

Mount Pleasant CE VC Junior School

“Learning Through Faith, Family and Friendship.”



School Vision:

We are a happy, safe, inclusive school where excellence is celebrated. A Christian ethos encourages responsible behaviour and respect through Friendship, Trust and Forgiveness.

*We inspire a **love** of learning that encourages individuality, creativity and independence that extends from the school family into the wider world, enabling all to flourish.*

Jesus said, 'Love one another. As I have loved you, so you must love one another.' John 13:34

DT Long Term Plan

National Curriculum Objectives (KS2):

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].

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

Cooking and nutrition

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:

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

Cycle A Lower Phase:

Term:	Unit Title	Teaching Sequence (IALTs)	Sticky Knowledge
Aut 2 5-6 lessons	<u>Electrical systems: Torches</u> 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.	Lesson 1 - Electrical products - IALT: learn about electrical items and how they work. Lesson 2 - Evaluate torches - IALT: analyse and evaluate electrical products. Lesson 3 - Torch design - IALT: design a product to fit a set of specific user needs. Lesson 4 - Torch assembly - IALT: make and evaluate a torch.	- I can recall the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. - I can explain facts about the history / invention of the electric light bulb by Sir Joseph Swan and Thomas Edison. - I can understand and explain that electrical conductors are: materials which electricity can pass through, that a battery contains stored electricity that can be used to power products, that an electric circuit must be complete for electricity to flow and that a switch can be used to complete / break an electrical circuit.
Spr 2 5-6 lessons	<u>Mechanical systems: Making a slingshot car</u> Using a range of materials, design and	Lesson-1 - chassis and launch mechanism - IALT: build a car chassis. Lesson 2 - designing the car body - IALT: design a shape that reduces air resistance. Lesson 3 - making the car body - IALT: make a model based on a chosen design.	- I can choose and design shapes that increase / decrease speed as a result of air resistance and also explain that air resistance is the level of drag on objects when they are forced through the air. - I can measure, mark, cut and assemble with increasing accuracy.

	make a car with a working slingshot mechanism and house the mechanism using a range of nets.	Lesson 4 - assembly and testing - IALT: assemble and test my completed product.	• I can understand that all moving things have kinetic energy and explain that kinetic energy refers to the energy that an object / person has by being in motion. • I can explain that a template is a stencil to help draw the same shape accurately, that a birds-eye view refers to a view from a high angle and that graphics are images which are designed to explain or advertise something.
Sum 2 5-6 lessons	<u>Structure:</u> <u>Pavilions</u> Investigate and model frame structures to improve their stability, then apply this research to design and create a stable, decorated pavilion.	Lesson 1 - exploring frame structures - IALT: create a range of different shaped frame structures. Lesson 2 - designing a pavilion - IALT: design a structure. Lesson-3 - pavilion frame - IALT: build a frame structure. Lesson-4 - pavilion cladding - IALT: add cladding to a frame structure.	• I can explain that a Pavillion is a decorative building or structure for leisure activities. • I can design a stable pavilion structure that is aesthetically pleasing. • I can select appropriate materials to build a strong structure, reinforce corners to add strength and consider different textural effects created from the materials I choose. • I can explain that the product's function refers to its purpose, that the target audience means the person or group a product is designed for and that aesthetics are how good a product looks. • I can explore why architects consider light, shadow and pattern when designing.

Cycle B Lower Phase:

Term:	Unit Title	Teaching Sequence (IALTs)	Sticky Knowledge
Aut 2 5-6 lessons	<u>Cooking and Nutrition: Eating seasonally</u> Explain that fruits and vegetables grow in different countries based on their climates. Understand that seasonal fruits and vegetables grow in a given season. Understand that eating seasonal fruit and vegetables positively affects the environment. Design a tart recipe using seasonal ingredients.	Lesson 1 - food around the world - IALT: explain why food comes from different places around the world. Lesson-2 - seasonal food - IALT: explain the benefits of seasonal foods. Lesson 3 - cutting and peeling - IALT: develop cutting and peeling skills. Lesson 4 - tasting seasonal ingredients - IALT: evaluate seasonal ingredients. Lesson 5 - making a mock-up - IALT: design a mock-up using criteria. Lesson 6 - evaluating seasonal tarts - IALT: evaluate a dish.	• I can follow instructions within a recipe, peel and cut ingredients safely. • I can understand that: not all fruits and vegetables can be grown in the UK, that they grow seasonally and that climate change affects food growth. • I can describe the benefits of eating seasonal fruits / vegetables and the impact on the environment • I can explain that imported food is that which has been brought into the country and exported food is that which has been sent to another country.
Spr 2 5-6 lessons	<u>Digital World: Wearable technology</u> Give a brief explanation of the digital revolution and/or remember key examples. Suggest a feature from the virtual micro:bit that is suitable for the product. Write a program that initiates a flashing LED panel, or another pattern, on the virtual micro:bit when a button is pressed.	Lesson 1 - existing products - IALT: research and evaluate existing products. Lesson-2 - design criteria - IALT: develop design criteria. Lesson-3 - programming - IALT: use code to program and control a product. Lesson-4 - product concept - IALT: develop and communicate ideas. Lesson 5 - point of sales displays - IALT: develop ideas through computer aided design. Lesson 6 - evaluation focus groups - IALT: improve a design based on feedback.	• I can understand that, in programming, a 'loop' is code that repeats something over and over until stopped. • I can explain that a micro:bit is a pocket-sized, codeable computer. • I can explain what the 'Digital Revolution' is. • I understand that CAD stands for Computer-aided design.

	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 way to attach the product to the user, with some consideration for the overall theme and the user. Create annotated diagrams to help illustrate how their product is worn. 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 using a focus group.		
Sum 2 5-6 lessons	<u>Structures: Constructing a castle</u> Identify and learn about the key features of a castle, before designing and making a recycled-material castle (structure).	Lesson 1 - features of a castle - IALT: recognise how multiple shapes (2D and 3D) are combined to form a strong and stable structure. Lesson 2 - designing a castle - IALT: design a castle. Lesson 3 - nets and structures - IALT: construct 3D nets.	• I can recall and explain the features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge, and gatehouse. • I understand that a paper net is a flat 2D shape that can become a 3D shape once assembled. • I know that a design specification is a list of success criteria for a product.

		Lesson 4 - building a castle - IALT: construct and evaluate my final product.	I can explain that flat and wide based objects are more stable and that castles needed to be strong to withstand enemy attack.
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Cycle A Upper Phase:

Term:	Unit Title	Teaching Sequence (IALTs)	Sticky Knowledge
Aut 2 5-6 lessons	<u>Textiles:</u> <u>Waistcoats</u> Using a combination of textiles skills such as attaching fastenings, appliqué and decorative stitches, children design, assemble and decorate a waistcoat for a chosen purpose.	Lesson 1 - waistcoat design IALT: design a waistcoat Lesson 2 - preparing fabric IALT: mark and cut fabric according to a design. Lesson 3 - assembling my waistcoat IALT: assemble a waistcoat Lesson 4 - decorating my waistcoat IALT: decorate your waistcoat.	- I understand that using a template helps to accurately mark out a design on fabric. - I understand the importance of consistently using the same sized stitches. - I can use pins effectively to secure a template to a piece of fabric. - I can draw upon past knowledge of decorative stitches and those new to me to add detail to a product.
Spr 2 5-6 lessons	<u>Structures:</u> <u>Playgrounds</u> Research existing playground equipment and their different forms, before designing and developing a range of apparatus to meet a list of specified design criteria.	Lesson 1 - design a new playground IALT: design a playground with a variety of structures. Lesson 2 - building structures IALT: build a range of structures. Lesson 3 - perfecting structures IALT: improve and add detail to structures. Lesson 4 - playground landscapes IALT: create a surrounding landscape.	- I can explain that a prototype is an inexpensive model to test design ideas. - I can measure, mark and cut wood to create a range of structures. - I understand that structures can be strengthened by manipulating materials and shapes. - I understand that in the real world, 'design' can impact users in both positive and negative ways.
Sum 2	<u>Digital World:</u>	Lesson 1 - navigating the world	I understand that multifunctional means an object

5-6 lessons	<u>Navigating the world</u> Design and program a navigation tool to produce a multifunctional device for trekkers using CAD 3D modelling software. Pitch and explain the product to a guest panel	IALT: write a design brief and criteria based on a client request. Lesson 2 - programming a navigation tool IALT: write a program to include multiple functions as part of a navigation device. Lesson 3 - product outcome IALT: develop a sustainable product concept. Lesson 4 - 3D CAD models IALT: develop 3D CAD skills to produce a virtual model. Lesson 5 - product pitch IALT: o present a pitch to 'sell' the product to a specified client.	/ product that has more than one function. - I understand that magnetometers are devices that measure the Earth's magnetic field to determine which way someone / something is facing. - I understand that sensors can be useful in products as it means the product can function without human input.
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Cycle B Upper Phase:

Term:	Unit Title	Teaching Sequence (IALTs)	Sticky Knowledge
Aut 2 5-6 lessons	<u>Electrical Systems: Doodlers</u> Our Doodlers unit explores series circuits further and introduces motors. Explore how the design cycle can be approached at a different starting point, by investigating an	Lesson 1: Electrical systems and motors IALT - understand how motors are used in electrical products. Lesson 2: Meet the Doodlers IALT - investigate an existing product to determine the factors that affect the product's form and function. Lesson 3: Doodler design and construction IALT - apply the findings from research to develop a unique product.	- I can explain that product analysis is critiquing the strengths / weaknesses of a product. - I understand that series circuits only have one direction for electricity to flow. - I know that when there is a break in a series circuit, all components turn off. - I understand that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin.

	existing product, which uses a motor, to encourage pupils to problem-solve and work out how the product has been constructed, ready to develop their own.	Lesson 4: Doodler DIY kits IALT - develop a DIY kit for another individual to assemble their product.	
Spr 2 5-6 lessons	<u>Mechanical Systems</u> <u>Pop-ups</u> Design and create a functional pop-up book using levers, sliders, layers and spacers to create paper-based mechanisms.	Lesson 1: Pop-up book page design IALT - design a pop-up book. Lesson 2: Making my pop-up book IALT - follow my design brief to make my pop up book. Lesson 3: Using layers and spacers IALT - use layers and spacers to cover the working of mechanisms. Lesson 4: Writing and illustrating - Kapow Primary IALT - create a high-quality product suitable for a target user.	• I can explain that a design brief is a description of what is going to be designed and made. • I understand that designers will often want to hide mechanisms to ensure their product is aesthetically pleasing. • I know that mechanisms control movement and can change one kind of movement into another. • I understand how to use sliders, pivots and folds to create paper-based mechanisms.
Sum 2 5-6 lessons	<u>Cooking and Nutrition:</u> <u>Develop A Recipe</u> Opportunities for children to learn a simple bolognese recipe and adapt it to improve nutritional content.	Lesson 1: From Farm to Fork IALT - understand how ingredients are reared and processed. Lesson 2: Different choices IALT - make adaptations to design a recipe. Lesson 3: Nutritional Value IALT - evaluate nutritional content. Lesson 4: Preparing ingredients IALT - practise food preparation skills. Lesson 5: Designing labels IALT - design a product label. Lesson 6: Making bolognese IALT - follow and make an adapted recipe.	• I understand where meat comes from. • I know that cross-contamination means bacteria and germs have passed onto ready-to-eat foods (when food mixes with raw meat / unclean objects) and coloured chopping boards can prevent cross-contamination. • I understand that nutritional information is found on food packaging.

Cycle A - Lower Phase

Term:	Unit Title	Unit Title
<u>Aut 2</u> 5-6 lessons	<u>Electrical systems:</u> <u>Torches</u>	<u>Textiles:</u> <u>Waistcoats</u>
<u>Spr 2</u> 5-6 lessons	<u>Mechanical systems:</u> <u>Making a slingshot car</u>	<u>Structures:</u> <u>Playgrounds</u>
<u>Sum 2</u> 5-6 lessons	<u>Structure:</u> <u>Pavilions</u>	<u>Digital World:</u> <u>Navigating the world</u>

Cycle A - Upper Phase**Cycle B - Lower Phase**

Term:	Unit Title	Unit Title
<u>Aut 2</u> 5-6 lessons	<u>Cooking and Nutrition:</u> <u>Eating seasonally</u>	<u>Electrical Systems:</u> <u>Doodlers</u>
<u>Spr 2</u> 5-6 lessons	<u>Digital World:</u> <u>Wearable technology</u>	<u>Mechanical Systems</u> <u>Pop-ups</u>
<u>Sum 2</u> 5-6 lessons	<u>Structures:</u> <u>Constructing a castle</u>	<u>Cooking and Nutrition:</u> <u>Develop A Recipe</u>

Cycle B - Upper Phase