Design and Technology Curriculum
St Marys Junior School

Intent Statement

Kapow Primary's Design and technology scheme of work aims to inspire pupils to become curious, creative and innovative thinkers with a broad understanding of how products are designed and made, in other words, to think like designers and engineers. The intention is for pupils to develop the confidence to identify problems, generate ideas, plan and create products and evaluate their outcomes.

The scheme aims to raise pupils' awareness of how design and technology shape the way they live, work and interact with the world. It encourages pupils to become resourceful, enterprising individuals who have the skills to contribute to and improve the world around them.

The scheme supports teachers in developing their subject knowledge and skills, enabling the delivery of engaging, well-informed lessons with confidence. The curriculum is designed to be both accessible and ambitious, ensuring all learners' full participation and potential achievement.

Subject Concepts
Strands:

Kapow Primary's Design and technology curriculum is structured around four strands that run through every unit:

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

These strands ensure a balanced coverage of the substantive, disciplinary and procedural knowledge pupils need to progress in Design and technology. They support the development of creativity, problem-solving and technical understanding, preparing pupils to design purposeful, functional products with increasing independence and confidence.

Disciplinary Learning
Key areas

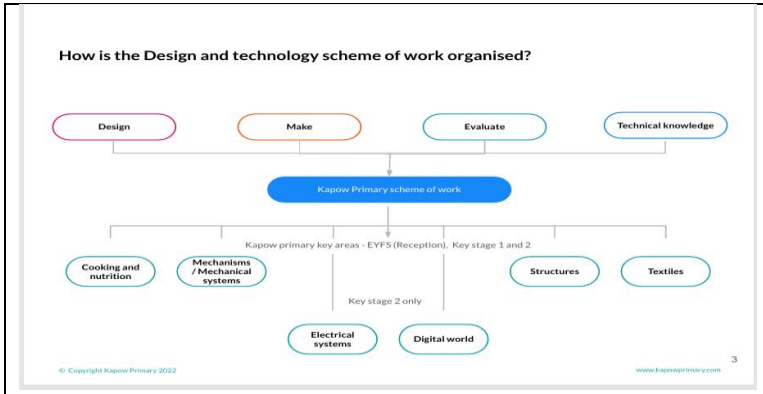
The National curriculum for Design and technology sets out the importance of creativity through different contexts in the Technical knowledge strand, referring to structures, mechanisms and electrical systems. Cooking and nutrition are given their own heading.

To support this, Kapow Primary's D&T curriculum is organised into the following six key areas:

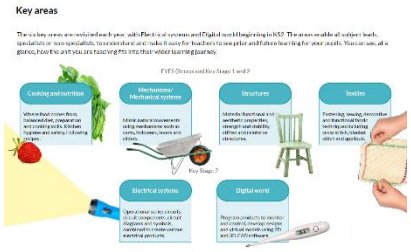
- **Structures.**
- **Mechanisms/Mechanical systems.**
- **Textiles.**
- **Cooking and nutrition.**
- **Electrical systems.**
- **The digital world.**

Curriculum Enrichment

DT Day & Competition
KNEX Challenge



These areas are revisited across year groups to give pupils a broad and balanced experience of designing and making products using a range of materials, tools and technologies.



Topic	Key Area, topic and significant designers	Key Learning Goals	Key Skills	Vocabulary	Equipment list
Year 3 Autumn 2	Digital World: Wearable technology ***Christopher Latham Sholes*** *Patented the typewriter in 1868.* ***Seymour Rubenstein and Rob Barnaby*** *Credited with the invention of the first word processor.*	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. • To understand what is meant by 'point of sale display.' • To know that CAD stands for 'Computer-aided design'.	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, 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. 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.	• analogue • analyse • annotate • badge • CAD • control • design criteria • develop • digital • digital revolution • digital world • display • electronic • fastening • feature • feedback • form • function • initiate • layers • loops • Micro:bit	Laptops/ desktop computers / tablets with access to BBC micro:bit editor and Sketchpad through an internet browser or app (tablets) ❑ BBC micro:bits with battery packs of MI:power coin cell boards (optional) ❑ Micro USB cables (optional)

				• monitor • net • point of sale • product • product concept • program • sense • stimulator • smart • technology • test • user	
Year 3 Spring 2	Structures: Castles ***Eugène Viollet-le-Duc*** *A French architect and author, Viollet-le-Duc was famous for his interpretive "restorations" of medieval buildings.* *He redesigned parts of the famed Notre-Dame Cathedral in Paris and numerous castles, enhancing the structures while maintaining their historical significance.* *He could provide a good example of understanding and employing 3D shapes and structures for creating strong architectural forms.* ***Zaha Hadid*** *An Iraqi-British architect, Hadid was known for her radical deconstructivist designs.* *Many of her works involve fluid and unconventional shapes, demonstrating a creative approach to 3D design.*	To understand that wide and flat based objects are more stable. To understand the importance of strength and stiffness in structures To know that 3D shapes can form structures. To know structures can be strengthened by manipulating materials and shapes. 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	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. Constructing a range of 3D geometric shapes using nets. Creating special features for individual designs. Making facades from a range of recycled materials. 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.	• 2D shapes • 3D shapes • castle • design criteria • evaluate • Facade • Feature • Flag • Net • Recyclable • Scoring • Stable • Strong • Structure • Tab • Weak	2D shapes to draw around (optional) ❑ 3D maths shapes ❑ Scissors ❑ Glue sticks ❑ Blu tac ❑ Tape ❑ Toilet/ kitchen roll tubes and other packaging ❑ Squared paper (optional) ❑ Laptops or tablets with access to Microsoft Office ❑ A3 card ❑ A3 coloured card ❑ Material textures printed

Year 3 Summer 2	Cooking and nutrition: Eating Seasonally	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.	Describing how climate affects where foods grow. 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.	• arid • climate • complementary • country • export • import • mediterranean • mock-up • mountain • peel • polar • seasonal • seasons • snip • temperate • texture • tropical • weather •	Chopping boards ❑ Two vegetable knives ❑ Two green chopping boards ❑ Two large bowls ❑ A brown chopping board ❑ Three peelers ❑ Oven ❑ Tablets / computers ❑ Seasonal vegetables for tart (see *Lesson 4: Tasting seasonal ingredients)* ❑ Ingredients for tart:, ready rolled puff pastry, pesto or tomato paste, cheese, fresh basil Additional adults
Topic	**Key Area, topic and significant designers**	**Key Learning Goals**	**Key Skills**	**Vocabulary**	**Equipment list**
Year 4 Autumn 2	Structure Pavilions	To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own. To know that a pavilion is a decorative building or structure for leisure activities. To know that cladding can be applied to structures for different effects. To know that aesthetics is how a product looks. To know that a product's function means its purpose.	Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. Creating a range of different shaped frame structures. Making a variety of free standing frame structures of different shapes and sizes. Selecting appropriate materials to build a strong structure and cladding.	• aesthetic • cladding • design criteria • evaluation • frame structure • function • inspiration • pavillion • reinforce • stable • structure • target audience • target customer • texture • theme	❑ Gumdrops or plasticine ❑ Toothpicks / cocktail sticks ❑ A4 stiff card ❑ Materials for making the frame: matchsticks, lolly sticks, toothpicks, straws, card, pipe cleaners, card triangles etc ❑ Glue guns ❑ Tape ❑ Craft materials for cladding: tracing paper, card, sweet

		To understand that the target audience means the person or group of people a product is designed for. To know that architects consider light, shadow and patterns when designing.	Reinforcing corners to strengthen a structure. Creating a design in accordance with a plan. Learning to create different textural effects with materials. Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs.		wrappers, leaves, crepe paper, fabrics, newspaper, wool, string,
Year 4 Spring 2	Cooking and Nutrition: Adapting a recipe	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.	Designing a biscuit within a given budget. Conducting market research. Following a baking recipe. Understanding safety and hygiene rules. Adapting a recipe. Evaluating an adapted recipe. Evaluating and comparing a range of products. Suggesting modifications.	• adapt • addition • budget • buttery • combine • comment • construct • cream • crunchy • cuboid • fold • hygiene • layout • market research • modify • multiplication • opinion • pounds • sieve • sift • target audience • texture • unique • wooden spoon •	Six different types of biscuits for taste-testing ❑ Plates ❑ Basic biscuit recipe ingredients: butter, caster sugar, egg yolk, vanilla extract, plain flour ❑ Additional ingredients: cocoa powder, chocolate chips, porridge oats, honey, mini marshmallows, raisins, desiccated coconut, dried fruit, cinnamon, lemon or orange zest, sprinkles, chocolate, icing. ❑ Butter knives ❑ Bowls ❑ Wooden spoons ❑ Scales ❑ Baking trays ❑ Baking parchment

					❑ Oven ❑ Computers with access to Excel (optional) ❑ Empty biscuit boxes ❑ A3 card ❑ Additional adults
Year 4 Summer 2	Electrical systems Torches ***Sir Joseph Swan*** *English physicist and chemist. Invented the first electric light bulb in 1860, which used a glass, vacuum casing and filament, that we recognise in the bulbs of today. His original design was not very practical to power and Thomas Edison further developed this design.* ***Thomas Edison*** *American inventor, with a world record number of original invention patents (1,093). Developed the incandescent lamp, improving on Joseph Swan's design almost 20 years later in 1880, which could then be used as part of a circuit to form a practical lighting system.*	To know that an electrical circuit must be complete for electricity to flow. To know that a switch can be used to complete and break an electrical circuit. To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.	Designing a torch, considering the target audience and creating both design and success criteria focusing on features of individual design ideas. Making a torch with a working electrical circuit and switch. Using appropriate equipment to cut and attach materials. Assembling a torch according to the design and success criteria. Evaluating electrical products. Testing and evaluating the success of a final product.	• battery • bulb • buzzer • cell • component • conductor • copper • design criteria • electrical item • electricity • electronic item • function • insulator • series circuit • switch • test • torch • wire	Electrical circuit component sets: batteries, battery holders, wires, bulb, buzzer and motor ❑ Cardboard / card ❑ Split pins ❑ Paper clips ❑ Recycled materials to make the body of the torch, such as: plastic bottles, packaging, cardboard etc. ❑ Foil ❑ Scissors
Topic	**Key Area, topic and significant designers**	**Key Learning Goals**	**Key Skills**	**Vocabulary**	**Equipment list**
Year 5 Autumn 2	Electrical Systems: Electronic Christmas Cards	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 LED converts electrical energy into light	Identifying factors that make existing products effective Developing design criteria based on findings from investigating existing products. Developing design criteria that clarifies the target receiver	• Annotate • Assemble • Electrical component • LED • battery • bulb • cell • component	Single sheets A4 card Copper tape LEDs Batteries Felt tip pens

		To know the names of the components in a basic series circuit, including a buzzer. 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.	Making a functional series circuit, incorporating an LED. Constructing a product with consideration for the design criteria. 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.	• conductor • copper • design criteria • electrical item • electricity • electronic item • function • insulator • series circuit • switch • test • wire	
Year 5 Spring 2	Structures: Bridges ***Norman Foster*** *Designer of the London Millennium Footbridge.*	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. To understand the difference between arch, beam, truss and suspension bridges. To understand how to carry and use a saw safely.	Designing a stable structure that is able to support weight. Creating a frame structure with a focus on triangulation. 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.	• abutment • accurate • arched bridge • beam bridge • coping saw • evaluation • file • mark out • material properties • measure • predict • reinforce • research • sandpaper • set square • suspension bridge • tenon saw • test • truss bridge • wood	Single sheets of A4 card ❑ A weight, such as a toy car ❑ Piles of books/bricks/blocks about 10 cm high and 15cm apart ❑ Weights to test the strength of the bridge ❑ Glue ❑ Scissors ❑ Sticky tape or masking tape ❑ Paper straws / tubes ❑ Glue gun ❑ Class camera ❑ Square rod wood pieces ❑ Lolly sticks / matchsticks ❑ Saws (preferably tenon saw and bench hooks) ❑ Sandpaper ❑ Files (optional) ❑ PVA glue

			Explaining why selecting appropriating materials is an important part of the design process. Understanding basic wood functional properties. 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.		❑ Jelutong or Balsa wood
Year 5 Summer 2	Cooking and nutrition: spaghetti bolognaise	To know that beef comes from cows reared on farms. To know that recipes can be adapted to suit nutritional needs and dietary requirements. To know that nutritional information is found on food packaging. To know that coloured chopping boards can prevent cross-contamination. To know that food packaging serves many purposes.	Researching existing recipes. Suggesting alternative ingredients. Designing a jar label. Writing an alternative recipe. Understanding cross-contamination. Using preparation skills. Making a developed recipe. Explaining the farm to fork process. Analysing nutritional content.	• abattoir • adaptation • balanced • beef • brand • cook • cross-contamination • develop • enhance • equipment • farm • label • measure • nutrient • nutrition • nutritional value • preference • press • process • safety • theme	❑ Whiteboards and pens ❑ Access to the internet for research ❑ Two beef bolognese sauces for children to taste test (if you have vegetarians provide similar examples without meat) ❑ Enlarged photocopy of nutritional value of each sauce you bought ❑ Ingredients for bolognese recipes ❑ Cooker hob ❑ Chopping boards ❑ Peelers ❑ Vegetable knives ❑ Pans ❑ Wooden spoons ❑ Graters ❑ Garlic crushers ❑ Examples of supermarket bolognese sauce packaging

					❑ Empty, clean jars ❑ Thin card ❑ Adult helpers!
Topic	**Key Area, topic and significant designers**	**Key Learning Goals**	**Key Skills**	**Vocabulary**	**Equipment list**
Year 6 Autumn 2	Textiles: Waistcoats **Vivienne Westwood** ● Vivienne Westwood became well known for designing corsets with a punk influence. ● She even created her own clan, MacAndreas, with its own tartan. The Lochcarron of Scotland recognised the design. This process usually takes 200 years. **Stella McCartney** ● Started out training to design and make suits. ● She now has a design label named after her. ● Stella McCartney was appointed creative director by Adidas for the 2012 Olympics, designing outfits for Team GB. ● As a vegetarian, she stays true to her beliefs by refusing to work with fur or leather. **Thomas Burberry** ● One of Britain's oldest fashion labels. ● It began as an outdoors wear company renowned for its hard-wearing, waterproof fabric: gabardine. ● The material was invented by Thomas Burberry in 1870 and was very popular.	To understand that it is important to design clothing with the client/ target customer in mind. To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. To understand the importance of consistently sized stitches.	Designing a waistcoat in accordance with a specification linked to set of design criteria. Annotating designs, to explain their decisions. Using a template when cutting fabric to ensure they achieve the correct shape. Using pins effectively to secure a template to fabric without creases or bulges. Marking and cutting fabric accurately, in accordance with their design. Sewing a strong running stitch, making small, neat stitches and following the edge. Tying strong knots. Decorating a waistcoat, attaching features (such as appliqué) using thread. Finishing the waistcoat with a secure fastening (such as buttons). Learning different decorative stitches. Sewing accurately with evenly spaced, neat stitches.	• Accurate • Adapt • Annotate • Design • Design criteria • Detail • Fabric • Fastening • Knot • Properties • Running-stitch • Seam • Sew • Shape • Target audience • Target customer • Template • Thread • Unique • Waistcoat • Waterproof	Cheap fabric ❑ Chalk ❑ Selection of threads and fabric ❑ Scissors ❑ Needles ❑ Pins ❑ Selection of buttons, beads etc

	● Polar explorers like Roald Amundsen and Ernest Shackleton used the fabric during their journeys. ● Burberry has now become a luxury fashion brand.		Evaluate Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Reflecting on their work continually throughout the design		
Year 6 Spring 2	Structures: Playgrounds	To know that structures can be strengthened by manipulating materials and shapes. To understand what a 'footprint plan' is. To understand that in the real world, design, can impact users in positive and negative ways. To know that a prototype is a cheap model to test a design	Designing a playground featuring a variety of different structures, considering how the structures will be used, considering effective and ineffective designs. Building a range of play apparatus structures drawing upon new and prior knowledge of structures. Measuring, marking and cutting wood to create a range of structures. Using a range of materials to reinforce and add decoration to structures. Improving a design plan based on peer evaluation. Testing and adapting a design to improve it as it is developed. Identifying what makes a successful structure.	• adapt • apparatus • bench hook • cladding • coping saw • design • Dowel • evaluation • feedback • idea • landscape • mark out • measure • modify • natural materials • plan view • playground • prototype • reinforce • sketch • strong • structure • Tenon saw • texture • user • vice • weak	A3 card ❑ Lolly sticks or toothpicks ❑ Jelutong and/ or dowel ❑ Tenon saw and bench hooks OR coping saws and vices ❑ Card ❑ Scissors ❑ Glue guns / PVA ❑ Straws ❑ Pipe cleaners ❑ Foil, egg boxes, cardboard tubes and other junk modelling materials ❑ Range of materials for the building cladding, such as: foil, tracing paper, elastic bands, plastic bags, packaging, newspaper, string/ wool, leaves, corrugated card/ plastic etc. ❑ Papier maché (optional) ❑ Felt tips ❑ Paint ❑ Coloured paper

					❑ Natural materials, such as: twigs, leaves stones, tree bark ❑ Playdough or plasticine ❑ Sand ❑ Foil
Year 6 Summer 2	No DT due to SATS				