Design and technology

Long-term plan

Standard

Our standard Long-term plan covering the KS1 and KS2 National Curriculum and including lessons for the EYFS (Reception).

This document is regularly updated to reflect changes in our content and the most recent version can always be found here.

This version was created on 11.07.24

Contents:

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:

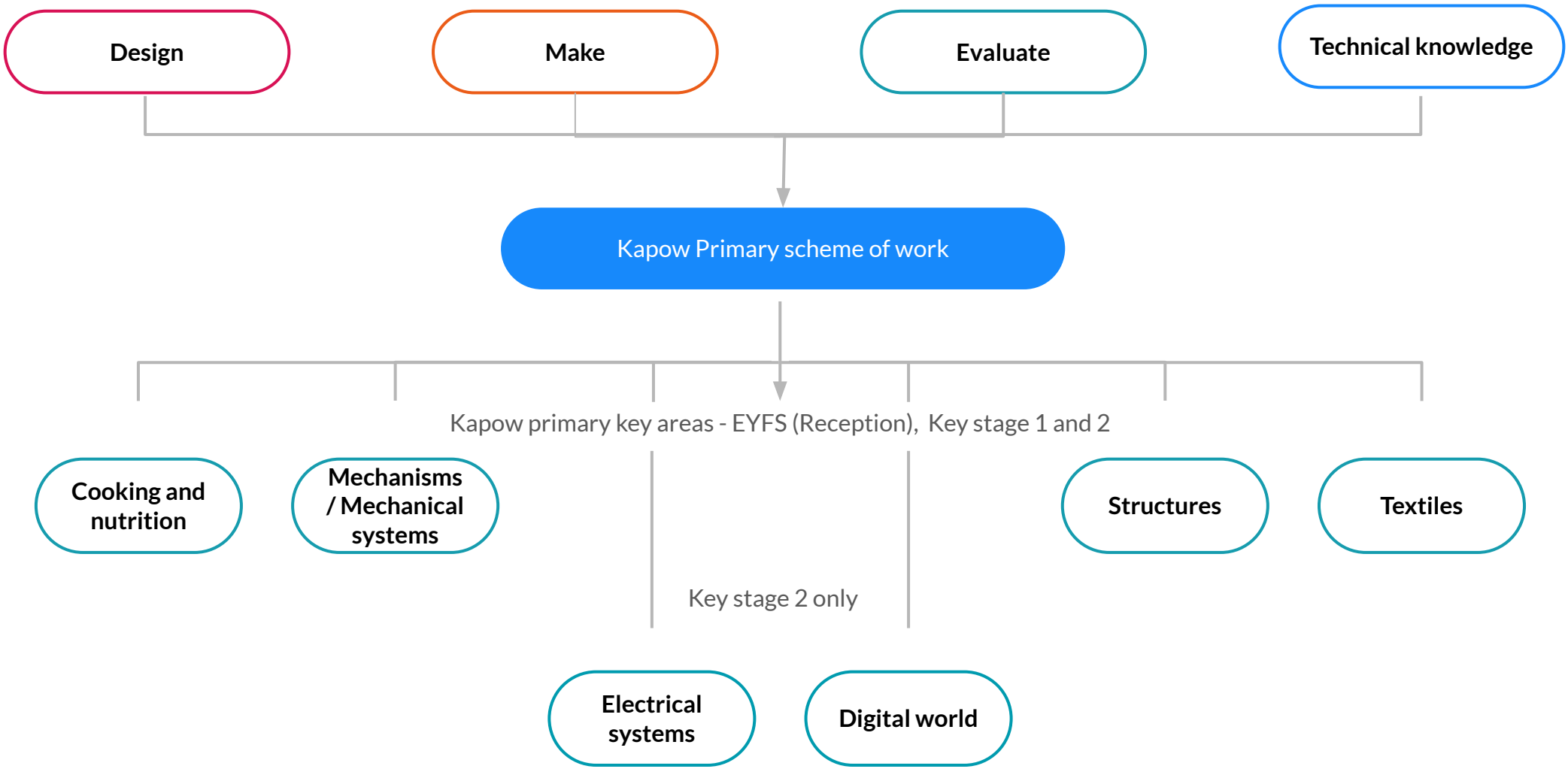
- ★ develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world.
- ★ build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes 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.
  (*This aim is linked to the four strands, but is primarily met by teaching units from our Cooking and nutrition key area)

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

- **Design**
- **Make**
- **Evaluate**
- **Technical knowledge**

Our D&T: National curriculum overview document shows which of our units cover each of the National curriculum attainment targets and strands above. Each lesson plan references the relevant National curriculum objectives, along with cross-curricular links to any other subjects. For EYFS (Reception) links are made to Development matters and the Early Learning Goals.

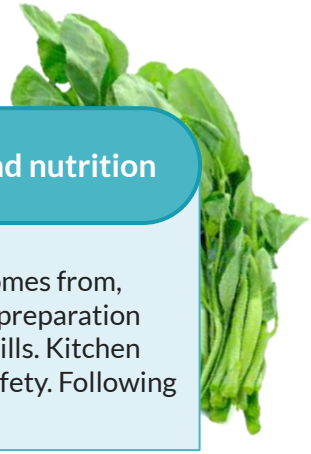
How is the Design and technology scheme of work organised?



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.

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.

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.

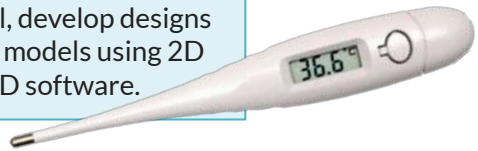
Key Stage 2

Electrical systems

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

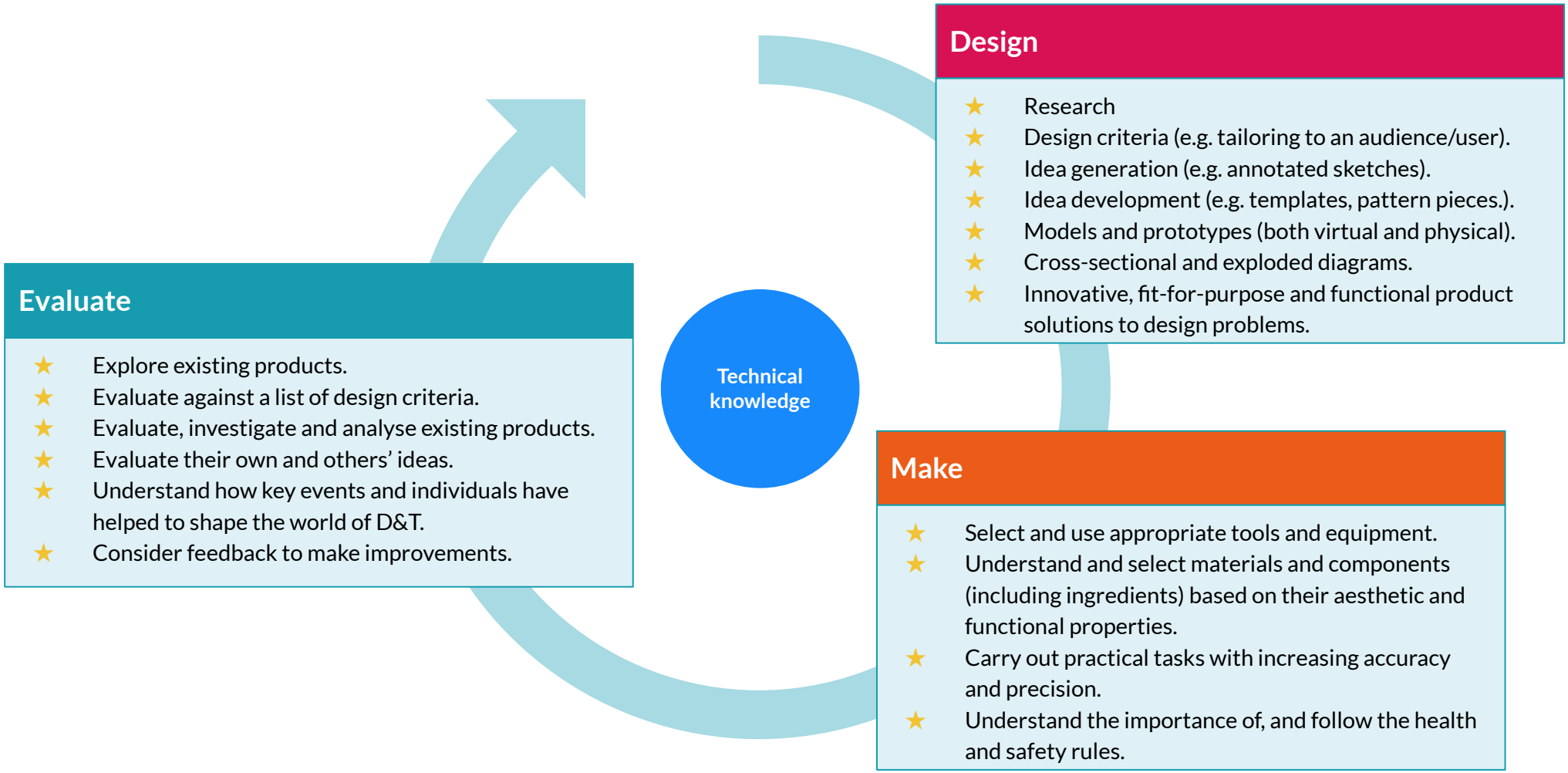
Digital world

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. Cooking and nutrition 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
EYFS	Explore junk modelling, tinkering with temporary and permanent joins, and a range of materials. Create basic models to test in different conditions.	Explore a simple paper slider mechanism.	Explore and develop threading and weaving skills with different materials and objects.			Explore and become familiar with different fruits and vegetables, using their senses.
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.	**KS2 only*** 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: • Protect the circuitry. • Reflect light. • Conduct electricity. • Insulate.	**KS2 only*** 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. 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.	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.	**Mechanical systems** 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 toppers.	Understand that fabric can be layered for effect, recognising the appearance and technique for different stitch and fastening types, including their: • Strength. • Appropriate use. • Design.			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.

Design and technology in EYFS (reception)

Child-led learning is integral to the Early Years curriculum, and rightly so. Supporting children in following and exploring their own interests allows for a greater depth of learning and understanding and much higher levels of wellbeing and engagement.

Adults in the classroom can model how to use Design and technology to aid children in their pursuits and scaffold the learning so that they can reach a deeper level of understanding.

We know that the difficulty with child-led Design and technology projects often arises when the pupils are not equipped to properly plan their creation or execute their ideas in the way that they wish, sometimes meaning that they will spend a very short amount of time at the workshop or junk modelling area before moving on.

Planning, designing, making and developing skills and knowledge are all fundamental parts of our Design and technology scheme. As you work through our EYFS reception units, children will have plenty of opportunities to get to know each of these areas, as they explore different materials, processes and outcomes.

When pupils are accessing these areas outside of lesson times, it is your job to support and scaffold their learning, offering suggestions or listening to their ideas. Rather than creating artificial learning opportunities during these times of child-led play, instead wait until you observe that a child or group of children have shown a particular interest in a topic. Offer to help them enhance their chosen area of exploration by providing additional resources, demonstrating how to use existing resources or even using the computer.

To learn more please see our Teacher guide: D&T and Continuous Provision.

Oracy in Design and technology

‘Oracy is the ability to speak eloquently, to articulate ideas and thoughts, to influence through talking, to collaborate with peers and to express views confidently and appropriately.

Oracy refers both to the development of speaking and listening skills, and the effective use of spoken language in teaching and learning. It is to speech what literacy is to reading and writing, and numeracy is to Maths.’

Speak for Change: Final report and recommendations from the Oracy All-Party Parliamentary Group Inquiry.

Learning *through* talk

At Kapow Primary, we believe it's crucial to provide pupils with opportunities for exploratory talk during their learning. This involves thinking aloud, questioning, discussing, and collaboratively building ideas.

Learning *to* talk

Similarly, developing oracy skills is essential for pupils to express and articulate themselves effectively across various contexts and settings, including formal ones like public speaking, debates, and interviews.

Through our Design and technology curriculum, pupils have opportunities to develop their oracy skills by:

- Presenting their design ideas or products to audiences of different sizes.
- Explaining designs, preferences or final products.
- Role-playing from the point of view of the user.
- Discussing products and design ideas using new vocabulary.
- Collaborating by organising tasks within a group.
- Critiquing others’ designs and products.
- Reflecting on and responding to feedback towards their own designs and products.
- Summarising design ideas.

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 or six lessons. The scheme is currently being updated so that each unit will have six lessons, starting with the Cooking and nutrition units.

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 essential documents that can support you in planning and approaching our **Design and technology** scheme of work and they can be found on our Subject planning page

- ✓ Progression of knowledge and skills document
- ✓ National curriculum mapping
- ✓ Knowledge organisers
- ✓ Approaching the new Digital world units *to program, monitor and control products*
- ✓ Design and technology resource and costings sheet
- ✓ Equipment list
- ✓ Personal development, SMSC and British values mapping
- ✓ Intent, Implementation, Impact statement
- ✓ Risk assessments

Suggested long-term plan: Design and technology - Overview (EYFS and KS1)

	Unit 1	Unit 2	Unit 3	Unit 4		
EYFS (Reception)	**Structures**	**Cooking and nutrition**	**Textiles**	**Structures**		
	Junk modelling	Soup	Bookmarks	Boats		
	Autumn lesson	**Christmas lesson**	**Spring lesson**	**Easter lesson**	**Summer lessons**	
	Hibernation box	Sliding picture	Flower threading	Hanging decoration	Designing a rainbow salad *and* Making a rainbow salad	
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Year 1	**Mechanisms**	**Structures**	**Textiles**	**Mechanisms**	**Cooking and nutrition**	★ 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.
	Making a moving story book	Constructing a windmill	Textiles: Puppets	Wheels and axles	Smoothies (6 lessons)	
Year 2	**Mechanisms**	**Cooking and nutrition**	**Mechanisms**	**Structures**	**Textiles**	
	Fairground wheel	Balanced diet (6 lessons)	Making a moving monster	Baby bear's chair	Pouches	

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 six lessons in EYFS (Reception) and four lessons in KS1, unless stated otherwise.

Suggested long-term plan: Design and technology - Overview (Key stage 2)

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.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 3	**Textiles**	**Electrical systems**	**Mechanical systems**	**Digital world**	**Cooking and nutrition**	**Structures**
	Cross-stitch and applique Cushions or Egyptian collars	Electric poster	Pneumatic toys	Wearable technology	Eating seasonally (6 lessons)	Constructing a castle
Year 4	**Electrical systems**	**Mechanical systems**	**Digital world**	**Cooking and nutrition**	**Structures**	**Textiles**
	Torches	Making a slingshot car	Mindful moments timer	Adapting a recipe (6 lessons)	Pavilions	Fastenings
Year 5	**Mechanical systems**	**Digital world**	**Cooking and nutrition**	**Structures**	**Textiles**	**Electrical systems**
	Making a pop-up book	Monitoring devices	Developing a recipe (6 lessons)	Bridges	Stuffed Toys	Doodlers
Year 6	**Digital world**	**Cooking and nutrition**	**Structures**	**Textiles**	**Electrical systems**	**Mechanical systems**
	Navigating the world	Come dine with me (6 lessons)	Playgrounds	Waistcoats	Steady hand game	Automata toys

	EYFS: Reception		
Unit 1	**Workshop** Junk modelling **(5 lessons)** Exploring materials through junk modelling, children develop their scissor skills and awareness of different materials and joining techniques. Children begin to make verbal plans and material choices before starting and problem solve while making their model.	Autumn lesson	Hibernation box (1 lesson) Designing and making a hibernation box, children consider the function of a product.
Unit 2	**Cooking and nutrition** Soup **(5 lessons)** Learning about vegetables and where they come from while preparing to make a soup. Children describe the taste of a range of vegetables and design a soup recipe as a class. They practise cutting skills and prepare the vegetables for their class soup before testing the final product.	Christmas lesson	Sliding picture (1 lesson) Creating a sliding mechanism chimney picture, children develop their cutting and joining skills.
Unit 3	**Textiles** Bookmarks Developing fine motor skills through a range of threading activities before moving on to use binka and a needle. Children design a bookmark, considering what to include and why and then follow their designs to complete their bookmarks.	Spring lesson	Flower threading (1 lesson) Creating their own threading cards, children practise using scissors and a hole punch.
Unit 4	**Structures** Boats Considering the properties of materials through water play, children discover which materials are waterproof and whether they float or sink. Children evaluate a variety of boats and use their new-found knowledge to design and make a boat that is waterproof and floats.	Easter lesson	Hanging decoration (1 lesson) Designing a hanging egg decoration, children make choices about how to decorate.
		Summer lessons	Rainbow salad (2 lessons) Researching, designing and making a colourful and healthy salad.

	Year 1		
Autumn 1	**Mechanisms** Making a moving story book **(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.	**Autumn 2**	**Structures/ Mechanisms** Constructing a windmill **(4 lessons)** Construct a windmill to complete a request from a user. Develop an understanding of different types of windmill, how they work and their key features. Begin to use technical skills such as making evenly spaced cuts and adding weight to ensure a successful structure.
Spring 1	**Textiles** Puppets **(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.	**Spring 2**	**Mechanisms** Wheels and axles **(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.
Summer 1	**Cooking and nutrition** Smoothies **(6 lessons)** Handle and explore fruits and vegetables and learn how to identify fruit, before undertaking taste testing to establish chosen ingredients for a smoothie they will make, with accompanying packaging.	**Summer 2**	★ Celebrate KS1's achievements in D&T, with a gallery of their products. Rotate the classes and ask them to provide feedback and ask questions to their peers ★ Set an invention challenge with scrap and recycled materials. Provide the pupils with a variety of textures and joining methods before sharing their ideas ★ Extra-curricular trips. You could plan to take the pupils to see what happens in the world of production, material sourcing, invention and mechanisms ★ As overflow time to complete units where other school events takeover or to provide more time for classes to complete projects

	Year 2		
Autumn 1	**Mechanisms** Fairground wheel **(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	**Cooking and nutrition** Balanced diet **(6 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	**Mechanisms** Making a moving monster **(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	**Structures** Baby bear's chair **(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	**Textiles** Pouches **(4 lessons)** Introduction to sewing. Pupils make their own template, accurately cut their fabric and sew a basic running stitch.	Summer 2	★ Celebrate KS1's achievements in D&T, with a gallery of their products. Rotate the classes and ask them to provide feedback and ask questions to their peers ★ Set an invention challenge with scrap and recycled materials. Provide the pupils with a variety of textures and joining methods before sharing their ideas ★ Extra-curricular trips. You could plan to take the pupils to see what happens in the world of production, material sourcing, invention and mechanisms ★ As overflow time to complete units where other school events takeover or to provide more time for classes to complete projects

	Year 3		
Autumn 1	**Textiles** **Cross stitch and appliqué (4 lessons)** Cushions or Egyptian collars 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 or Egyptian collars.	Autumn 2	**Electrical systems** Electric poster **(4 lessons)** An introduction to information design and electrical systems, pupils create an electric poster using a basic circuit to develop a museum display about The Romans.
Spring 1	**Mechanical systems** Pneumatic toys **(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. Pupil are introduced to thumbnail sketches and exploded diagrams.	Spring 2	**Digital world** Wearable technology **(4 lessons)** Design, code and promote a piece of wearable technology to use in low light conditions, developing their understanding of programming to monitor and control products to solve a design scenario.
Summer 1	**Cooking and nutrition** Eating seasonally **(6 lessons)** Pupils discover when and where fruits and vegetables are grown and learn about seasonality in the UK. They respond to a design brief to design a seasonal food tart using ingredients harvested in the UK in May and June.	Summer 2	**Structure** Constructing a castle **(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.

	Year 4		
Autumn 1	**Electrical systems** Torches **(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.	Autumn 2	**Mechanical systems** Making a slingshot car **(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.
Spring 1	**Digital world** Mindful moments timer **(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.	Spring 2	**Cooking and nutrition** Adapting a recipe **(6 lessons)** Work in groups to adapt a simple biscuit recipe, to create a biscuit suited to a chosen target audience. They ensure that their creation comes within a given budget of overheads and ingredients.
Summer 1	**Structure** Pavilions **(4 lessons)** Exploring pavilion structures, learning 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.	Summer 2	**Textiles** Fastenings **(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.

	Year 5		
Autumn 1	**Mechanical systems** Making a pop-up book **(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.	Autumn 2	**Digital world** Monitoring devices **(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.
Spring 1	**Cooking and nutrition** Developing a recipe **(6 lessons)** Research and modify a traditional bolognese sauce recipe to improve the nutritional value. Cook improved version and create packaging that fits design criteria. Learn about where beef comes from.	Spring 2	**Structures** Bridges **(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.
Summer 1	**Textiles** Stuffed toys **(4 lessons)** Create a stuffed toy by applying skills learnt in previous units. Introduce blanket stitch.	Summer 2	**Electrical systems** Doodlers **(4 lessons)** Explore series circuits further and introduce motors. Explore how the design cycle can be approached at a different starting point, by investigating an existing product, which uses a motor, to encourage pupils to problem-solve and work out how the product has been constructed, ready to develop their own.

	Year 6		
Autumn 1	**Digital world** Navigating the world **(5 lessons)** ***Lesson 5 is optional**** 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**	**Cooking and nutrition** Come dine with me **(6 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' and write a favourite recipe.
Spring 1	**Structures** Playgrounds **(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**	**Textiles** Waistcoats **(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	**Electrical systems** Steady hand game **(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**	**Mechanical systems** Automata toys **(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.

This page shows recent updates that have been made to this document.

Date	Update
08.06.22	Y5 *Doodlers* unit replaces *Electronic greetings card* unit p. 7 and p. 15
19.08.22	Added new alternative Year 3 Cross stitch and applique theme p.10
09.11.22	Added EYFS (Reception) units which are now published on the website.
20.03.23	Changed key area title from 'Food' to 'Cooking and nutrition' and removed 'Cooking and nutrition as a strand.
28.08.23	Year 3 unit has been refreshed and is now called 'Wearable technology' (p.12, p. 16) Year 1 units have been re-ordered (p.11, p.14) so that the Cooking and nutrition unit is later in the year. This means that schools will be able to use the refreshed version of the unit as it will be available. Note on all food units to explain that they will soon be refreshed and contain six lessons.
27.10.23	Cooking and nutrition units have been updated and refreshed to include six lessons.
30.04.24	Updated to reflect refreshed 'Constructing a windmill unit.' (p.14).
10.07.24	Added a page on oracy in Design and technology (p.9).