St Mary's Catholic Primary School

Design and Technology

2025-2026

What do we want for our pupils?

Intent:

At St Mary's Catholic Primary School, we use Kapow's Design and Technology curriculum to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation and evaluation. We want our pupils to develop the confidence to take risks through drafting design concepts, modelling and testing and to be reflective learners who evaluate their work and the work of others. Through the Kapow scheme, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.

Implementation:

Design and Technology is a huge focus at St Mary's and children are able to express themselves in a creative way. Children follow Kapow which has four major strands running through:

- Design
- Make
- Evaluate
- Technical knowledge

Units of lessons are sequential, allowing children to build their skills and knowledge, applying them to a range of outcomes. Lessons incorporate a range of teaching strategies from independent tasks, paired and group work including practical hands-on, computer-based and inventive tasks. Each of the key areas follows the design process (design, make and evaluate) and has a particular theme and focus from the technical knowledge or cooking and nutrition section of the curriculum. Kapow is a spiral curriculum and key areas are revisited again and again with increasing complexity building our children's knowledge in depth.

What is our goal?

Impact

The expected impact of following the Kapow Design and Technology scheme is that children will:

- Understand the functional and aesthetic properties of a range of materials and resources.
- Understand how to use and combine tools to carry out different processes for shaping, decorating, and manufacturing products.
- Build and apply a repertoire of skills, knowledge and understanding to produce high quality, innovative outcomes, including models, prototypes, CAD, and products to fulfil the needs of users, clients, and scenarios.
- Understand and apply the principles of healthy eating, diets, and recipes, including key processes, food groups and cooking equipment.
- Have an appreciation for key individuals, inventions, and events in history and of today that impact our world.
- Recognise where our decisions can impact the wider world in terms of community, social and environmental issues.

- Self-evaluate and reflect on learning at different stages and identify areas to improve.
- Meet the end of key stage expectations outlined in the National curriculum for Design and technology.
- Meet the end of key stage expectations outlined in the National curriculum for Computing.

Assessment in Art and Design

Assessment

Teachers make regular assessments of each child's progress.

Formative assessment opportunities are provided through:

- analysis of children's work
- peer assessment
- questioning
- discussions
- end of unit quizzes

Year Group	Autumn 1 DT	Autumn 2 ART	Spring 1 DT	Spring 2 ART	Summer 1 DT	Summer 2 ART
Year 1	Structures – Stable Structures		Mechanisms – Matching Slider Game		Cooking and Nutrition - Smoothies	
Year 2	Structures – Baby Bear's Chair		Mechanisms – Fairground Wheel		Textiles - Pouches	
Year 3	Structures – Constructing a Castle		Textiles – Egyptian Collars		Mechanical Systems - Pneumatic Toys	
Year 4	Mechanical Systems – Making a Slingshot Car		Digital World – Mindful Moments Timer		Electrical Systems - Torches	
Year 5	Structures - Bridges		Textiles – Stuffed Toys		Cooking and Nutrition – Developing a Recipe	
Year 6	Structures - Playgrounds		Mechanical Systems – Automata Toys		Digital World – Navigating the World	

KS1 pupils should be taught:

Design:

- design purposeful, functional, appealing products for themselves and other users based on design criteria
- generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

Make:

- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing].
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.

Evaluate:

- explore and evaluate a range of existing products.
- evaluate their ideas and products against design criteria.

Technical knowledge:

- build structures, exploring how they can be made stronger, stiffer and more stable.
- explore and use mechanisms [for example, levers, sliders, wheels and axles] in their products.

Cooking:

- use the basic principles of a healthy and varied diet to prepare dishes.
- understand where food comes from.

Year 1	Autumn 1– Structures	Spring 1– Mechanisms	Summer 1– Cooking and Nutrition
	Stable Structures	Matching Slider Game	Smoothies

Pupils who are secure will: • Explain that structures are things that are built and have a purpose. • Understand that structures with a wider base are more stable than ones with a narrow base. • Explain that extra weight added to the base of a structure makes it more stable. • Design a product for a particular user. • Use a sketch to show ideas. • Choose the best method for joining the parts of the product. • Make evenly spaced cuts. • Use scissors to cut out a shape neatly and accurately. • Explain what they like and dislike about their final product.	Pupils who are secure will: • Understand that products all around us are designed and serve a purpose. • Define a mechanism as made of parts that move. • Identify products that use mechanisms. • Describe the movement of sliding mechanisms as up and down, left and right or forwards and backwards. • Contribute to discussions. • Think about the needs of the user. • Work independently to make a working slider mechanism. • Communicate ideas. • Use a range of tools with increasing accuracy to cut and join materials. • Understand the benefits of using different materials and explain choices. • Explain what went well and what to improve about their product.	Pupils who are secure will: • Describe fruits and vegetables and explain how to identify fruits. • Name a range of places that fruits and vegetables grow. • Describe basic characteristics of fruit and vegetables. • Prepare fruits and vegetables to make a smoothie. •
<u>Vocabulary</u> freestanding, stable, structure	<u>Vocabulary</u> mechanism, movement, slider	<u>Vocabulary</u> blend, blender, chopping board, compare, cut, design, evaluate, flavor, fork, fruit, healthy, ingredients, juice, juicer, leaf, plant

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Make:

- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing].
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.

Evaluate:

- explore and evaluate a range of existing products.
- evaluate their ideas and products against design criteria.

Technical knowledge:

- build structures, exploring how they can be made stronger, stiffer and more stable.
- explore and use mechanisms [for example, levers, sliders, wheels and axles] in their products.

Cooking:

- use the basic principles of a healthy and varied diet to prepare dishes.
- understand where food comes from.

Year 2	Autumn 1– Structures	Spring 1– Mechanisms	Summer 1– Textiles
	Baby Bear's Chair	Fairground Wheel	Pouches

Pupils who are secure will: • 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.	Pupils who are secure will: • Describe how axles help wheels move a vehicle and design and label a working fairground wheel. • Evaluate different designs. • Describe the properties of different materials and select appropriate materials for the wheel. • Build a stable structure, test elements of the design and adapt the design as necessary. • Make the wheel rotate, evaluate a wheel mechanism and adapt it as necessary. • Recall that a survey is used to find out what people like, tally results and use the results to inform the design. • Add pods for the correct number of people and ensure that the pods stay upright when rotating around a fixed point. • Explain the decisions for the pod design.	Pupils who are secure will: • Sew a running stitch with regular-sized stitches and understand that both ends must be knotted. • Prepare and cut fabric to make a pouch from a template. • Use a running stitch to join the two pieces of fabric together. • Decorate their pouch using the materials provided.
<u>Vocabulary</u> design criteria, man-made, natural, properties, structure, stable, shape, model, test	<u>Vocabulary</u> design brief, design criteria, evaluate, frame, model, opinion, rotate, survey	<u>Vocabulary</u> decorate, fabric, fabric glue, knot, needle, needle threader, running stitch, sew, template, thread

KS2 pupils should be taught:

Design:

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.
- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

Make:

- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- accurately select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluate:

- investigate and analyse a range of existing products.
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- understand how key events and individuals in design and technology have helped shape the world.

Technical Knowledge:

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].
- understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] .
- apply their understanding of computing to program, monitor and control their products.

Cooking:

- understand and apply the principles of a healthy and varied diet prepare and cook a variety of predominantly savory dishes using a range of cooking techniques
- understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

Year 3	Autumn 1– Structures	Spring 1– Textiles	Summer 1– Mechanical Systems
	Constructing a Castle	Egyptian Collars	Pneumatic Toys
	Pupils who are secure will: • Draw and label a simple castle that includes the most common features. • Recognise that a castle is made up of multiple 3D shapes. • Design a castle with key features which satisfy a given purpose. • Score or cut along lines on the net of a 2D	Pupils who are secure will: • Demonstrate their ability to use cross-stitch as a decorative feature or to join two pieces of fabric together. • Develop appliqué designs based on design criteria. • Design, cut and shape their template for an usekh or wesekh collar with increasing	Pupils who are secure will: • Define a mechanism as a system of parts working together to create movement and a pneumatic system can be used as part of this. • Describe how a pneumatic system forces air over a distance to create movement and identify pneumatic systems in a range

shape. • Use glue to securely assemble geometric shapes. • Utilise skills to build a complex structure from simple geometric shapes. • Evaluate their work by answering simple questions.	accuracy. • Decorate their Egyptian collar using a variety of techniques, such as appliqué, cross-stitch, beads, buttons and pinking. • Measure and attach a ribbon with a running stitch. • Recognise different types and qualities of fabrics. • Explain the aesthetic and functional properties of some of their material choices.	of everyday objects. • Describe different types of drawings used in design to explain ideas clearly and explain why one may be more useful for a particular situation. • Develop design criteria from a design brief. • Begin to draw different types of diagrams to generate suitable ideas. • Recall different types of pneumatic systems used to design a toy and create one for a specific movement. • Build secure housing for a pneumatic system, consider sustainable resources and work with materials to create different effects by cutting, creasing, folding, etc. • Evaluate how well the design, materials and equipment help to achieve the design brief.
<u>Vocabulary</u> 2D, 3D, castle, design, key features, net, scoring, shape, stable, stiff, strong, structure, tab	<u>Vocabulary</u> asymmetrical, applique, cotton, cross-stitch, embellish, fabric, patch, pinking, polyester, running stitch, silk, symmetrical, template, thread, unique	<u>Vocabulary</u> diagram, evaluate, feedback, housing, linkage, mechanical system, mechanism, pivot, pneumatic system, thumbnail sketch

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- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

Make:

- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- accurately select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluate:

- investigate and analyse a range of existing products.
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- understand how key events and individuals in design and technology have helped shape the world.

Technical Knowledge:

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].
- understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] .
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Year 4	Autumn 1– Mechanical Systems	Spring 1– Digital World	Summer 1– Electrical Systems
	Making a Slingshot Car	Mindful Moments Timer	Torches

Pupils who are secure will: • Work independently to produce an accurate, functioning car chassis. • Design a shape that is suitable for the project. • Attempt to reduce air resistance through the design of the shape. • Produce panels that will fit the chassis and can be assembled effectively using the tabs they have designed. • Construct car bodies effectively. • Conduct a trial accurately and draw conclusions and improvements from the results.	Pupils who are secure will: • State and/or describe the advantages and disadvantages of existing products (timers). • Understand how virtual micro:bit features could be used as part of a design idea. • Use research to inform design criteria. • Write a program that displays a timer on the virtual micro:bit based on their chosen seconds/minutes. • Suggest where the errors are, if testing is unsuccessful, by comparing the correct code to their own. • State key functions in the program editor (e.g. loops). • Evaluate the immediate appeal of the virtual micro:bit timer and how it might function. • Express which stages of the project they enjoyed or found more challenging. • Explain the need for a company to stand out against competition and/or state the importance of logos in business. • Recall and describe the name and use of key tools used in Sketchpad (CAD) software. • Fulfil the design requirements of the logo. • Evaluate the product using feedback from the user.	Pupils who are secure will: • Identify electrical products and explain why they are useful. • Help to make a working switch. • Identify the features of a torch and how it works. • Describe what makes a torch successful. • Create suitable designs that fit the success criteria and their own design criteria. • Create a functioning torch with a switch according to their design criteria.
<u>Vocabulary</u> chassis, energy, kinetic, mechanism, air resistance, design, structure, graphics, research, model, template	<u>Vocabulary</u> advantage, aesthetic, annotate, assemble, block, brand, brand identity, bug, clipart, coding, computer-aided design, criteria, debug, design, develop, disadvantage	<u>Vocabulary</u> battery, bulb, buzzer, circuit diagram, component, conductor, electrical item, electricity, electronic item, insulator, series circuit, switch, target audience, test, torch, wire

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- apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
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Year 5	Autumn 1– Structures	Spring 1– Textiles	Summer 1– Cooking and Nutrition
	Bridges	Stuffed Toys	Developing a Recipe

Pupils who are secure will: • Identify stronger and weaker shapes. • Recognise that supporting shapes can help increase the strength of a bridge, allowing it to hold more weight. • Identify beam, arch and truss bridges and describe their differences. • Use triangles to create simple truss bridges that support a load (weight). • Cut beams to the correct size, using a cutting mat. • Smooth down any rough cut edges with sandpaper. • Follow each stage of the truss bridge creation as instructed by their teacher. • Complete a bridge, with varying ranges of accuracy and finish, supported by the teacher. • Identify some areas for improvement, reinforcing their bridges as necessary. •	Pupils who are secure will: • Design a stuffed toy, considering the main component shapes of their toy. • Create an appropriate template for their stuffed toy. • Join two pieces of fabric using a blanket stitch. • Neatly cut out their fabric. • Use appliqué or decorative stitching to decorate the front of their stuffed toy. • Use blanket stitch to assemble their stuffed toy, repairing when needed. • Identify what worked well and areas for improvement.	Pupils who are secure will: • Describe the process of beef production. • Research a traditional recipe and make changes to it. • Add nutritional value to a recipe by selecting ingredients. • Prepare and cook a version of Bolognese sauce.
<u>Vocabulary</u> accuracy, aesthetics, arch bridge, assemble, beam bridge, bench hook/vice, corrugation, evaluate, factors, hardwood, joints, lamination, mark out, material properties, quality of finish, reinforce	<u>Vocabulary</u> accurate, annotate, appendage, blanket-stitch, design criteria, detail, evaluation, fabric, sew, shape, stuffed toy, stuffing, template	<u>Vocabulary</u> abattoir, adaptation, balanced, beef, brand, cook, cross-contamination, cut, design, enhance, equipment, evaluate, farm, grate, hygiene, ingredients, label, measure, nutrient, nutrition, nutritional value, preference, press, process, recipe, safety, theme

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Year 6	Autumn 1– Structures	Spring 1– Mechanical Systems	Summer 1– Navigating the World
	Playgrounds	Automata Toys	Navigating the World

Pupils who are secure will: • Create five apparatus designs, applying the design criteria to their work. • Make suitable changes to their work after peer evaluation. • Make roughly three different structures from their plans using the materials available. • Complete their structures, improving the quality of their rough versions and applying some cladding to a few areas. • Secure their apparatus to a base. • Make a range of landscape features using a variety of materials which will enhance their apparatus.	Pupils who are secure will: • Mark, saw and cut out the components and supports of their toy with varying degrees of accuracy to the intended measurements. • Follow health and safety rules, taking care with the equipment. • Attempt a partial assembly of their toys using an exploded diagram following a teacher's demonstration. • Develop a design idea with some descriptive notes. • Explore different cam profiles and choose three for their follower toppers with an explanation of their choices. • Create neat, decorated follower toppers with some accuracy. • Measure and cut panels that fit with some inaccuracies to conceal the inner workings of the automata. • Decorate and finish the automata to meet the design criteria and brief. • Evaluate their finished product, making descriptive and reflective points on function and form.	Pupils who are secure will: • Incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief. • Write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen. • Identify errors (bugs) in the code and suggest ways to fix (debug) them. • Self and peer evaluate a product concept against a list of design criteria with basic statements. • Identify key industries that use 3D CAD modelling and why. • Recall and describe the name and use of key tools used in Tinkercad (CAD) software. • Combine more than one object to develop a finished 3D CAD model in Tinkercad. • Complete a product pitch plan that includes key information.

Vocabulary apparatus, design criteria, equipment, playground, landscape features, cladding	Vocabulary accurate, automata, axle, bench hook, cam, cam profile, component, cross-sectional diagram, diagram, dowel, evaluate, exploded diagram, follower, form, frame, function	Vocabulary application, biodegradable, Boolean, cardinal compass, client, corrode, design brief, design criteria, duplicate, environmentally friendly, equipment, function, GPS tracker, if statement, lightweight, loop, moldable, navigation, pedometer, product lifestyle, product lifespan, program, recyclable, replica, smart, smartphone, sustainable design, value