Loxdale Primary School Knowledge and Skills Progression

Subject Area: Design & Technology

National Curriculum Objectives.	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 [for example, 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 o design purposeful, functional, appealing products for themselves and other users based on design criteria o generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology Make o select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] o select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics Evaluate o explore and evaluate a range of existing products o evaluate their ideas and products against design criteria Technical knowledge o build structures, exploring how they can be made stronger, stiffer and more stable o explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. 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 [for example, the home, school, leisure, culture, enterprise, industry and the wider environment]. When designing and making, pupils should be taught to: Design o 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 o generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design Make o select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately o 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 o investigate and analyse a range of existing products o evaluate their ideas and products against their own design criteria and consider the views of others to improve their work o understand how key events and individuals in design and technology have helped shape the world Technical knowledge o apply their understanding of how to strengthen, stiffen and reinforce more complex structures o understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] o understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] o apply their understanding of computing to program, monitor and control their products.

	<u>Cooking and nutrition</u> 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. Pupils should be taught to: <u>Key stage 1</u> o use the basic principles of a healthy and varied diet to prepare dishes o understand where food comes from. <u>Key stage 2</u> o understand and apply the principles of a healthy and varied diet o prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques o understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

Early Years					
<u>EAD</u>	• Listen with increased attention to sounds. • Respond to what they have heard, expressing their thoughts and feelings. • Remember and sing entire songs. • Take part in simple pretend play, using an object to represent something else. • Join different materials and explore different textures.	• Explore colour and colour mixing. • Show different emotions in their drawings and paintings. • Play instruments with increasing control to express their feelings and ideas. • Sing the melodic shape of familiar songs.	• Explore different materials freely, in order to develop their ideas about how to use them and what to make. • Create closed shapes with continuous lines and begin to use these shapes to help represent objects. • Draw with increasing complexity and detail.	• Begin to develop complex stories using small world equipment. • Make imaginative and complex 'small worlds' with blocks and construction kits.	• Develop their ideas and then decide which materials to use to express them.

		Year One and Two	**Year Three and Four**	**Year Five and Six**
Master Practical	**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).	• 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.	• 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).

	Electrics		• Create products with series and parallel circuits. • Control and monitor models using apps designed for this purpose.	• 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	• Practise drilling, screwing, gluing and nailing materials to make and strengthen products.	• Choose suitable techniques to construct products or to repair items. • Strengthen materials using suitable techniques.	• Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filing and sanding).
	Mechanisms	Create products using levers, wheels and winding mechanisms.	Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as linked levers or pneumatics).	• Convert rotary motion to linear using cams. • Use innovative combinations of electronics (or computing) and mechanics in product designs.
	Food and Nutrition	Cut, peel and grate ingredients safely and hygienically. • Measure or weigh using measuring cups or electronic scales. • Assemble and cook ingredients.	• Prepare ingredients hygienically using appropriate utensils. • Measure ingredients accurately to the nearest gram. • Follow a recipe. • Assemble and cook ingredients (controlling the temperature of the hob, if cooking).	• Understand the 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.
Take inspiration from design		• Explore objects and designs to identify likes and dislikes. • Suggest improvements to existing designs. • Explore how products have been created.	• 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.	• 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
Design, make, evaluate and improve		• Design products that have a clear purpose and an intended user. • Make products, refining the design as work progresses. • Use software to design	• 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.	• 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.