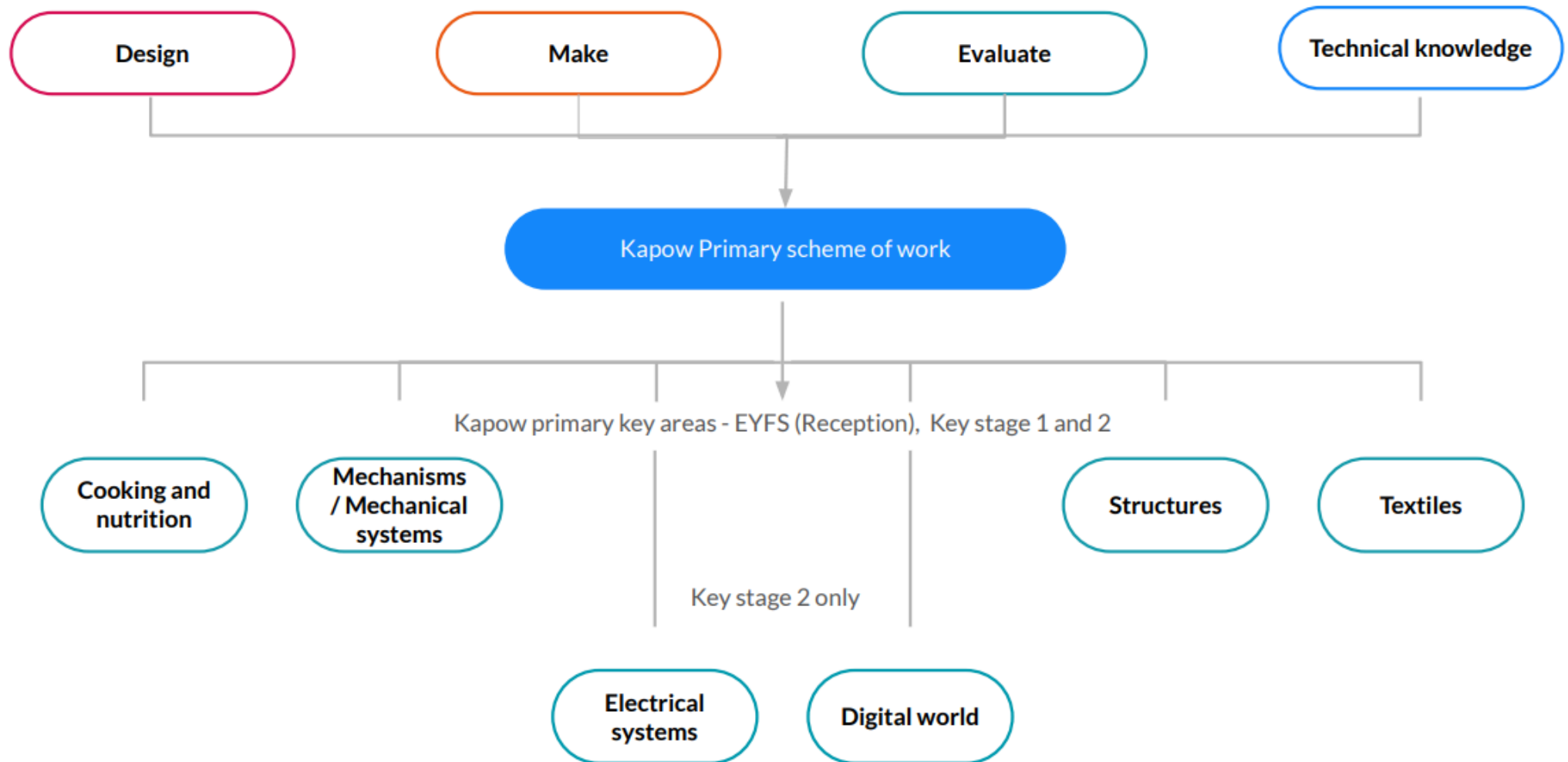


How is the Design and technology scheme of work organised?



Structures - EYFS

Exploring materials through junk modelling, the children develop their scissor skills and awareness of different materials and joining techniques. The children begin to make verbal plans and material choices before starting and problem solve while making their model.

S K I L L S	DESIGN	<ul style="list-style-type: none">• Making verbal plans and material choices.• Developing a junk model
	MAKE	<ul style="list-style-type: none">• 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.
	EVALUATE	<ul style="list-style-type: none">• 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.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none">• 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.
	ADDITIONAL	

Structures - Y1

Examining stable shapes using innate sense of balance, pupils discover ways to make freestanding structure more stable with a wide or a heavy base. Design and make a fun and stable pencil pot for a Year 1 pupil.

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Beginning to recognise how products and designs in the world around us solve certain needs. • Stating what they intend to make and why - identifying the purpose. • Talking about ideas, with purpose and user in mind. • Talking about existing products when generating ideas.
	MAKE	<ul style="list-style-type: none"> • Choosing between a small number of materials, ingredients or components. • Explaining their choices based on personal experiences. • Requesting equipment appropriate to the purpose. (e.g. scissors for cutting, glue for joining) • Refining their grip to cut competently and confidently.
	EVALUATE	<ul style="list-style-type: none"> • Saying what they like about their peers' designs and products. • Accepting feedback and understanding it is meant to improve their work.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> • Recognising that different structures are used for different purposes. • Exploring the features of structures. • Describing structures as buildings or freestanding structures. • Creating supporting structures to aid stability.
	ADDITIONAL	<ul style="list-style-type: none"> • To know that the purpose is what something is for. • To know that a plan is deciding what to do first and next. • To know that different equipment does different things. • To know the names of common pieces of equipment. • To know that some tools are sharp like scissors and knives. • To know that a structure is something that has been made and put together.

Structures - Y2

Using the story of 'There's a Bear on My Chair' as inspiration, pupils design and make a new chair for the bear in the story. They learn about strong shapes and stiff and flexible materials to help make choices when building their chairs.

S K I L L S	DESIGN	<ul style="list-style-type: none"> Using a simple design brief that outlines the intended use, target user, and key features of the product, to create simple design criteria. Creating ideas with design criteria in mind. Referring to specific parts of existing products when generating ideas.
	MAKE	<ul style="list-style-type: none"> Choosing materials, ingredients or components from a wider range of materials, ingredients or components. Explaining their choices based on the properties of materials and components. Looking for ways to make cutting easier, like turning the material they are cutting, not fully closing scissors etc. Choosing known geometric shapes when making. Beginning to shape objects to improve how they work.
	EVALUATE	<ul style="list-style-type: none"> Discussing a range of existing products and saying what they like and dislike about them. Comparing a range of products and explaining why some better meet different design criteria than others.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> Recognising that different structures are used for different purposes. Exploring the features of structures. Making stable structures from card. Creating supporting structures to aid stability. Using stable objects like cylinders to create structures. Comparing the stability of different shapes. Identifying the weakest part of a structure.
	ADDITIONAL	<ul style="list-style-type: none"> To know that a design brief helps to decide what to make. To know that design criteria are the steps for making a product successful. To know that design criteria help when thinking of ideas. To know that different products work in different ways and have parts that make them work. To know the names of some geometric shapes, triangle, pyramid, square, cube, circle, sphere. To know that a structure is something that has been made and put together. To know that the shape of a structure affects its strength. To know that a 'strong' structure is one which does not break easily.

Structures - Y3

Exploring how 3D shell structures are created from nets and used in packaging, pupils evaluate what makes good packaging and follow a simple design criteria to create their own.

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. • Beginning to use 2D CAD software to communicate their ideas
	MAKE	<ul style="list-style-type: none"> • Creating accurate shapes from templates. • Cutting out more complex shapes accurately. • Choosing shapes to suit the function of a product.
	EVALUATE	<ul style="list-style-type: none"> • Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. • Investigating and analysing a range of existing products by looking at their functionality and appeal. • Reflecting on feedback to decide if and how it could be used to improve future iterations.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> • Beginning to understand how different structures are built. • Strengthening structures by ribbing. • Constructing a range of 3D shapes.
	ADDITIONAL	<ul style="list-style-type: none"> • To know that creating accurate shapes improves how they look and sometimes their function. • To know good suggestions help give better feedback. • To know that they can choose to use feedback or not. • To know that a shell structure is a hollow shape with a thin outer layer. • To know that 3D shapes can form structures. • To know structures can be strengthened by manipulating materials and shapes.

Structures - Y5

Exploring different bridge designs and how frame structures can be strengthened. Pupils apply accurate measuring, marking and cutting skills while testing a range of bridge-strengthening techniques.

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.
	MAKE	<ul style="list-style-type: none"> • 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 saw 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	<ul style="list-style-type: none"> • 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.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • To understand the difference between arch, beam, truss and suspension bridges. • To understand how to carry and use a saw safely.

MECHANISMS - Y1

Learning how to use scissors to cut straight and rounded edges, pupils develop an understanding of how wheels, axles and axle holders work and problem-solve to improve their original wheels. They also design and build pull-along toys and evaluate them against design criteria.

S K I L L S	DESIGN	<ul style="list-style-type: none"> Thinking about what others might want from a design. Beginning to recognise how products and designs in the world around us solve certain needs. Considering who they are designing for - by identifying the user. Stating what they intend to make and why - by identifying the purpose. Talking about ideas with purpose and user in mind. Talking about existing products when generating ideas. Using basic drawing skills to communicate ideas.
	MAKE	<ul style="list-style-type: none"> Planning more than one step ahead. Choosing between a small number of materials, ingredients or components. Explaining their choices based on personal experiences. Requesting equipment appropriate to the purpose. Explaining in simple terms why certain tools must be handled carefully. Following and recalling simple safety instructions. Finding the middle of an object. Refining their grip to cut competently and confidently. Adding texture to create visual interest. <ul style="list-style-type: none"> Cutting straight lines and evenly spaced lines. Beginning to cut large shapes and thicker materials like card. Puncturing holes. Recognising the edges of paper and card need to be stuck firmly using a glue stick. Using tools, like scissors, to create shapes. Beginning to cut large shapes and thicker materials like card. Beginning to use controlled painting or colouring techniques to finish a product.
	EVALUATE	<ul style="list-style-type: none"> Discussing existing products, saying what they like about them. Comparing two products and discussing which is better for a specific purpose. Discussing how their products could be improved based on personal preferences. Comparing their finished products with their original designs. Saying what they like about their peers' designs and products. Accepting feedback and understanding it is meant to improve their work
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> Recognising and exploring everyday objects that have mechanisms. Many things that move have parts inside to help them work. Mechanisms usually limit unwanted movement. An axle allows the wheel to turn without falling off.
	ADDITIONAL	<ul style="list-style-type: none"> To know that the 'user' is the person who will use the product. To know that different users may want different things from a design. To know that designers usually design and make something to solve a problem. To know that who they are designing for makes a difference to what they design. To know that the purpose is what something is for. To know that existing products can help when deciding what to design. To know that drawings are a way to explain ideas. To know that a plan is deciding what to do first and next. <ul style="list-style-type: none"> To know that different equipment does different things. To know the names of common pieces of equipment. To know that some tools are sharp like scissors and knives. To know that following instructions helps with safety. To know that cutting in a straight line can be helpful when making. To know that different materials can be shaped by different tools. To know that some products will be better than others. To know that their ideas or products can be made better. To know that their final product might be different to their original idea. To know that their ideas can make someone else's work better.

MECHANISMS - Y2

Investigating different types of levers and how they work. Pupils identify pivots and levers on various mechanisms. They create their own levers using appropriate materials and notice how levers make some tasks easier

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Creating ideas with design criteria in mind. • Referring to specific parts of existing products when generating ideas. • Using labels to explain parts of a design, label materials etc, including using ICT. • Integrating moving parts when creating mock-ups.
	MAKE	<ul style="list-style-type: none"> • Integrating moving parts when creating mock-ups. • Planning more than one step ahead. • Choosing materials or components from a wider range of materials or components. • Choosing between pieces of equipment that are used for the same purpose (e.g. joining) and explaining why their choice suits the task. • Explaining their choices based on the properties of materials and components. • Following and recalling simple safety instructions.
	EVALUATE	<ul style="list-style-type: none"> • Discussing whether they were able to use the tools and techniques effectively. • Comparing a range of products and explaining why some better meet different design criteria than others. • Evaluating their ideas and creations against simple design criteria.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> • Recognising and exploring everyday objects that have mechanisms. • Exploring everyday objects that use levers (e.g. scissors, tongs, door handle, stapler).
	ADDITIONAL	<ul style="list-style-type: none"> • To know that different products work in different ways and have parts that make them work. • To know drawings can help explain how something works. • To know many things that move have parts inside to help make them work. • To know some properties of materials, e.g., hard, soft, flexible, water-proof, strong, etc. • To know some pieces of equipment are better suited to certain jobs. • To know some tools are sharp like scissors and knives. • To know following instructions helps with safety. • To know many things that move have parts inside to help them work. • To know mechanisms usually limit unwanted movement. • To know a pivot is the part that a lever moves around.

MECHANISMS - Y4

After building three prototype mechanical cars, pupils select the best features to design their final product: a mechanical car kit. They create design criteria, conduct competitor market research and act as customers to provide feedback.

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Developing drawing and sketching skills with a focus on clarity and simplicity. • Beginning to recognise the benefit of a range of diagram types or prototypes to communicate ideas. (eg. sketches, cross-sectional diagram, thumbnail sketches and exploded diagrams) • Creating prototypes using materials with similar properties to their final design. • Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. • Developing designs by adding detail and justifications about materials, tools, methods.
	MAKE	<ul style="list-style-type: none"> • Following detailed safety instructions. • Using a ruler as a measuring tool with increasing accuracy by creating spaced marks using millimetres and measuring lengths of objects. • Handle different sizes and types of scissors with confidence. • With close supervision using a hot glue gun to join wooden materials (e.g. lolly sticks). • Selecting equipment required for a series of tasks based on the plan. Explain why each piece is suitable for each stage. • Selecting materials, components or ingredients from a wider choice but within a limited design space (e.g. seasonal ingredients from May and June in the UK).
	EVALUATE	<ul style="list-style-type: none"> • Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. • Reflecting on feedback to decide if and how it could be used to improve future iterations. • Investigating and analysing a range of existing products by looking at their functionality and appeal. • Analysing why specific products, designers or inventors are successful. • Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. • Evaluating how effective their chosen materials and tools were in fulfilling the design brief.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> • To understand that a mechanical system can allow us to move something more easily. • To know that mechanical systems have more than one mechanism that moves to make them work. • To know that mechanical systems are often hidden in products to make them look more appealing.
	ADDITIONAL	<ul style="list-style-type: none"> • To know that extra information on drawings or diagrams can help the user understand a design or idea. • To know that an exploded diagram shows how the parts of a product fit together. • To know that a prototype is a detailed model that helps a user understand how a product will work. • To know that a target audience is a group of people that might like the idea. • To know that different tools and equipment have different dangers. • To know that a ruler can be used to measure length. • To know that a hot glue gun can be used to join materials. • To know that better suggestions of improvements mean better feedback. • To know that they can choose to use feedback or not. • To know that some products are more successful than other because of their function. • To know that choices of materials and equipment can affect the final product. • To know that feedback is ideas and suggestions from other people that can help improve their work.

MECHANISMS - Y5

Investigating the history, mechanics and uses of gears and pulleys. Pupils construct a gear and pulley system and design an eco-bike that utilises energy from an exercise bike for practical work.

S K I L L S	DESIGN	<ul style="list-style-type: none"> Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. Using a series of prototypes to refine and improve their designs
	MAKE	<ul style="list-style-type: none"> Consistently apply safety instructions. Select appropriate scissors to handle delicate cutting tasks and challenging materials. Cutting patterns and drawings accurately. In supervised groups, using hot glue guns safely. Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly. Choosing PVA glue over hot glue for its safety when joining materials in less intensive projects.
	EVALUATE	<ul style="list-style-type: none"> Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. Considering alternative materials, tools or techniques that could enhance the product. Providing feedback that is helpful, specific, and encouraging. Incorporating feedback from peers or users improve their product further, explaining the changes they made and the impact they had.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> That mechanical systems that use gears in everyday objects (eg bicycle, clock). That gears and pulleys allow us to transfer movement and force from one part of a mechanical system to another. That gears allow us to increase the output of a mechanism.
	ADDITIONAL	<ul style="list-style-type: none"> That original and innovative ideas are different from what has been made before. That annotations are detailed labels and comments on diagrams. That risks are things that might happen. That hot glue creates a strong bond quickly. That is often better to choose safer equipment. That sustainability means thinking about the materials that were used to make a product and how the product was made. That their final product can still be improved by different materials or techniques. That evaluating their designs in detail will help them understand its successful and less successful parts. That feedback should be positive, helpful and specific. That explaining how they used feedback to improve their design can help them create better products in the future.

TEXTILES - EYFS

Developing fine motor skills through a range of threading activities before moving on to use binka and a needle. The children design a bookmark, considering what to include and why and then follow their designs to complete their bookmarks.

S K I L L S	DESIGN	<ul style="list-style-type: none">• Discussing what a good design needs.• Designing a simple pattern with paper.• Designing a bookmark.• Choosing from available materials.
	MAKE	<ul style="list-style-type: none">• Developing fine motor/cutting skills with scissors.• Exploring fine motor/threading and weaving (under, over technique) with a variety of materials.• Using a prepared needle and wool to practise threading.
	EVALUATE	<ul style="list-style-type: none">• Reflecting on a finished product and comparing to their design.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none">• To know that a design is a way of planning our idea before we start.• To know that threading is putting one material through an object.
	ADDITIONAL	

TEXTILES - Y1

Recognising fabrics as materials made from different types of threads. Pupils also learn how to thread a needle and make simple rows of stitches in embroidery fabric, then apply these skills to design and stitch a design onto a piece of bunting.

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Talking about ideas, with purpose and user in mind. • Using basic drawing skills to communicate ideas.
	MAKE	<ul style="list-style-type: none"> • Explaining in simple terms why certain tools must be handled carefully. • Following and recalling simple safety instructions. • Using a straightedge to draw a straight line. • Beginning to use objects with a fixed width or length to create even spacing of markings or cuts. (e.g. a lolly stick). • Using a large plastic needle and large-weave embroidery fabric to begin to create a running stitch. • Applying masking tape to fix something in place or join to edges.
	EVALUATE	<ul style="list-style-type: none"> • Reflecting on a finished product, explaining likes and dislikes.
	TECHNICAL	<ul style="list-style-type: none"> • Discussing fabric properties. • Threading large needles. • Rehearsing sewing techniques with large needles and thick thread, like wool. • Sewing a running stitch in large-weave embroidery fabric or hessian. • Spacing stitches evenly.
K N O W L E D G E	ADDITIONAL	<ul style="list-style-type: none"> • To know drawings are a way to explain ideas. • To know the names of common pieces of equipment. • To know that following instructions helps with safety. • To know that spacing cuts or marks evenly can be useful. • To know that texture is how something feels. • To know that evenly spaced stitches help when following a pattern.

TEXTILES - Y6

Designing bags for a specific user using pattern piece templates. Pupils choose features that are aesthetic or functional, such as fastenings or pockets, to add to their designs. They then sew their chosen features onto the bags.

S K I L L S	DESIGN	<ul style="list-style-type: none"> Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.
	MAKE	<ul style="list-style-type: none"> Using a ruler to accurately measure and draw lines and marks. Using nets to create 3D objects. Using a combination of joining techniques to ensure strong joins (for example, using safety pins to hold fabric in place while a running stitch is sewn).
	EVALUATE	<ul style="list-style-type: none"> Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects
	TECHNICAL	<ul style="list-style-type: none"> Using pins effectively to secure a template to fabric without creases or bulges. Tying knots at the end of thread to secure it. Attaching objects like buttons using thread.
K N O W L E D G E	ADDITIONAL	<ul style="list-style-type: none"> To know how designers use pattern pieces when creating textile products. To know how nets can be folded to create 3D shapes. To know safety pins can hold fabric in place before sewing. To know consistently sized stitches improve the aesthetic of a product. To know the shape of a product can affect both its aesthetics and function. To know aesthetics is how something looks. To know complete products are sometimes made in parts that are sewn together

COOKING AND NUTRITION- Y2

Learning about what constitutes a balanced diet, pupils taste test ingredient combinations from different food groups. They then design a wrap of their choice which includes a healthy mix of protein, vegetables and dairy

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Designing three wrap ideas.
	MAKE	<ul style="list-style-type: none"> • Chopping foods safely to make a wrap. • Constructing a wrap that meets a design brief. • Grating foods to make a wrap. • Snipping smaller foods instead of cutting. • Spreading soft foods to make a wrap. • Identifying the five food groups. • Learning about balanced diet.
	EVALUATE	<ul style="list-style-type: none"> • Describing appearance, smell and taste. • Taste and evaluating different food combinations. • Describing the information that should be included on a label.
K N O W L E D G E	<ul style="list-style-type: none"> • To know that 'diet' means the food and drink that a person or animal usually eats. • To know what makes a balanced diet. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To know that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that 'ingredients' means the items in a mixture or recipe. • To know how to cut, grate, snip and spread to prepare foods. • To know how to review and give a score to evaluate. 	

COOKING AND NUTRITION- Y3

Learning about seasonality, pupils discover when and where fruits and vegetables are grown 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.

S K I L L S	DESIGN	<ul style="list-style-type: none">• Describing how climate affects where foods grow.
	MAKE	<ul style="list-style-type: none">• Identifying seasonal ingredients from the UK.• Following the instructions within a recipe.• Tasting seasonal ingredients.• Peeling foods by hand or with a peeler.• Cutting ingredients safely.• Choosing ingredients based on a design brief.
	EVALUATE	<ul style="list-style-type: none">• Describing the texture and flavour of ingredients.• Describing the benefits of seasonal fruits and vegetables and the impact on the environment.
K N O W L E D G E	<ul style="list-style-type: none">• To know that seasonal means foods that grow in a given season in a given country.• To know some seasonal foods that grow in the UK and what season they grow in.• To know that eating seasonal foods can have a positive impact on the environment.• To know how to describe the flavour and texture of foods.• To know how to cut a peel safely.• To know that the appearance of food is as important as taste.• To know that similar coloured fruits and vegetables often have similar nutritional benefits.	

COOKING AND NUTRITION- Y4

Working in groups to adapt a simple biscuit recipe, pupils create a biscuit suited to a chosen target audience. They ensure that their creation comes within a given budget of overheads and ingredients.

S K I L L S	DESIGN	<ul style="list-style-type: none">• Designing a biscuit within a given budget.• Conducting market research.
	MAKE	<ul style="list-style-type: none">• Following a baking recipe.• Understanding safety and hygiene rules.• Adapting a recipe.
	EVALUATE	<ul style="list-style-type: none">• Evaluating an adapted recipe.• Evaluating and comparing a range of products.• Suggesting modifications.
K N O W L E D G E	<ul style="list-style-type: none">• To know that the amount of an ingredient in a recipe is known as the 'quantity.'• To know that safety and hygiene are important when cooking.• To know the following cooking techniques: sieving, measuring, stirring, cutting out and shaping.• To know the importance of budgeting while planning ingredients for a recipe.• To know that products often have a target audience.	

ELECTRICAL SYSTEMS - Y4

Investigating electrical components and circuits and how they are used in everyday products to improve safety and convenience. Pupils build simple circuits with switches before designing their own electrical product using a cross-sectional diagram.

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Noticing simple problems or needs in their everyday life. • Using empathy and conducting simple surveys to recognise the needs of others. • Coming up with more ideas and considering the feasibility of their ideas in the classroom. • Developing drawing and sketching skills with a focus on clarity and simplicity. • Beginning to recognise the benefit of a range of diagram types or prototypes to communicate ideas. (eg. sketches, cross-sectional diagram, thumbnail sketches and exploded diagrams)
	MAKE	<ul style="list-style-type: none"> • Selecting materials, components or ingredients from a wider choice but within a limited design space (e.g. seasonal ingredients from May and June in the UK). • Explaining their choices with regard to function and form. • Following detailed safety instructions.
	EVALUATE	<ul style="list-style-type: none"> • Investigating and analysing a range of existing products by looking at their functionality and appeal. • Analysing why specific products, designers or inventors are successful. • Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements.
	TECHNICAL	<ul style="list-style-type: none"> • Recognising and exploring everyday electrical products. • Identifying some electrical components. • Using batteries and other electrical components safely. • Creating a working electrical circuit. • Incorporating switches into circuits.

K N O W L E D G E	<ul style="list-style-type: none"> • A problem or need is something that a designer can help to solve. • A target audience is a group of people that might like the idea. • Not everything can be made in the classroom. • Extra information on drawings or diagrams can help the user understand a design or idea. • A cross-sectional diagram shows the inside of a product. • Form is the look and shape of something. • Function is what something does and how it works. • Some products are more successful than other because of their function. • Designers and inventors create products. • Choices of materials and equipment can affect the final product. • An electrical system is a group of parts (components) that work together to transport electricity around a circuit. • Some common features of an electric product (e.g. switch, battery, plug, dials, buttons, etc). • A battery contains stored electricity that can be used to power products. • An electrical circuit must be complete for electricity to flow. • A switch can be used to complete and break an electrical circuit.
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ELECTRICAL SYSTEMS - Y5

Building on their existing knowledge of circuits, pupils explore motors and how they can create movement. Pupils also experiment with different wobble bot components to design and develop a new product tailored to a specific user's needs.

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. • Developing more independence in generating ideas. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Using a series of prototypes to refine and improve their designs.
	MAKE	<ul style="list-style-type: none"> • Selecting materials, components or ingredients based on research or user needs. • Explaining their choices, referring to their research. • Understanding and explaining the importance of each safety rule. • Consistently apply safety instructions.
	EVALUATE	<ul style="list-style-type: none"> • Considering alternative materials, tools or techniques that could enhance the product. • Providing feedback that is helpful, specific, and encouraging. • Incorporating feedback from peers or users improve their product further, explaining the changes they made and the impact they had.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> • Beginning to understand that electricity flows around a circuit. • Using different components to produce different results from electrical systems. • Creating working electrical circuits with a wider variety of electrical components. • Deconstructing electrical systems to understand how they work.
	ADDITIONAL	<ul style="list-style-type: none"> • Environmental impact is how the product and making the product might affect the environment. • Original and innovative ideas are different from what has been made before. • Improving on prototypes can help to improve the final design. • Research can help decide which materials are best for both aesthetics and functional properties. • Some equipment can work well with other equipment. • Risks are things that might go wrong. • The shape of an object can affect both its aesthetics and function. • Sustainability means thinking about the materials that were used to make a product and how the product was made. • Evaluating their designs in detail will help them understand its successful and less successful parts. • Feedback should be positive, helpful and specific. • Explaining how they used feedback to improve their design can help them create better products in the future. • An electric motor converts electricity into rotational movement. • A motorised product is one which uses a motor to function. • The names of components that can form an electrical system

S K I L L S	DESIGN	<ul style="list-style-type: none"> • Problem solving by suggesting which features on a micro:bit might be useful and justifying my ideas. • Drawing and manipulating 2D shapes, using computer-aided design (CAD), to produce a point of sale badge. • Developing design ideas through annotated sketches to create a product concept. • Developing design criteria to respond to a design brief
	MAKE	<ul style="list-style-type: none"> • Following a list of design requirements. • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.
	EVALUATE	<ul style="list-style-type: none"> • Analysing and evaluating wearable technology. • Using feedback from peers to improve design.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> • 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. • To know that a simulator is able to replicate the functions of an existing piece of technology.
	ADDITIONAL	<ul style="list-style-type: none"> • To understand what is meant by 'point of sale display.' • To know that CAD stands for 'Computer-aided design'.

S K I L L S	DESIGN	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.
K N O W L E D G E	TECHNICAL	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.

