St Francis Xavier Catholic Primary School

Design and Technology Long Term Plan

Curriculum Intent

At St Francis Xavier, we aspire for all of our pupils to develop an enthusiasm and a passion for design and technology and to master the knowledge and skills detailed in the design and technology National Curriculum. We strive to enable pupils to retain key knowledge and skills in the long term.

At St Francis Xavier, we ensure that our pupils are exposed to inspiring, rigorous and practical DT projects, whilst acquiring skills and knowledge to create products suitable for a purpose and audience. We encourage our pupils to use their creativity and imagination to design and make products that solve real and relevant problems within a variety of contexts.

Our curriculum aims 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 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. 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 advancement.

The Design and technology National curriculum outlines the three main stages of the design process: design, make and evaluate. Each stage of the design process is underpinned by technical knowledge which encompasses the contextual, historical, and technical understanding required for each strand. Cooking and nutrition has a separate section, with a focus on specific principles, skills and techniques in food, including where food comes from, diet and seasonality. The National curriculum organises the Design and technology attainment targets under four subheadings: Design, Make, Evaluate, and Technical knowledge. We have taken these subheadings as our curriculum strands and our curriculum has a clear progression of skills and knowledge within these strands and key areas across each year group building towards clearly defined end points .

Design and technology is taught every other half-term alternately with art and design.

National Curriculum

At St Francis Xavier our design and technology curriculum ensures full coverage of the *Design and technology programmes of study: key stages 1 and 2 National curriculum in England*

Key stage 1

When designing and making, pupils should be taught to:

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.

Key stage 2

When designing and making, pupils should be taught to:

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.

Art & DT Curriculum Map

Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	Stand Alone Lessons
Year 1	Structures: Constructing a windmill	Drawing: Make your mark	Textiles: Puppets	Sculpture and 3D: Paper play	Cooking and nutrition: Fruit and vegetables	Painting and mixed media: Colour splash	Unit: Mechanisms: Making a moving story book (Lesson 1) Unit: Craft: Woven wonders (Lesson 1, 2 and/or 3)
Year 2	Craft and design: Map it out	Structures: Baby bear's chair	Painting and mixed media: Life in colour	Mechanisms: Fairground wheel	Sculpture and 3D: Clay houses	Mechanisms: Making a moving monster	Unit: Food: A balanced diet (Lesson 1) Unit: Drawing: Tell a story (Lesson 2, 4 and /or 5)
Year 3	Cooking and nutrition: Eating seasonally	Drawing: Growing artists	Digital world: Wearable Technology	Craft and design: Ancient Egyptian scrolls	Structures: Constructing a castle	Sculpture and 3D: Abstract shape and space	Unit: Textiles: Cross-stitch and appliqué (Lesson 1) Unit: Mechanical systems: Pneumatic toys (Lesson 1 and/or 2) Unit: Painting and mixed media: Prehistoric painting (Lesson 1, 3 and /or 4)
Year 4	Drawing: Power prints	Structure: Pavilions	Painting and mixed media: Light and dark	Mechanical systems: Making a slingshot car	Craft and design: Fabric of nature	Electrical systems: Torches	Unit: Food: adapting a recipe (Lesson 1) Unit: Textiles: Fastenings (Lesson 1) Unit: Sculpture and 3D: Mega materials (Lesson 1, 2 and/or 5)
Year 5	Drawing: I need space	Electrical systems: Doodlers	Mechanical systems: Making a pop-up book	Sculpture and 3D: Interactive installation	Cooking and nutrition: What could be healthier?	Painting and mixed media: Portraits	N/A Unit: Craft and design: Architecture (Lesson 3, 4 and/or 5)
Year 6	Craft and design: Photo opportunity	Textiles: Waistcoats	Drawing: Make my voice heard	Structure: Playgrounds	Sculpture and 3D: Making memories -	Digital world: Navigating the world	N/A Unit: Painting and mixed media: Artist study (Lesson 1, 4 and/or 5)

Year One

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Structures: Constructing a windmill	**Drawing: Make your mark**	**Textiles: Puppets**	**Sculpture and 3D: Paper Play**	**Cooking and nutrition: Fruit and vegetables**	**Painting and mixed media: Colour splash**

Structures: Constructing a windmill

Pupils will be able to:

- Identify some features that would appeal to the client (a mouse) and create a suitable design.
- Explain how their design appeals to the mouse.
- Make stable structures, which will eventually support the turbine, out of card, tape and glue.
- Make functioning turbines and axles that are assembled into the main supporting structure.
- Say what is good about their windmill and what they could do better

Key Vocabulary: axle, bridge, design, design criteria, model, net, packaging, structure, template, unstable, stable, strong, weak

KS1 Y1 Design & Technology Constructing Windmills- Kapow Primary

Textiles: Puppets

Pupils will be able to:

- Join fabrics together using pins, staples or glue.
- Design a puppet and use a template.
- Join their two puppets' faces together as one.
- Decorate a puppet to match their design.

Key Vocabulary: decorate, design, fabric, glue, model, hand puppet, safety pin, staple, stencil, template

Textiles: Puppets - Kapow Primary

Cooking and nutrition: Fruit and vegetables

Pupils will be able to:

- Describe fruits and vegetables and explain why they are a fruit or a vegetable.
- 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.

Key Vocabulary: fruit, vegetable, seed, leaf, root, stem, smoothie, healthy, carton, design, flavour, peel, slice

D&T Fruit and Vegetables KS1 Y1 - Kapow Primary

Year Two

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Craft and design: Map it out	**Structures: Baby bear's chair**	**Painting and mixed media: Life in colour**	**Mechanisms: Fairground wheel**	**Sculpture and 3D: Clay houses**	**Mechanisms: Making a moving monster**

Structures: Baby bear's chair

Pupils will be able to:

- Identify man-made and natural structures.
- Identify stable and unstable structural shapes.
- Contribute to discussions.
- Identify features that make a chair stable.
- Work independently to make a stable structure, following a demonstration.
- Explain how their ideas would be suitable for Baby Bear.
- Produce a model that supports a teddy, using the appropriate materials and construction techniques.
- Explain how they made their model strong, stiff and stable.

Key Vocabulary: design criteria, man-made, natural, properties, structure, stable, shape, model, test

Structures: Baby Bear's chair - Kapow Primary

Mechanisms: Fairground wheel

Pupils will be able to:

- Design and label a wheel.
- Consider the designs of others and make comments about their practicality or appeal.
- Consider the materials, shape, construction and mechanisms of their wheel.
- Label their designs.
- Build a stable structure with a rotating wheel.
- Test and adapt their designs as necessary.
- Follow a design plan to make a completed model of the wheel.

Key Vocabulary: design, design criteria, wheel, Ferris wheel, pods, axle, axle holder, frame, mechanism

Mechanisms: Fairground wheel - Kapow Primary

Mechanisms: Making a moving monster

Pupils will be able to:

- Identify the correct terms for levers, linkages and pivots.
- Analyse popular toys with the correct terminology.
- Create functional linkages that produce the desired input and output motions.
- Design monsters suitable for children, which satisfy most of the design criteria.
- Evaluate their two designs against the design criteria, using this information and the feedback of their peers to choose their best design.
- Select and assemble materials to create their planned monster features.
- Assemble the monster to their linkages without affecting their functionality.

Key Vocabulary: axle, design criteria, input, linkage, mechanical, output, pivot, wheel

Mechanisms: Making a moving monster - Kapow Primary

Year Three

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Cooking and nutrition: Eating seasonally	**Drawing: Growing artists**	**Digital world: Electronic charm**	**Craft and design: Ancient Egyptian scrolls**	**Structures: Constructing a castle**	**Sculpture and 3D: Abstract shape and space**

Cooking and nutrition: Eating seasonally

Pupils will be able to:

- Explain that fruits and vegetables grow in different countries based on their climates.
- Understand that 'seasonal' fruits and vegetables are those that grow in a given season and taste best then.
- Know that eating seasonal fruit and vegetables has a positive effect on the environment.
- Design their own tart recipe using seasonal ingredients.
- Understand the basic rules of food hygiene and safety.
- Follow the instructions within a recipe.

Key Vocabulary: climate, imported, natural, reared, seasonal, diet, ingredients, processed, recipe, seasons, sugar

Cooking and nutrition: Eating seasonally - Kapow Primary

Digital world: Electronic charm

Pupils will be able to:

- Give a brief explanation of the digital revolution and/or remember key examples.
- Suggest a feature from the Micro:bit that is suitable for an eCharm.
- Write a program that initiates a flashing LED panel, or another pattern, on the Micro:bit when a button is pressed.
- Identify errors, if testing is unsuccessful, by comparing their code to a correct example.
- Explain the basic functionality of their finished program.
- Suggest key features for a pouch, with some consideration for the overall theme and the user.
- Use a template when cutting and assembling a pouch, with some support.
- Describe what is meant by 'point of sale display' with an example.
- Follow basic design requirements using computer-aided design, drawing at least one shape with a text box and bright colours, following a demonstration.
- Evaluate their design.

Structures: Constructing a castle

Pupils will be able to:

- 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 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.

Key Vocabulary: 2D, 3D, castle, design key features, net, scoring, shape, stable, stiff, strong, structure, tab

D&T Structures: Constructing a castle KS2 - Kapow Primary

	Key Vocabulary: smart wearables, product design, digital revolution, technology, analogue, digital, feature, function, digital world, Micro:bit, electronic products, program, loops, initiate, simulator, control, monitor, sense, template, develop, fasten, test, user, CAD (computer-aided design), point of sale, display, badge, stand KS2 Y3: Design and Technology: Smart Wearables Unit - Kapow Primary	

Year Four					
Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Drawing: Power prints	**Structure: Pavilions**	**Painting and mixed media: Light and dark**	**Mechanical systems: Making a slingshot car**	**Craft and design: Fabric of nature**	**Electrical systems: Torches**

Structure: Pavilions

Pupils will be able to:

- Produce a range of free-standing frame structures of different shapes and sizes.
- Design a pavilion that is strong, stable and aesthetically pleasing.
- Select appropriate materials and construction techniques to create a stable, free-standing frame structure.
- Select appropriate materials and techniques to add cladding to their pavilion.Work co-operatively to create a joint artwork, experimenting with their methods.

Key Vocabulary: 3D shapes, Cladding, Design criteria, Innovative, Natural, Reinforce, Structure

Structure: Pavilions - Kapow Primary

Mechanical systems: Making a slingshot car

Pupils will be able to:

- 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.

Key Vocabulary: chassis, energy, kinetic, mechanism, air resistance, design, structure, graphics, research, model, template

Mechanical systems: Making a slingshot car - Kapow Primary

Electrical systems: Torches

Pupils will be able to:

- 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.

Key Vocabulary: battery, bulb, buzzer, conductor, circuit, circuit diagram, electricity, insulator, series circuit, switch, component, design, design criteria, diagram, evaluation, LED, model, shape, target audience, input, recyclable, theme, aesthetics, assemble, equipment, ingredients, packaging, properties

Electrical systems: Torches - Kapow Primary

Year Five					
Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Drawing: I need space	**Electrical systems: Doodlers**	**Mechanical systems: Making a pop-up book**	**Sculpture and 3D: Interactive installation**	**Cooking and nutrition: What could be healthier?**	**Painting and mixed media: Portraits**

Electrical systems: Doodlers

Pupils will be able to:

- Identify simple circuit components (battery, bulb and switch) with a basic explanation of their function.
- Explain that a series circuit is assembled in a loop to allow the electricity to flow along one path.
- Describe a motor as a circuit component that changes electrical energy into movement.
- Provide examples of motorised products that use movement to rotate or spin different parts.
- Remove and replace different parts of a Doodler, as part of a team.
- Suggest ways to switch the configuration to amend the form or function of the Doodler.
- Explain, in an investigation report, each of the changes they made and the effect this had on the Doodler's ability to draw scribbles (function) and appearance (form).

Mechanical systems: Making a pop-up book

Pupils will be able to:

- Produce a suitable plan for each page of their book.
- Produce the structure of the book.
- Assemble the components necessary for all their structures/mechanisms.
- Hide the mechanical elements with more layers using spacers where needed.
- Use a range of mechanisms and structures to illustrate their story and make it interactive for the users.
- Use appropriate materials and captions to illustrate the story.

Key Vocabulary: design, input, motion, mechanism, criteria, research, reinforce, model

D&T Year 5 Mechanical Systems KS2 - Kapow Primary

Cooking and nutrition: What could be healthier?

Pupils will be able to:

- Understand how beef gets from the farm to our plates.
- Present a subject as a poster with clear information in an easy to read format.
- Contribute ideas as to what a 'healthy meal' means.
- Notice the nutritional differences between different products and recipes.
- Recognise nutritional differences between two similar recipes and give some justification as to why this is.
- Work as a team to amend a bolognese recipe with healthy adaptations.
- Follow a recipe to produce a healthy bolognese sauce.
- Design packaging that promotes the ingredients of the bolognese.

Key Vocabulary: beef, reared, processed, ethical, diet, ingredients, supermarket, farm, balanced

• Develop design criteria with consideration for the target user, the purpose of their Doodler, a key function and the Doodler's form and final appearance (e.g. fun, bright, soft). • Explain simply why their Doodler has a certain configuration based on the findings of their investigation (e.g. I used four pens because the Doodler would fall over with two). • Create a functional Doodler that creates scribbles on paper with or without a switch. • Identify and list each of the required materials, tools and circuit components required to build a Doodler. • Explain simply the steps to assemble a Doodler as part of a set of instructions (or storyboard). • Write instructions to build a functional circuit, explaining how to identify if it is functional or not. • Provide suggestions to improve a peer's set of instructions after testing how effective they are at guiding someone. **Key Vocabulary:** circuit component, configuration, current, develop, DIY, investigate, motor, motorised, problem solve, product analysis, series circuit, stable, target user Electrical systems: Doodlers - Kapow Primary		Cooking and nutrition: What could be healthier? - Kapow Primary

Year Six					
Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Craft and design: Photo opportunity	**Textiles: Waistcoats**	**Drawing: Make my voice heard**	**Structure: Playgrounds**	**Sculpture and 3D: Making memories -**	**Digital world: Navigating the world**

Textiles: Waistcoats

Pupils will be able to:

- Consider a range of factors in their design criteria and use this to create a waistcoat design.
- Use a template to mark and cut out a design.
- Use a running stitch to join fabric to make a functional waistcoat.
- Attach a secure fastening, as well as decorative objects.
- Evaluate their final product.

Key Vocabulary: annotate, decorate, design criteria, fabric, target customer, waistcoat, waterproof

Textiles: Waistcoats - Kapow Primary

Structure: Playgrounds

Pupils will be able to:

- 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.

Key Vocabulary: apparatus, design criteria, equipment, playground, landscape features, cladding

Structure: Playgrounds - Kapow Primary

Digital world: Navigating the world

Pupils will be able to:

- 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.

Key Vocabulary: smart, smartphone, equipment, navigation, cardinal compass, application (apps), pedometer, GPS tracker,

		design brief, design criteria, client, function, program, duplicate, replica, loop, variable, value, if statement, Boolean, corrode, moudable, lightweight, sustainable design, environmentally friendly, biodegradable, recyclable, product lifecycle KS2 Year 6: D&T: Digital World: Navigating the World - Kapow Primary