </ul>	<p>Know about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products</p> <p><b><u>Own ideas and products</u></b> Be able to refer to their design criteria as they design and make.</p> <p>Modifying plans as they work and use their design criteria to evaluate their completed products.</p> <p><b><u>Existing products</u></b> Learn ow to investigate and analyse:</p> <ul style="list-style-type: none"> <li>• how well products have been designed</li> <li>• how well products have been made</li> </ul>

	<ul style="list-style-type: none"> <li>• why materials have been chosen</li> <li>• what methods of construction have been used</li> <li>• how well products work</li> <li>• how well products achieve their purposes</li> <li>• how well products meet user needs and wants</li> </ul>	<ul style="list-style-type: none"> <li>• why materials have been chosen</li> <li>• what methods of construction have been used</li> <li>• how well products work</li> <li>• how well products achieve their purposes</li> <li>• how well products meet user needs and wants</li> </ul>
<b>DISCIPLINARY KNOWLEDGE</b>		
	<p>Use what the work of famous inventors and engineers to influence and inspire their own design process.</p> <p><b><u>Own ideas and products</u></b>  Be able to identify the strengths and areas for development in their ideas and products  Be able to consider the views of others, including intended users, to improve their work  With support, suggest alternative ways to make their products or how their products could be improved.</p> <p><b><u>Existing products</u></b>  Investigate and analyse asking questions such as:</p> <ul style="list-style-type: none"> <li>• who designed and made the products?</li> <li>• where products were designed and made?</li> <li>• when were these products designed and made?</li> <li>• can this product can be recycled or reused? <ul style="list-style-type: none"> <li>• What is the intended purpose of the product?</li> </ul> </li> </ul>	<p>Use what the work of famous inventors and engineers to influence and inspire their own design process.</p> <p><b><u>Own ideas and products</u></b>  Be able to identify the strengths and areas for development in their ideas and products  Be able to consider the views of others, including intended users, to improve their work</p> <p>Be able to critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make  Be able to evaluate their ideas and products against their original design specification suggesting things they would do differently next time.</p> <p><b><u>Existing products</u></b>  Investigate and analyse products by asking questions such as:</p> <ul style="list-style-type: none"> <li>• how much products cost to make?</li> <li>• how innovative products are?</li> <li>• how sustainable the materials in products are ?</li> <li>• what impact products have beyond their intended purpose?</li> </ul>

## **DT unit contexts and cross curricular opportunities**

<b>Year 3</b>	<b>Textiles</b> <b>Making a felt toy</b> Science link - Plants and their uses	<b>Mechanisms</b> <b>Shadow puppets</b> Science link: Light	<b>Food</b> Geography link: Wet & Dry places Science link: Animals including humans (nutrition and food)
<b>Year 4</b>	<b>Electrical circuits</b> <b>Night lights</b> Science link: Electricity – light circuit with a switch.	<b>Food</b> Science links - States of matter, Food chains & digestive system Geography link: Sustainability	<b>Structures</b> <b>Skyscrapers</b> Geography link: North America
<b>Year 5</b>	<b>Structures</b> <b>Bridges</b> History link: Local history - Isambard Kingdom Brunel Geography link: Rivers	<b>Food</b> States of matter, reproduction in plants (fruit & seeds) Geography link: Climate change	<b>Textiles</b> <b>Cross stitch</b> History link – Victorians
<b>Year 6</b>	<b>Food</b> Science link - States of matter, diet & exercise, classifying plants	<b>Mechanisms</b> <b>Levers and pulleys</b> Science link: Forces (Y5 revision) Geography link: Mountains	<b>Electrical circuits</b> <b>Make a game or fairground ride using buzzers, alarms, motors</b> Science link – Electricity & light