Design and Technology: Projects on a Page. Skills led.

Purpose of Study:

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims:

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Early Years

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 - 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 perform practical tasks [for example, 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

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 [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 - 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]

Principles for progression

1. Use common techniques across the school.
2. Practise the same skills at different ages over and over again - do the children tackle them better each time?
3. Revisit key areas of content and key vocabulary.
4. Keep an integrated model of artistic progression in mind. Aim to improve children's enquiry skills, knowledge and concepts, so they develop an ever deeper understanding of people and societies.
5. Attitudes have a huge impact on learning. Plan teaching activities that challenge and engage children, as well as yielding evidence of progression

Design and Technology			
	Designing	Making	Evaluating
Nursery	Children join construction materials together. They understand that tools can be used for a purpose		
Reception	Children use what they have learnt about media and materials in original ways, thinking about uses and purposes. Represent their own ideas, thoughts and feelings through design and technology		
Year 1	Generate ideas based on simple design criteria and their own experiences, explaining what they could make Develop, model and communicate their ideas through talking, drawings and mock ups with card and paper	Plan by suggesting what to do next Select and use tools, explaining their choices to cut, shape, join paper and card Select new and reclaimed materials and construction kits Use simple finishing techniques suitable for the product they are creating Use simple utensils and equipment for preparing food Select from a range of fruit and vegetables according to their characteristics- colour, texture, taste, etc.	Explore a range of existing products Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria Taste and evaluate a range of fruit and vegetables to determine the intended user's preference
Year 2	Design a functional and appealing product for a chosen user and purpose based on a simple design criteria Generate, develop, model and communicate their ideas through talking, drawing, templates, mock ups and ICT	Select from and use a range of tools and equipment to perform practical tasks such as cutting and joining to allow movement and finishing Select from and use a range of materials and components such as paper, card, plastic and wood according to their characteristics	Explore and evaluate a range of existing products Evaluate their ideas throughout and their final products against original design criteria
Year 3	Generate and clarify realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific users Use annotated sketches and appropriate ICT to develop and communicate ideas Develop ideas through the analysis of existing products	Plan the main stages of making Select and use a range of appropriate tools with some accuracy e.g.- cutting, joining and finishing Select fabrics and fastenings according to their functional characteristics e.g.- strength and aesthetic qualities e.g. pattern Select from a range of food products thinking about sensory characteristics Explain choices of materials according to functional and aesthetic qualities Use finishing techniques suitable to the product	Evaluate a range of products relevant to the task Test and evaluate their product against the original design criteria and with the intended user Take into account others' views Understand how a key event/individual has influenced the development of a chosen product
Year 4	Gather information about needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular groups or individuals Generate, develop, model and communicate realistic ideas through discussion and as appropriate sketches, cross sectional and exploded diagrams	Order the main stages of making Select from and use tools and equipment to cut, shape, join and finish with some accuracy Select from and use materials and components including construction materials and electrical components according to their functional properties and aesthetic qualities	Investigate and analyse a range of existing products Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their own work
Year 5	Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web based resources Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost Generate, develop and model innovative ideas through discussion, prototypes, diagrams and annotated sketches	Formulate a clear plan, including a step by step list of what needs to be done and lists of resources to be used Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks Use finishing techniques suitable for the product they are designing and making Write a step by step recipe including list of ingredients, utensils and equipment Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients Make, decorate and present food appropriately for the intended user and purpose Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment	Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development and carrying out appropriate tests Research key events and individuals linked to products made Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using tables/graphs or charts Take into account the views of others Understand how key chefs have influenced eating habits to promote varied and healthy diets Test the system to demonstrate its effectiveness for the intended user and product
Year 6	Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web based resources Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost Generate, develop and model innovative ideas through discussion, prototypes, diagrams and annotated sketches	Produce a detailed list of tools, equipment and materials. Formulate step by step plans and if appropriate allocate tasks to a team Select from and use a range of tools and equipment and materials to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost	Investigate and analyse products linked to their own Compare the final product to the original design specification Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness to purpose Consider the views of others to improve their work