DESIGN AND TECHNOLOGY

Subject Profile

	Substantive Knowledge End Points (Unit outcomes) **Includes:** Declarative knowledge ***To know (that)…*** Procedural knowledge ***To know how to…***	**Substantive Knowledge Strands** **Cooking and nutrition** **Mechanisms / Mechanical systems** **Structures** **Textiles** **Electrical systems (KS2 Only)** **Digital world (KS2 Only)**	**Disciplinary Knowledge** **(What an expert does)** Design Make Evaluate Technical Knowledge
Reception			
Reception covers the following within continuous provision whilst following the Early Years Foundation Stage - Early Learning Goals.	To know that: • washing hands and keeping clean is important for food hygiene To know how to: • select resources independently and explain your choice • create in 2D and 3D • make stable 3D objects • join materials in different ways • use props and materials appropriately in role play • generate an idea before creating • make suggestions to improve • make healthy food choices	**Cooking and nutrition** **Structures** **Textiles**	Design Make Evaluate Technical Knowledge
YEAR 1			
Smoothies	*To know that:* • a fruit has seeds and a vegetable does not • a vegetable is any edible part of a plant • a blender is a machine that mixes ingredients *To know how to:* • cut fruit and vegetables safely using a butter knife	Cooking and nutrition	Design Make Evaluate

			Technical Knowledge
Constructing Windmills	*To know that:* • a structure is something built for a reason • stable structures do not topple • adding weight to the base of a structure can make it more stable	Structures	Design Make Evaluate Technical Knowledge
Puppets	*To know that:* • a template can be used to cut out the same shape multiple times *To know how to:* • join fabrics together using pins, staples or glue • cut out fabrics neatly using scissors	**Textiles**	Design Make Evaluate Technical Knowledge

YEAR 2			
Baby Bear's Chair	*To know that:* • a 'strong' structure is one which does not break easily • a 'stable structure' is one which is firmly fixed and unlikely to change or move • shapes with wide, flat bases are most stable • you can build strong and stiff structures by folding paper	Structures	Design Make Evaluate Technical Knowledge
Fairground Wheels	*To know that:* • axels are used in mechanisms that turn *To know how to:* • test and adapt a design to solve problems that may occur	Mechanisms	Design Make Evaluate

			Technical Knowledge
Making a Moving Monster	*To know that:* • there is always an input and output to a mechanism • a linkage mechanism joins two components together that move • a lever is something that turns on a pivot	Mechanisms	Design Make Evaluate Technical Knowledge

YEAR 3			
Eating Seasonally	*To know that:* • climate affects where foods grow • 'seasonal foods' means foods that grow in each season in a given country • eating seasonal foods can have a positive impact on the environment *To know how to:* • cut, grate and peel fruit and vegetables safely with different tools (such as a peeler, grater and small kitchen knife) • cut safely using the bridge and claw grip.	Cooking and nutrition	Design Make Evaluate Technical Knowledge
Electric poster	*To know that:* • electrical systems are a group of parts (components) that work together to transport electricity around a circuit. • a bulb, battery, battery holder and crocodile wires build simple circuits. *To know how to:* • generate a final design for an electric poster with consideration for the client's needs and design criteria. • plan the position of the bulb (circuit component) and its purpose.	Electrical systems	Design Make Evaluate Technical Knowledge
Constructing a Castle	*To know:* • the importance of strength and stiffness in structures. *To know how to:*	Structures	Design Make

	• score and cut along lines on the net of a 3D shape • construct 3D geometric shapes using nets		Evaluate Technical Knowledge

YEAR 4			
Pavilions	*To know that:* • a 'free-standing' structure is one that can stand on its own • aesthetics are how a product looks • a pavilion is a decorative building or structure for leisure activities. *To know how to:* • reinforce corners to strengthen a structure.	Structures	Design Make Evaluate Technical Knowledge
Making a Slingshot Car	*To know that:* • all moving things have kinetic energy • the shape of a moving object will affect how it moves due to air resistance • choosing shapes will increase or decrease speed because of air resistance. *To know how to:* • measure, mark, cut and assemble with increasing accuracy	Mechanisms	Design Make Evaluate Technical Knowledge
Torches	*To know that:* • electrical conductors are materials which electricity can pass through • electrical insulators are materials which electricity cannot pass through • an electrical circuit must be complete for electricity to flow.	Electrical systems	Design Make Evaluate Technical Knowledge

	To know how to: • design a torch, consider the target audience when creating my design and success criteria		

YEAR 5			
Making a Pop-Up Book	*To know that:* • mechanisms control movement • mechanisms can be used to change one kind of motion into another *To know how to:* • use sliders, pivots and folds to create paper-based mechanisms	Mechanisms	Design Make Evaluate Technical Knowledge
Doodlers	*To know that:* • when there is a break in a series circuit, all components turn off • an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin *To know how to:* • Identify simple circuit components (battery, bulb and switch) and give a basic explanation of their function • write instructions to build a functional circuit, explaining how to identify if it is functional or not	Electrical systems	Design Make Evaluate Technical Knowledge
Developing a recipe	*To know that:* • recipes can be adapted to suit nutritional needs and dietary requirements • nutritional information is found on food packaging • cross-contamination is the transferring of harmful bacteria from one food to another *To know how to:* • add nutritional value to a recipe by selecting ingredients	Cooking and nutrition	Design Make Evaluate Technical Knowledge
YEAR 6			

Waistcoats	*To know that:* • using a template (or clothing pattern) helps to accurately mark out a design on fabric • the importance of consistently sized stitches for neatness and strength *To know how to:* • mark and cut fabric accurately, in accordance with a design • use a running stitch to join fabric to make a functional waistcoat	**Textiles**	Design Make Evaluate Technical Knowledge
Playgrounds	*To know that:* • structures can be strengthened by manipulating materials and shapes • a 'footprint plan' shows general design ideas and the location of structures • a prototype is a cheap model to test a design idea *To know how to:* • use a range of materials to reinforce and add decoration to structures	Structures	Design Make Evaluate Technical Knowledge
Navigating the World	*To know that:* • 'multifunctional' means an object or product has more than one function • accelerometers can detect movement *To know how to:* • develop a product idea through annotated sketches	Digital world	Design Make Evaluate Technical Knowledge

Key Stage 1 National Curriculum Expectations

Through a variety of creative and practical activities, KS1 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

Cooking and nutrition

As part of their work with food, KS1 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. KS1 pupils should be taught to:

- use the basic principles of a healthy and varied diet to prepare dishes
- understand where food comes from.

Key Stage 2 National Curriculum Expectations

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, KS2 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

As part of their work with food, KS2 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. KS2 pupils should be taught to:

- 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