

Design and Technology

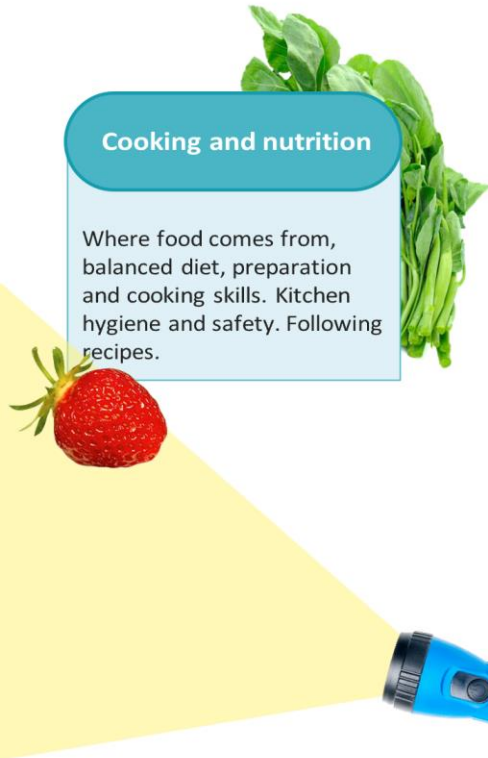


Year 4

EYFS (Reception) Key Stage 1 and 2

Cooking and nutrition

Where food comes from, balanced diet, preparation and cooking skills. Kitchen hygiene and safety. Following recipes.



**Mechanisms/
Mechanical systems**

Mimic natural movements using mechanisms such as cams, followers, levers and sliders.



Key Stage 2

Structures

Material functional and aesthetic properties, strength and stability, stiffen and reinforce structures.



Textiles

Fastening, sewing, decorative and functional fabric techniques including cross stitch, blanket stitch and appliqué.



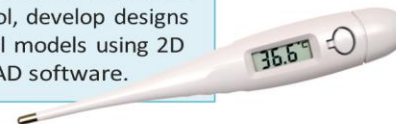
Electrical systems

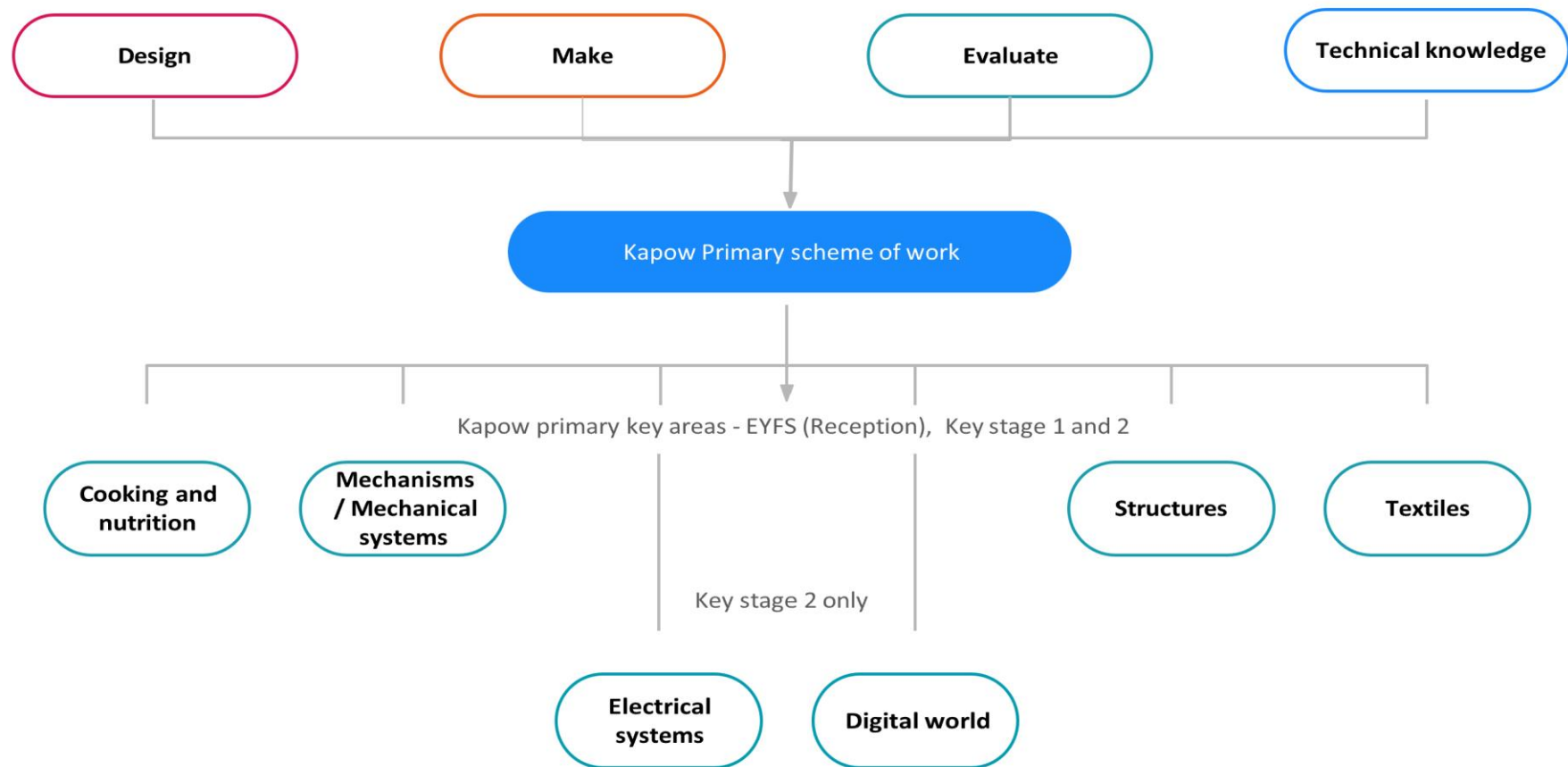
Operational series circuits, circuit components, circuit diagrams and symbols, combined to create various electrical products.



Digital world

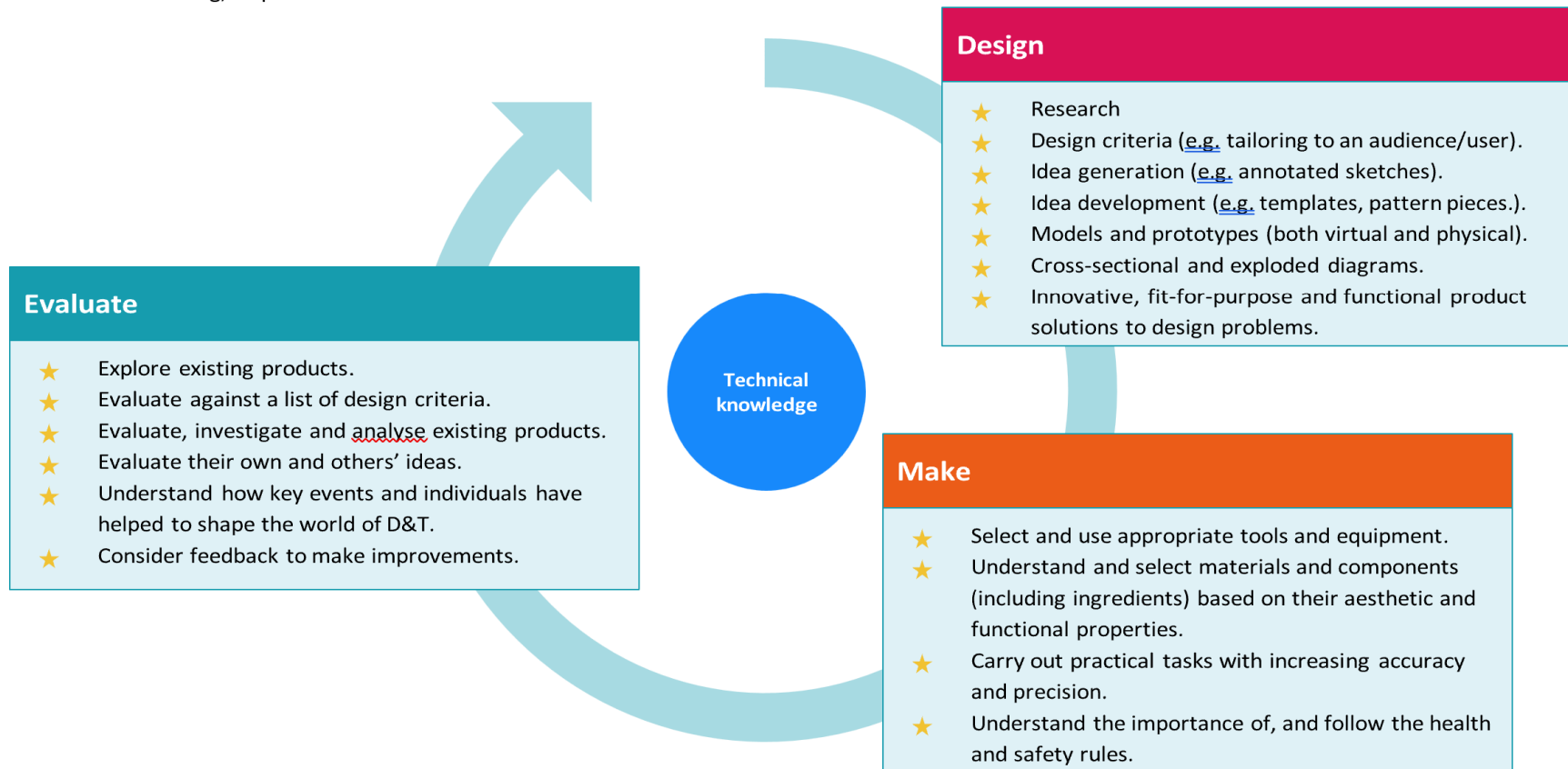
Program products to monitor and control, develop designs and virtual models using 2D and 3D CAD software.





The design process

The Design and technology National Curriculum [outlines](#) the three main stages of the design process: design, make and evaluate. Each Kapow Primary unit follows these stages, to form a full project. Each stage of the design process is underpinned by technical knowledge which encompasses the contextual, historical and technical understanding, required for each strand.



National Curriculum

KS2

Design	Make	Evaluate	Technical Knowledge	Cooking and Nutrition
● 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,	● Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]. ● Select from and use a wider range of materials and	● 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	● 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 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,

model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design	components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities	● Understand how key events and individuals in design and technology have helped shape the world	● 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.	and know where and how a variety of ingredients are grown, reared, caught and processed.
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Skills Progression

Structure - Pavilions

Skills	Design	• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight.
	Make	• Creating a range of different shaped frame structures. • Making a variety of free-standing frame structures of different shapes and sizes. • Selecting appropriate materials to build a strong structure and cladding. • Reinforcing corners to strengthen a structure. • Creating a design in accordance with a plan. Learning to create different textural effects with materials.
	Evaluate	• Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs.

Knowledge	Technical	• To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own.
	Additional	• To know that a pavilion is a a decorative building or structure for leisure activities. • To know that cladding can be applied to structures for different effects. • To know that aesthetics are how a product looks. • To know that a product's function means its purpose. • To understand that the target audience means the person or group of people a product is designed for. To know that architects consider light, shadow and patterns when designing.

Mechanisms / mechanical systems.

Making a slingshot car and torches

Skills	Design	• Designing a shape that reduces air resistance. • Drawing a net to create a structure from. • Choosing shapes that increase or decrease speed as a result of air resistance. Personalising a design.	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.
	Make	• Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design.	• Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria.

	Evaluate	Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	• Evaluating electrical products. Testing and evaluating the success of a final product.
Knowledge	Technical	• To understand that all moving things have kinetic energy. • To understand that kinetic energy is the energy that something (object/person) has by being in motion. • To know that air resistance is the level of drag on an object as it is forced through the air. To understand that the shape of a moving object will affect how it moves due to air resistance.	• To understand that electrical conductors are materials which electricity can pass through. • To understand that electrical insulators are materials which electricity cannot pass through. • To know that a battery contains stored electricity that can be used to power products. • To know that an electrical circuit must be complete for electricity to flow.

			To know that a switch can be used to complete and break an electrical circuit.
	Additional	• To understand that products change and evolve over time. • To know that aesthetics means how an object or product looks in design and technology. • To know that a template is a stencil you can use to help you draw the same shape accurately. • To know that a birds-eye view means a view from a high angle (as if a bird in flight). • To know that graphics are	• To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.

		images which are designed to explain or advertise something. • To know that it is important to assess and evaluate design ideas and models against a list of design criteria.	
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Cooking and Nutrition

Adapting a recipe

Skills	Design	• Designing a biscuit within a given budget, drawing upon previous taste testing judgements.
	Make	• Following a baking recipe, from start to finish, including the preparation of ingredients. • Cooking safely, following basic hygiene rules. Adapting a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet).
	Evaluate	• Evaluating a recipe, considering: taste, smell, texture and appearance. • Describing the impact of the budget on the selection of ingredients. • Evaluating and comparing a range of food products. Suggesting modifications to a recipe (e.g. This biscuit has too many raisins, and it is falling apart, so next time I will use less raisins).

Knowledge	Technical	• To know that the amount of an ingredient in a recipe is known as the 'quantity.' • To know that it is important to use oven gloves when removing hot food from an oven. • To know the following cooking techniques: sieving, creaming, rubbing method, cooling. • To understand the importance of budgeting while planning ingredients for biscuits
	Additional	

Textiles

Fastenings

Skills	Design	• Writing design criteria for a product, articulating decisions made. Designing a personalised book sleeve.
	Make	• Making and testing a paper template with accuracy and in keeping with the design criteria. • Measuring, marking and cutting fabric using a paper template. • Selecting a stitch style to join fabric. • Working neatly by sewing small, straight stitches. Incorporating a fastening to a design.
	Evaluate	• Testing and evaluating an end product against the original design criteria. • Deciding how many of the criteria should be met for the product to be considered successful. • Suggesting modifications for improvement. Articulating the advantages and disadvantages of different fastening types.

Knowledge	Technical	• To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro. • To know that different fastening types are useful for different purposes. To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.

	Additional	
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Digital World

Mindful moments timer

Skills	Design	• Writing design criteria for a programmed timer (Micro:bit). • Exploring different mindfulness strategies. • Applying the results of my research to further inform my design criteria. • Developing a prototype case for my mindful moment timer. • Using and manipulating shapes and clipart by using computer-aided design (CAD), to produce a logo. • Following a list of design requirements.
	Make	• Developing a prototype case for my mindful moment timer. • Creating 3D structures using modelling materials. • Programming a micro: bit in the Microsoft micro: bit editor, to time a set number of seconds/minutes upon button press.

	Evaluate	• Investigating and analysing a range of timers by identifying and comparing their advantages and disadvantages. • Evaluating my Micro: bit program against points on my design criteria and amending them to include any changes I made. • Documenting and evaluating my project. • Understanding what a logo is and why they are important in the world of design and business. • Testing my program for bugs (errors in the code). • Finding and fixing the bugs (debug) in my code. • Using an exhibition to gather feedback. • Gathering feedback from the user to make suggested improvements to a product
Knowledge	Technical	• To understand what variables are in programming. • To know some of the features of a Micro: bit. • To know that an algorithm is a set of instructions to be followed by the computer. • To know that it is important to check my code for errors (bugs). To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device.

	Additional	• To understand the terms 'ergonomic' and 'aesthetic'. • To know that a prototype is a 3D model made out of cheap materials, that allows us to test design ideas and make better decisions about size, shape and materials. • To know that an exhibition is a way for companies to showcase products, meet potential new customers and gather feedback from users.

All information taken directly from Kapow.