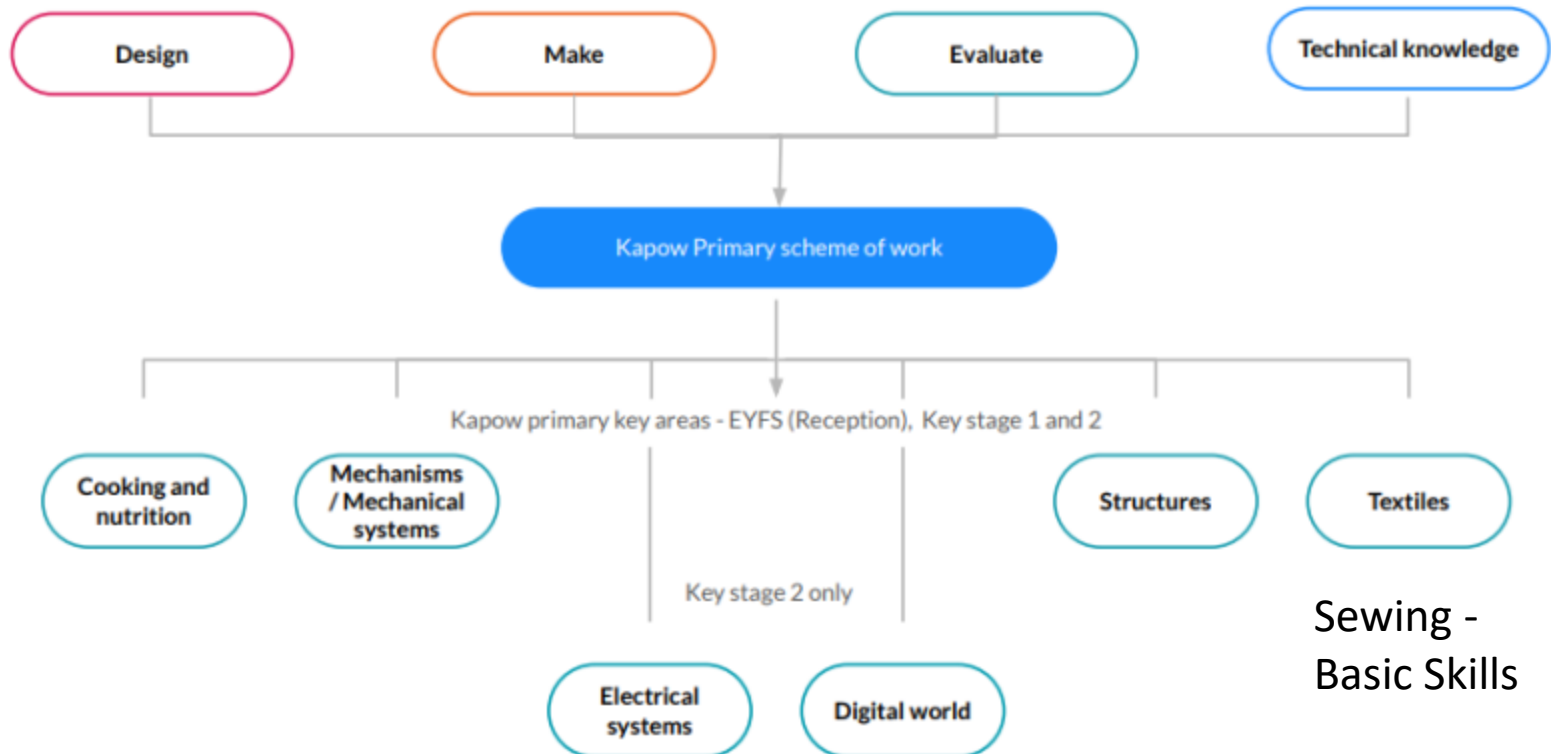


How is the Design and technology scheme of work organised?



EYFS Cycle A and B

Progression of skills and knowledge

Structures

		EYFS (Reception)	
		<u>Junk modelling</u>	<u>Boats</u>
Skills	Design	• Making verbal plans and material choices. • Developing a junk model.	• Designing a junk model boat. • Using knowledge from exploration to inform design.
	Make	• Improving fine motor/scissor skills with a variety of materials. • Joining materials in a variety of ways (temporary and permanent). • Joining different materials together. • Describing their junk model, and how they intend to put it together.	• Making a boat that floats and is waterproof, considering material choices.
	Evaluate	• Giving a verbal evaluation of their own and others' junk models with adult support. • Checking to see if their model matches their plan. • Considering what they would do differently if they were to do it again. • Describing their favourite and least favourite part of their model.	• Making predictions about, and evaluating different materials to see if they are waterproof. • Making predictions about, and evaluating existing boats to see which floats best. • Testing their design and reflecting on what could have been done differently. • Investigating the how the shapes and structure of a boat affect the way it moves.
Knowledge	Technical	• To know there are a range to different materials that can be used to make a model and that they are all slightly different. • Making simple suggestions to fix their junk model.	• To know that 'waterproof' materials are those which do not absorb water.
	Additional		• To know that some objects float and others sink. • To know the different parts of a boat.

Cooking and nutrition

Progression of skills and knowledge

		EYFS (Reception)
		<u>Soup</u>
Skills	Design	• Designing a soup recipe as a class. • Designing soup packaging.
	Make	• Chopping plasticine safely. • Chopping vegetables with support.
	Evaluate	• Tasting the soup and giving opinions. • Describing some of the following when tasting food: look, feel, smell and taste. • Choosing their favourite packaging design and explaining why.
Knowledge		• To know that soup is ingredients (usually vegetables and liquid) blended together. • To know that vegetables are grown. • To recognise and name some common vegetables. • To know that different vegetables taste different. • To know that eating vegetables is good for us. • To discuss why different packages might be used for different foods.

KS1 Cycle A

Progression of skills and knowledge

Skills	Design
	Make
	Evaluate
Knowledge	Technical
	Additional

Structures

Year 2

Baby bear's chair

- Generating and communicating ideas using sketching and modelling.
- Learning about different types of structures, found in the natural world and in everyday objects.

- Making a structure according to design criteria.
- Creating joints and structures from paper/card and tape.
- Building a strong and stiff structure by folding paper.

- Exploring the features of structures.
- Comparing the stability of different shapes.
- Testing the strength of own structures.
- Identifying the weakest part of a structure.
- Evaluating the strength, stiffness and stability of own structure.

- To know that shapes and structures with wide, flat bases or legs are the most stable.
- To understand that the shape of a structure affects its strength.
- To know that materials can be manipulated to improve strength and stiffness.
- To know that a structure is something which has been formed or made from parts.
- To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move.
- To know that a 'strong' structure is one which does not break easily.
- To know that a 'stiff' structure or material is one which does not bend easily.

- To know that natural structures are those found in nature.
- To know that man-made structures are those made by people.

Year 1

		<u>Making a moving storybook</u>
Skills	Design	- Explaining how to adapt mechanisms, using bridges or guides to control the movement. - Designing a moving story book for a given audience.
	Make	Following a design to create moving models that use levers and sliders.
	Evaluate	- Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed. - Reviewing the success of a product by testing it with its intended audience.
Knowledge	Technical	- To know that a mechanism is the parts of an object that move together. - To know that a slider mechanism moves an object from side to side. - To know that a slider mechanism has a slider, slots, guides and an object. - To know that bridges and guides are bits of card that purposefully restrict the movement of the slider.
	Additional	To know that in Design and technology we call a plan a 'design'.

Year 3/4 Cycle A

Progression of skills and knowledge

Electrical systems (KS2 only)

Year 3	
<u>Electric poster</u>	
Skills	Design • Carry out research based on a given topic (e.g. The Romans) to develop a range of initial ideas. • Generate a final design for the electric poster with consideration to the client's needs and design criteria. • Design an electric poster that fits the requirements of a given brief. • Plan the positioning of the bulb (circuit component) and its purpose.
	Make • Create a final design for the electric poster. • Mount the poster onto corrugated card to improve its strength and allow it to withstand the weight of the circuit on the rear. • Measure and mark materials out using a template or ruler. • Fit an electrical component (bulb). • Learn ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge).
	Evaluate • Learning to give and accept constructive criticism on own work and the work of others. • Testing the success of initial ideas against the design criteria and justifying opinions. • Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs.
Knowledge	Technical • To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit. • To understand common features of an electric product (switch, battery or plug, dials, buttons etc.). • To list examples of common electric products (kettle, remote control etc.). • To understand that an electric product uses an electrical system to work (function). • To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits.
	Additional • To understand the importance and purpose of information design. • To understand how material choices (such as mounting paper to corrugated card) can improve a product to serve its purpose (remain rigid without bending when the electrical circuit is attached).

Year 3		
<u>Eating seasonally</u>		
Skills	Design	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.
	Make	• Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination. • Following the instructions within a recipe.
	Evaluate	• Establishing and using design criteria to help test and review dishes. • Describing the benefits of seasonal fruits and vegetables and the impact on the environment. • Suggesting points for improvement when making a seasonal tart.
Knowledge		• To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons. • To know that cooking instructions are known as a 'recipe'. • To know that imported food is food which has been brought into the country. • To know that exported food is food which has been sent to another country. • To understand that imported foods travel from far away and this can negatively impact the environment. • To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre. • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health. • To know safety rules for using, storing and cleaning a knife safely. • To know that similar coloured fruits and vegetables often have similar nutritional benefits.

Electric Charm

Skills

Design

Make

Evaluate

Key skills

- ✓ Problem solving by suggesting potential features on a Micro:bit and justifying my ideas.
- ✓ Using a template when cutting and assembling the pouch.
- ✓ Applying function features such as foam to create switches and buttons.
- ✓ Developing design ideas for a technology pouch.
- ✓ Following a list of design requirements.
- ✓ Analysing and evaluating an existing product.
- ✓ Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge.
- ✓ Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch.
- ✓ Identifying the key features of a product.

Key knowledge

- ✓ To understand that in programming a 'loop' is code that repeats something again and again until stopped.
- ✓ To know that a Micro:bit is a pocket-sized, codeable computer.
- ✓ Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.

Year 5/6 Cycle A

Progression of skills and knowledge

Mechanisms / mechanical systems

		Year 5
		<u>Pop up book</u>
Skills	Design	• Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. • Storyboarding ideas for a book.
	Make	• Following a design brief to make a pop up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.
	Evaluate	• Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement.
Knowledge	Technical	• To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms.
	Additional	• To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.

Year 5		
<u>What could be healthier?</u>		
Skills	Design	- Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. - Writing an amended method for a recipe to incorporate the relevant changes to ingredients. - Designing appealing packaging to reflect a recipe.
	Make	- Cutting and preparing vegetables safely. - Using equipment safely, including knives, hot pans and hobs. - Knowing how to avoid cross-contamination. - Following a step by step method carefully to make a recipe.
	Evaluate	- Identifying the nutritional differences between different products and recipes. - Identifying and describing healthy benefits of food groups.
Knowledge		- To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. - To know that I can adapt a recipe to make it healthier by substituting ingredients. - To know that I can use a nutritional calculator to see how healthy a food option is. - To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects.

Year 6		
		<u>Navigating the world</u>
Skills	Design	• Writing a design brief from information submitted by a client. • Developing design criteria to fulfil the client's request. • Considering and suggesting additional functions for my navigation tool. • Developing a product idea through annotated sketches. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combining one or more 3D objects, using CAD.
	Make	• Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). • Explaining material choices and why they were chosen as part of a product concept. • Programming an N,E, S, W cardinal compass.
	Evaluate	• Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Developing an awareness of sustainable design. • Identifying key industries that utilise 3D CAD modelling and explaining why. • Describing how the product concept fits the client's request and how it will benefit the customers. • Explaining the key functions in my program, including any additions. • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. • Demonstrating a functional program as part of a product concept pitch.
Knowledge	Technical	• To know that accelerometers can detect movement. • To understand that sensors can be useful in products as they mean the product can function without human input.
	Additional	• To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. • To know that 'multifunctional' means an object or product has more than one function. • To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.

Year 1/2 Cycle B

Progression of skills and knowledge

Mechanisms / mechanical systems

		Wheels and axles
Skills	Design	• Designing a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move. • Creating clearly labelled drawings that illustrate movement.
	Make	• Adapting mechanisms, when: • they do not work as they should. • to fit their vehicle design. • to improve how they work after testing their vehicle.
	Evaluate	• Testing wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move.
Knowledge	Technical	• To know that wheels need to be round to rotate and move. • To understand that for a wheel to move it must be attached to a rotating axle. • To know that an axle moves within an axle holder which is fixed to the vehicle or toy. • To know that the frame of a vehicle (chassis) needs to be balanced.
	Additional	• To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles.

Year 1

Year 2	
<u>A balanced diet</u>	
Skills	Design • Designing a healthy wrap based on a food combination which work well together.
	Make • Slicing food safely using the bridge or claw grip. • Constructing a wrap that meets a design brief.
	Evaluate • Describing the taste, texture and smell of fruit and vegetables. • Taste testing food combinations and final products. • Describing the information that should be included on a label. • Evaluating which grip was most effective.
Knowledge	• To know that 'diet' means the food and drink that a person or animal usually eats. • To understand what makes a balanced diet. • To know where to find the nutritional information on packaging. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that nutrients are substances in food that all living things need to make energy, grow and develop. • To know that 'ingredients' means the items in a mixture or recipe. • To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy. • To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'.

Y3/4 Cycle B

Progression of skills and knowledge

Mechanisms / mechanical systems

Year 3

Pneumatic toys

Skills	Design	• Designing a toy which uses a pneumatic system. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Learning that different types of drawings are used in design to explain ideas clearly.
	Make	• Creating a pneumatic system to create a desired motion. • Building secure housing for a pneumatic system. • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy. • Selecting materials due to their functional and aesthetic characteristics. • Manipulating materials to create different effects by cutting, creasing, folding and weaving.
	Evaluate	• Using the views of others to improve designs. • Testing and modifying the outcome, suggesting improvements. • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client.
Knowledge	Technical	• To understand how pneumatic systems work. • To understand that pneumatic systems can be used as part of a mechanism. • To know that pneumatic systems operate by drawing in, releasing and compressing air.
	Additional	• To understand how sketches, drawings and diagrams can be used to communicate design ideas. • To know that exploded-diagrams are used to show how different parts of a product fit together. • To know that thumbnail sketches are small drawings to get ideas down on paper quickly.

		Year 3
		<u>Constructing a castle</u>
Skills	Design	• Designing a castle with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours. • Designing and/or decorating a castle tower on CAD software.
	Make	• Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials.
	Evaluate	• Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design. • Suggesting points for modification of the individual designs.
Knowledge	Technical	• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.
	Additional	• To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose. • To know that a façade is the front of a structure. • To understand that a castle needed to be strong and stable to withstand enemy attack. • To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product.

Y5/6 Cycle B

Progression of skills and knowledge

Electrical systems (KS2 only)

		Year 5
		Doodlers New!
Skills	Design	- Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. - Developing design criteria based on findings from investigating existing products. - Developing design criteria that clarifies the target user.
	Make	- Altering a product's form and function by tinkering with its configuration. - Making a functional series circuit, incorporating a motor. - Constructing a product with consideration for the design criteria. - Breaking down the construction process into steps so that others can make the product.
	Evaluate	- Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. - Determining which parts of a product affect its function and which parts affect its form. - Analysing whether changes in configuration positively or negatively affect an existing product. - Peer evaluating a set of instructions to build a product.
Knowledge	Technical	- To know that series circuits only have one direction for the electricity to flow. - To know when there is a break in a series circuit, all components turn off. - To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. - To know a motorised product is one which uses a motor to function.
	Additional	- To know that product analysis is critiquing the strengths and weaknesses of a product. - To know that 'configuration' means how the parts of a product are arranged.

		Year 5
		<u>Bridges</u>
Skills	Design	• Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.
	Make	• Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties.
	Evaluate	• Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others.
Knowledge	Technical	• To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood.
	Additional	• To understand the difference between arch, beam, truss and suspension bridges. • To understand how to carry and use a saw safely.

Year 6	
<u>Automata toys</u>	
Skills	Design • Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement. • Understanding how linkages change the direction of a force. • Making things move at the same time. • Understanding and drawing cross-sectional diagrams to show the inner-workings of my design.
	Make • Measuring, marking and checking the accuracy of the jelutong and dowel pieces required. • Measuring, marking and cutting components accurately using a ruler and scissors. • Assembling components accurately to make a stable frame. • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles. • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set.
	Evaluate • Evaluating the work of others and receiving feedback on own work. • Applying points of improvement to their toys. • Describing changes they would make/do if they were to do the project again.
Knowledge	Technical • To understand that the mechanism in an automata uses a system of cams, axles and followers. • To understand that different shaped cams produce different outputs.
	Additional • To know that an automata is a hand powered mechanical toy. • To know that a cross-sectional diagram shows the inner workings of a product. • To understand how to use a bench hook and saw safely. • To know that a set square can be used to help mark 90° angles.