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

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]

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

	KS1 NC	Y1	Y2	KS2 NC	Y3	Y4	Y5	Y6
Technical Knowledge	.**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 ***Cooking*** - use the basic principles of a healthy and varied diet to prepare dishes - understand where food comes from.	**Purpose** - Who or what is this for? Can the child talk about the decisions they are making and justify them? **Structure** - Do they know what makes a structure stable? i.e. a wide base **Evaluate** - Can they verbalise possible improvements to be made to their work or the work of others?	**Purpose** or design criteria - Can the child communicate their ideas through drawing and justify them? **Structure** - Do they know what makes a structure strong? **Evaluate** - Can they identify weaknesses in the outcome and suggest ways to improve it? • can they Evaluate own designs against design criteria? • can they use peer feedback to modify a final design?	**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. ***Food*** - 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	**Purpose** - Does the design comply with the design criteria? Do they consider existing products as part the design process? Are they considering aesthetics? Do they know how to test and modify the outcome, suggesting improvements?	How to generate ideas using thumbnail sketches and exploded diagrams. Are they using prototypes and mock ups to inform design? Do they understand how to reinforce their structures? **Evaluate** - Do they use research in order to inform design? Can they Evaluate a recipe, considering: taste, smell, texture and appearance?	Do they make links with other subjects? (Forces work in lent 1). Do their structures support weight?	Can they develop design criteria based on findings from investigating existing products? • Can they adapt a recipe based on research. Developing design criteria that clarifies the target user? Can they evaluate a recipe, considering: taste, smell, texture. Can they minimise cross contamination?
Structures		**I can** - make a stable structure from card, tape and glue. - turn 2D nets into 3D structures (nets provided). - choose and combine existing 3D shapes (packaging) to create a specified structure.	**I can** - create joints and structures from paper/card and tape. - strengthen paper or card by folding it **I know** - that in order to test for strength we have to approach it scientifically - as a fair test		**I can** - construct a 3d shape from a 2d net (see Y1 for progression)	**I can** - design a stable structure - evaluate structures made by the class. - describe what characteristics of a design and construction made it the most effective. - build frame structures designed to support weight - build a variety of free standing frame structures of different shapes and sizes. - reinforce corners to strengthen a structure.	**I can** - design a stable structure that is able to support weight. - adapt and improve own bridge structure by identifying points of weakness and reinforcing them as necessary. - suggest points for improvements for own bridges and those designed by others. - create a frame structure with a focus on triangulation. - make a range of different shaped beam bridges. - use triangles to create truss bridges that span a given distance and support a load. - select appropriate tools and equipment for particular tasks. identify where a structure needs reinforcement	**N/A**
Mechanisms		**I can** - design a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move. - combine existing 3D shapes (packaging)	**I can** make linkages using card for levers and split pins for pivots. adjust the widths, lengths and thicknesses of card used. cut and assemble components neatly		**I can** - design a toy which uses a pneumatic system. - reate a pneumatic system to create a desired motion using syringes and balloons.	**I can** - design a shape that reduces air resistance. - draw a net to create a structure from. - choose shapes that increase or decrease speed as a result of air resistance. - personalise a design. - measure, mark, cut and assemble with increasing accuracy. - evaluate the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	**I can** - design a pop-up book which uses a mixture of structures and mechanisms. - name each mechanism, input and output accurately. - storyboard ideas - make mechanisms and/or structures using sliders, pivots and circular motion to produce movement. - use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.	**N/A**
Textiles		**I can** - use a template to create a design for a puppet. - cut fabric neatly with scissors. - use joining methods to decorate a puppet. - sequence steps for construction. - reflect on a finished product, explaining likes and dislikes.	**N/A**		**I can** - design and make a template and apply individual design criteria. - select and cut fabrics with ease using fabric scissors. - thread needles with greater independence. - tye knots with greater independence. - sew running stitch to join fabric. - decorate fabric using appliqué. - complete design ideas with stuffing and sewing the edges.	**N/A**	**I can** - make and test a paper template with accuracy and in keeping with the design criteria. - measure mark and cut fabric using a paper template. - select a stitch style to join fabric, working neatly by sewing small, straight stitches. - incorporate fastening to a design. - suggest modifications for improvement. **I know** - that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro - that different fastening types are useful for different purposes. - that creating a mock up (prototype) of their design is useful for checking ideas and proportions.	**N/A**
Food		**N/A**	**I can** - design a healthy wrap based on a food combination which works well together. - slice food safely using the bridge or claw grip. - describe the taste, texture and smell of fruit and vegetables.		**N/A**	**I can** - design an item within a given budget - follow a baking recipe, from start to finish, including the preparation of ingredients. - cook safely, following basic hygiene rules. - adapt a recipe to improve it or change it to meet new criteria	**N/A**	**I can** - write a recipe, explaining the key steps, method and ingredients. - follow a recipe, including using the correct quantities of each ingredient (possibly reducing or increasing amounts in the correct ratio). - work to a given timescale - work safely and hygienically with independence
Computer Aided Design & Electronics		**N/A**	**N/A**		**N/A**	**N/A**	**N/A**	**I know** - how to place and manoeuvre 3D objects, using CAD - that, in a series circuit, electricity only flows in one direction. - that when there is a break in a series circuit, all components turn off. - that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin.