

## *Design and technology*

### *Long-term plan*

Our KS1 and KS2 long-term plan for **Design and technology**, is for schools that deliver the subject most weeks.

This document is regularly updated to reflect changes in our content. This version was created on 21-01-22.

Please visit [this link](#) to download the current version.

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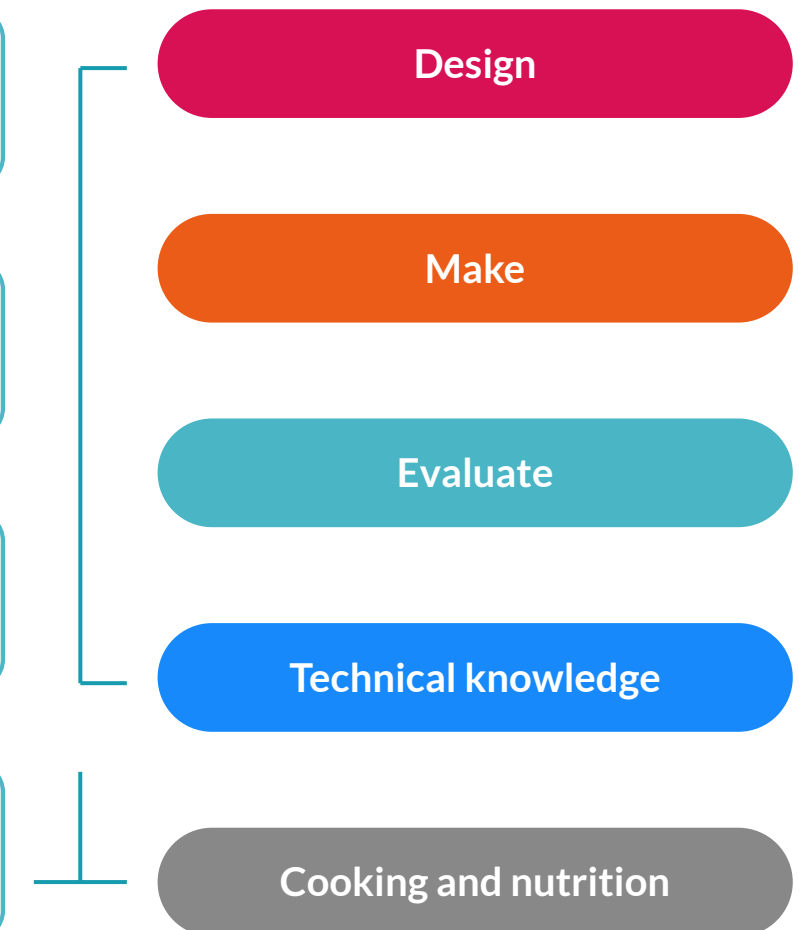
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# How does Kapow Primary's scheme of work align with the National Curriculum?

Our scheme of work fulfils the statutory requirements outlined in the **National Curriculum (2014)**. The National Curriculum Programme of Study 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.

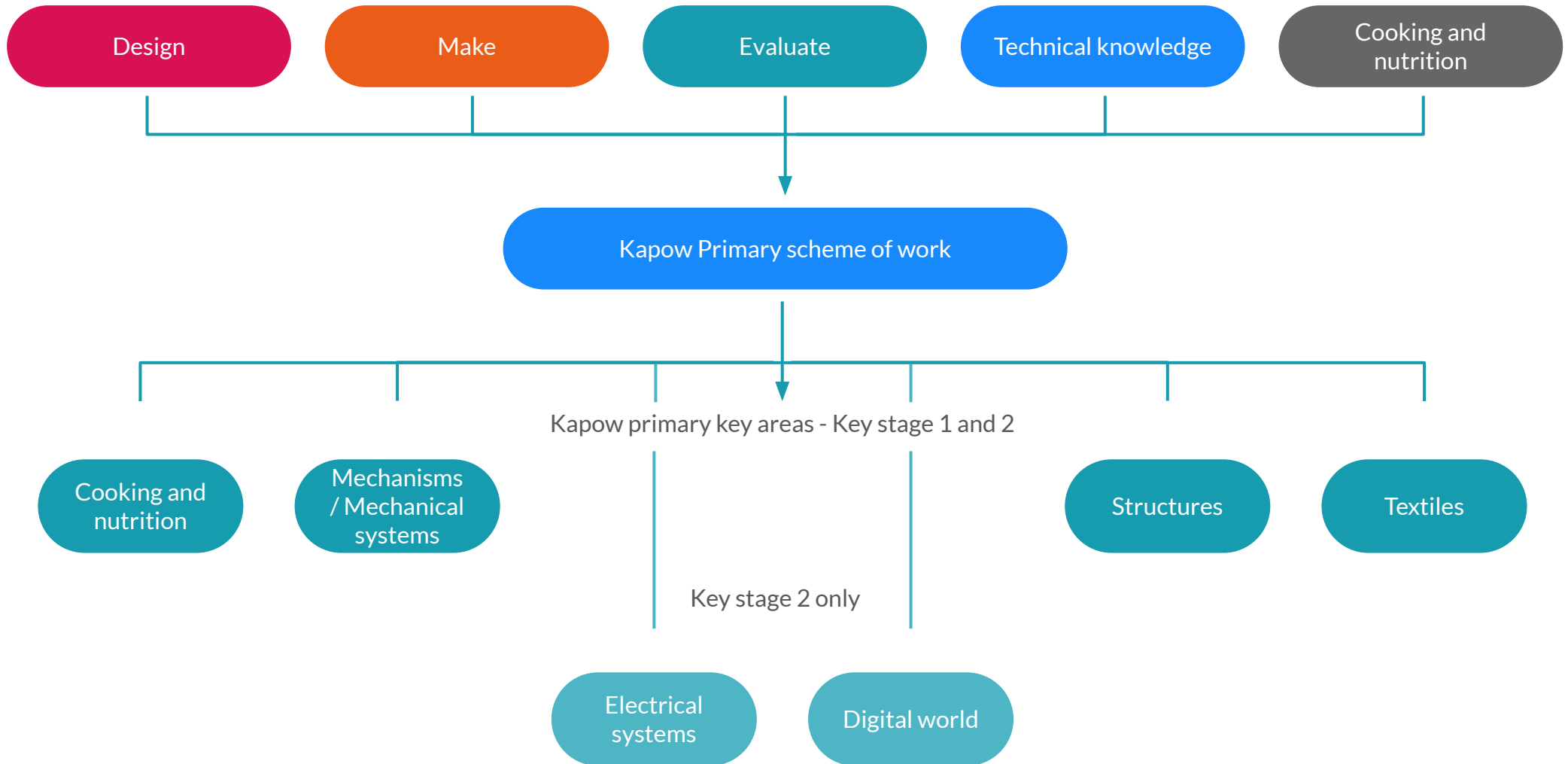
We have identified five key strands which run throughout our scheme of work:



Our [Curriculum overview](#) document shows which of our units cover each of the National Curriculum attainment targets as well as each of the five key areas. Each lesson plan references the relevant National Curriculum objectives, along with cross-curricular links to any other subjects.

# *How is the Design and technology scheme of work organised?*

National Curriculum guidance



# Key areas

The six key areas are revisited each year, with Electrical systems and Digital world beginning in KS2. The areas enable all subject leads, specialists or non-specialists, to understand and make it easy for teachers to see prior and future learning for your pupils. You can see, at a glance, how the unit you are teaching fits into their wider learning journey.

## 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.



### 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.



## Key Stage 2

### Electrical systems

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



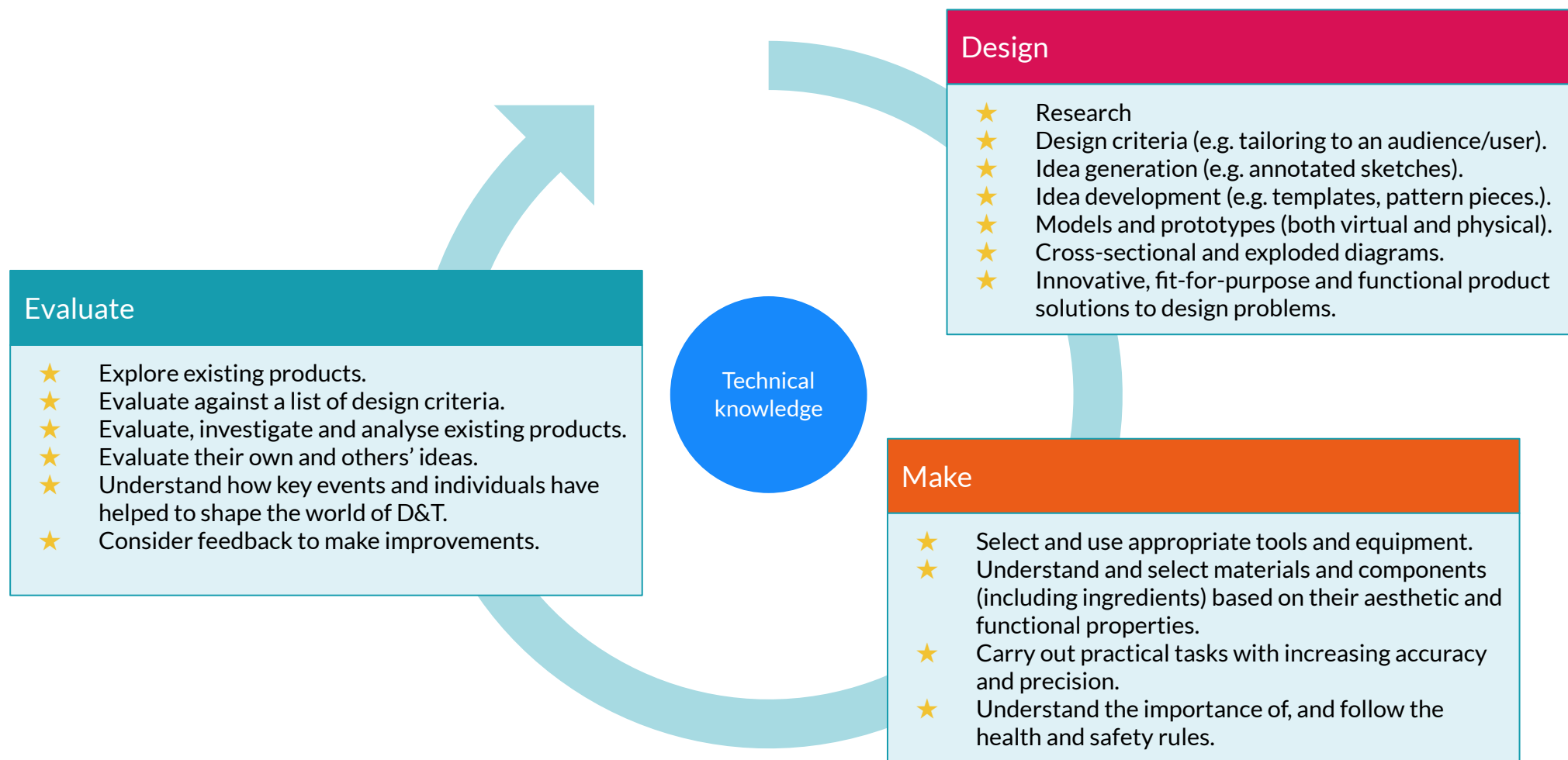
### Digital world

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.



**Cooking and nutrition\*** has a separate section in the D&T National Curriculum, with additional focus on specific principles, skills and techniques in food, including where food comes from, diet and seasonality. Food units still follow the design process summarised above, for example by tasking the pupils to develop recipes for a specific set of requirements (design criteria) and to suggest methods of packaging the food product including the nutritional information.

# How does Kapow Primary help our school to meet statutory guidance for D&T?

Each of our key areas links to the technical knowledge section of the Design and technology National Curriculum *or* reinforces principles learnt through exploring various methods and techniques. From KS1 to KS2, the technical knowledge descriptors build upon prior learning and/or introduce new learning.

	Structures	Mechanisms	Textiles	Electrical systems	Digital world	Cooking and nutrition
KS1	Build structures such as windmills and chairs, exploring how they can be made stronger, stiffer and more stable. Recognise areas of weakness through trial and error.	Introduce and explore simple mechanisms, such as sliders, wheels and axles in their designs. Recognise where mechanisms such as these exist in toys and other familiar products.	Explore different methods of joining fabrics and experiment to determine the pros and cons of each technique.	<b>KS2 only*</b> Create functional electrical products that use series circuits, incorporating different components such as bulbs, LEDs, switches, buzzers and motors.  Consider how the materials used in these products can:	<b>KS2 only*</b> Learn how to develop an electronic product with processing capabilities.  Apply Computing principles to program functions within a product including to control and monitor it.	Learn about the basic rules of a healthy and varied diet to create dishes.  Understand where food comes from, for example plants and animals.
KS2	Continue to develop KS1 exploration skills, through more complex builds such as pavilion and bridge designs. Understand material selection and learn methods to reinforce structures.	<b>Mechanical systems</b>  Extend pupils understanding of individual mechanisms, to form part of a functional system, for example: Automatas, that use a combination of cams, followers, axles/shaft, cranks and topers.	Understand that fabric can be layered for effect, recognising the appearance and technique for different stitch and fastening types, including their: <ul style="list-style-type: none"> <li>• Strength.</li> <li>• Appropriate use.</li> <li>• Design.</li> </ul>	<ul style="list-style-type: none"> <li>• Protect the circuitry.</li> <li>• Reflect light.</li> <li>• Conduct electricity.</li> <li>• Insulate.</li> </ul>	Understand how the history and evolution of product design lead to the on-going Digital revolution and the impact it is having in the world today.	Understand and apply the principles of a healthy and varied diet to prepare and cook a variety of dishes using a range of cooking techniques and methods.  Understand what is meant by seasonal foods.  Know where and how ingredients are sourced.

# *A spiral curriculum*

The scheme of work has been designed as a spiral curriculum with the following key principles in mind:

- ✓ **Cyclical:** Pupils return to the key areas again and again during their time in primary school.
- ✓ **Increasing depth:** Each time a key area is revisited it is covered with greater complexity.
- ✓ **Prior knowledge:** Upon returning to each key area, prior knowledge is utilised so pupils can build upon previous foundations, rather than starting again.



## *Is there any flexibility in the Kapow Primary Design and technology scheme?*

Our Design and technology scheme of work is organised into units of four lessons.

Within each unit, lessons must be taught in order as they build upon each other.

Across a single year group, units themselves do not need to be taught in the suggested order.

The flexibility in the order allows schools to adapt the planning to suit their school and to make use of cross-curricular links available.

The suggested order in these long term plans takes account of the limited resources which may be available in school. Therefore the key strands have been distributed across the year so that all year groups are not requiring the same tools and equipment at the same time.



## *Other useful documentation:*

There are a number of key and essential documents that can support you in planning and approaching our **Design and technology** scheme of work.



### Progression of skills document:

- Shows how understanding and application of key concepts and skills builds year on year.



### Knowledge organisers

- Each unit has a knowledge organiser to support pupils in retaining the knowledge covered in the unit.



### Approaching the new Digital world units to program, monitor and control products



### Design and technology resource and costings sheet



### Intent, Implementation, Impact statement



### Risk assessments

# Suggested long-term plan: Design and technology - Overview (All year groups)

The units within a year group can be taught in **any** order. We have considered the limited equipment available in school when creating our suggested order.  
 All units have 4 lessons

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Food	Mechanisms	Structures	Textiles	Mechanisms	★ Celebrate KS1's achievements in D&T, with a gallery of their products. ★ Set an invention challenge with scrap materials. ★ Extra-curricular trips. ★ Overflow time to complete units.
	<a href="#">Fruit and vegetables</a>	<a href="#">Making a moving story book</a>	<a href="#">Constructing a windmill</a>	<a href="#">Textiles: Puppets</a>	<a href="#">Wheels and axles</a>	
Year 2	Mechanisms	Food	Mechanisms	Structures	Textiles	
	<a href="#">Fairground wheel</a>	<a href="#">A balanced diet</a>	<a href="#">Making a moving monster</a>	<a href="#">Baby bear's chair</a>	<a href="#">Pouches</a>	
Year 3	Textiles	Electrical systems	Mechanical systems	Digital world	Food	Structures
	<a href="#">Cushions</a>	<a href="#">Static electricity</a>	<a href="#">Mechanical systems: Pneumatic toys</a>	<a href="#">Digital world: Electronic charm</a>	<a href="#">Eating seasonally</a>	<a href="#">Constructing a castle</a>
Year 4	Electrical systems	Mechanical systems	Digital world	Food	Structures	Textiles
	<a href="#">Torches</a>	<a href="#">Making a slingshot car</a>	<a href="#">Mindful moments timer</a>	<a href="#">Adapting a recipe</a>	<a href="#">Pavilions</a>	<a href="#">Fastenings</a>
Year 5	Mechanical systems	Digital world	Food	Structures	Textiles	Electrical systems
	<a href="#">Making a pop-up book</a>	<a href="#">Monitoring devices</a>	<a href="#">What could be healthier?</a>	<a href="#">Bridges</a>	<a href="#">Stuffed Toys</a>	<a href="#">Electronic greetings cards</a>
Year 6	Digital world	Food	Structures	Textiles	Electrical systems	Mechanical systems
	<a href="#">Navigating the world</a>	<a href="#">Come dine with me</a>	<a href="#">Playgrounds</a>	<a href="#">Waistcoats</a>	<a href="#">Steady hand game</a>	<a href="#">Automata toys</a>

## Suggested long-term plan: Design and technology - Outline (KS1)

	Year 1	Year 2
Autumn 1	Food	Mechanisms
	<a href="#">Fruit and vegetables</a> (4 lessons) Handle and explore fruits and vegetables and learn how to identify which category they fall into, before undertaking taste testing to establish chosen ingredients for a smoothie they will make, with accompanying packaging.	<a href="#">Fairground wheel</a> (4 lessons) Design and create a functional Ferris wheels, consider how the different components fit together so that the wheels rotate and the structure stands freely. Select appropriate materials and develop their cutting and joining skills.
Autumn 2	Mechanisms	Food
	<a href="#">Making a moving story book</a> (4 lessons) Experiment with sliders before planning and making three pages of a moving story book, based on a familiar story, drawing the page backgrounds, creating the moving parts and assembling it.	<a href="#">A balanced diet</a> (4 lessons) Explore and learn what forms a balanced diet, pupils will taste test ingredient combinations from different food groups that will inform a wrap design of their choice which will include a healthy mix of protein, vegetables and dairy.
Spring 1	Structures	Mechanisms
	<a href="#">Constructing a windmill</a> (4 lessons) Design, decorate and build a windmill for a mouse (client) to live in, develop an understanding of different types of windmill, how they work and their key features. Look at real existing examples and the functions that they carry out.	<a href="#">Making a moving monster</a> (4 lessons) After learning the terms: pivot, lever and linkage, pupils design a monster that will move using a linkage mechanism. Pupils practise making linkages and experiment with various materials to bring their monsters to life.
Spring 2	Textiles	Structures
	<a href="#">Puppets</a> (4 lessons) Explore different ways of joining fabrics before creating hand puppets based upon characters from a well-known fairytale. Develop technical skills of cutting, glueing, stapling and pinning.	<a href="#">Baby bear's chair</a> (4 lessons) Using the tale of Goldilocks and the Three Bears as inspiration, pupils help Baby Bear by making him a brand new chair, exploring different shapes and materials. When designing the chair, they consider his needs and what he likes.
Summer 1	Mechanisms	Textiles
	<a href="#">Wheels and axles</a> (4 lessons) Learn about the main components of a wheeled vehicle. Develop understanding of how wheels, axles and axle holders work; problem-solve why wheels won't rotate; to design and build their own vehicle designs.	<a href="#">Pouches</a> (4 lessons) Introduction to sewing. Pupils make their own template, accurately cut their fabric and sew a basic running stitch.
Summer 2	<ul style="list-style-type: none"> <li>★ Celebrate KS1's achievements in D&amp;T, with a gallery of their products. Rotate the classes and ask them to provide feedback and ask questions to their peers</li> <li>★ Set an invention challenge with scrap and recycled materials. Provide the pupils with a variety of textures and joining methods before sharing their ideas</li> <li>★ Extra-curricular trips. You could plan to take the pupils to see what happens in the world of production, material sourcing, invention and mechanisms</li> <li>★ As overflow time to complete units where other school events takeover or to provide more time for classes to complete projects</li> </ul>	

	<i>Year 3</i>	<i>Year 4</i>
<b>Autumn 1</b>	Textiles	Electrical systems
	<a href="#">Cushions</a> (4 lessons) Introduce two new skills to add to the pupils' repertoire: cross stitch and appliqué. Pupils apply their knowledge to the design, decoration and assembly of their own cushions.	<a href="#">Torches</a> (4 lessons) Pupils apply their scientific understanding of electrical circuits to create a torch made from recycled and reclaimed materials and objects. They design and evaluate their product against set design criteria.
<b>Autumn 2</b>	Electrical systems	Mechanical systems
	<a href="#">Static electricity</a> (4 lessons) Introduction to static electricity and the effects of static electricity on objects such as plastic straws, tissue paper and glitter. Pupils consider ways of using static electricity as part of a simple game.	<a href="#">Making a slingshot car</a> (4 lessons) Transform lollipop sticks, wheels, dowel and straws into a moving car. Pupils use a glue gun to construct, make the launch mechanism, design and create the chassis of a vehicle using nets.
<b>Spring 1</b>	Mechanical systems	Digital World
	<a href="#">Pneumatic toys</a> (4 lessons) Design and create a toy with a pneumatic system, learning how trapped air can be used to create a product with moving parts. Pupils are introduced to thumbnail sketches and exploded diagrams.	<a href="#">Mindful moments timer</a> (4 lessons) Design, program, prototype and brand a Micro:bit timer to a specified amount of minutes. Pupils carry out research and existing product analysis to determine how a programmable product could be personalised to their needs.
<b>Spring 2</b>	Digital World	Food
	<a href="#">Electronic charm</a> (4 lessons) Design, code, make and promote a Micro:bit electronic charm to use in low-light conditions, developing their understanding of programming to monitor and control products to solve a design scenario.	<a href="#">Adapting a recipe</a> (4 lessons) Work in groups to adapt a simple biscuit recipe, to create the tastiest biscuit ensuring that their creation comes within the given budget of overheads and costs of ingredients.
<b>Summer 1</b>	Food	Structure
	<a href="#">Eating seasonally</a> (4 lessons) Pupils discover when and where fruits and vegetables are grown and learn about seasonality in the UK. They look at the relationship between the colour of fruits and vegetables and their health benefits by making three dishes.	<a href="#">Pavilions</a> (4 lessons) Explore pavilion structures, learn about what they are used for and investigate how to create strong and stable structures before designing and creating their own pavilions, complete with cladding.
<b>Summer 2</b>	Structure	Textiles
	<a href="#">Constructing a castle</a> (4 lessons) Learning about the features of a castle, pupils design and make one of their own. They will also be using configurations of handmade nets and recycled materials to make towers and turrets before constructing a stable base.	<a href="#">Fastenings</a> (4 lessons) Building upon their sewing skills from previous years, pupils design and create a book sleeve; exploring a variety of fastenings and selecting the most appropriate for their design based on strength and appropriate-use.

# Suggested long-term plan: Design and technology - Outline (Upper KS2)

	Year 5	Year 6
Autumn 1	Mechanical systems	Digital world
	<a href="#">Making a pop-up book</a> (4 lessons) Create a four-page pop-up story book design, incorporating a range of functional mechanisms that use levers, sliders, layers and spacers to give the illusion of movement through interaction.	<a href="#">Navigating the world</a> (5 lessons) <i>Lesson 5 is optional*</i> Program a navigation tool to produce a multifunctional device for trekkers. Combine 3D virtual objects to form a complete product concept in 3D computer-aided design modelling software.
Autumn 2	Digital world	Food
	<a href="#">Monitoring devices</a> (4 lessons) Program a Micro: bit animal monitoring device that will alert the owner when the temperature is not optimal. Develop 3D CAD skills by learning how to navigate the Tinkercad interface and essential tools.	<a href="#">Come dine with me</a> (4 lessons) Research and prepare a three-course meal and taste-test and score their food. Research the journey of their main ingredient from 'farm to fork' or write a favourite recipe.
Spring 1	Food	Structures
	<a href="#">What could be healthier?</a> (4 lessons) Research and modify a traditional bolognese sauce recipe to make it healthier. Cook improved versions, creating appropriate packaging and learn about where the ingredients the importance of animal welfare when farming cattle.	<a href="#">Playgrounds</a> (4 lessons) Design and create a model for a new playground featuring five apparatus, made from three different structures. Using a footprint as the base, practise visualising objects in plan view and get creative including natural features.
Spring 2	Structures	Textiles
	<a href="#">Bridges</a> (4 lessons) After learning about various types of bridges and exploring how the strength of structures can be affected by the shapes used, create their own bridge and test its durability - using woodworking tools and techniques.	<a href="#">Waistcoats</a> (4 lessons) Select fabrics, use templates, pin, decorate and stitch materials together to create a waistcoat for a person or purpose of their choosing. Create or use a pattern template to fit a desired person or item (e.g. teddy bear).
Summer 1	Textiles	Electrical systems
	<a href="#">Stuffed Toys</a> (4 lessons) Create a stuffed toy by applying skills learnt in previous units. Introduce blanket stitch.	<a href="#">Steady hand game</a> (4 lessons) Design and create a steady hand game, use nets to create the bases and apply knowledge of electrical circuits to build an operational circuit with a buzzer that completes the circuit when the handle makes contact with the wire.
Summer 2	Electrical systems	Mechanical systems
	<a href="#">Electronic greetings cards</a> (4 lessons) Explore how circuits can be adapted to suit different purposes, explore series circuits and recreate one using conductive adhesive copper tape. Apply this knowledge to design and create an electronic greeting card.	<a href="#">Automata toys</a> (4 lessons) Use woodworking skills, pupils construct an automata; measuring and cutting their materials, assembling the frame, choosing cams and designing the characters that sit on the followers to form an interactive shop display.