Christ Church Upper Armley Primary School

Design and Technology Curriculum Intent and Overview

DT Curriculum at Christ Church Upper Armley Primary School

At Christ Church Upper Armley Primary School we want 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.

Through our scheme of work, 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.

Our Design and technology scheme of work enables pupils to meet the end of key stage attainment targets in the National curriculum and the aims also align with those in the National curriculum. EYFS (Reception) units provide opportunities for pupils' to work towards the
Development matters statements and the Early Learning Goals.

The scheme of work has been designed as a spiral curriculum with the following key principles in mind:

✓ Cyclical: Pupils return to the key strands again and again during their time in primary school.

✓ Increasing depth: Each time the key strand is revisited it is covered with greater complexity.

✓ Prior knowledge: Upon returning to each key strand, prior knowledge is utilised so pupils can build upon previous foundations, rather than starting again

National curriculum in England

Purpose of Study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Attainment targets

Early Years Foundation Stage

The Expressive Art and Design EYFS Statutory Educational Programme outlines:
The development of children's artistic and cultural awareness supports their imagination and creativity. It is important that children have regular
opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. The quality and variety of what children see, hear and participate in is crucial for developing their understanding, self-expression, vocabulary and ability to communicate through the arts. The frequency, repetition and depth of their experiences are fundamental to their progress in interpreting and appreciating what they hear, respond to and observe.

EYFS Art and Design DM/ELG		
3-4 Years Nursery	**Expressive Art and Design**	• Explore different materials freely, to develop their ideas about how to use them and what to make. • Develop their own ideas and then decide which materials to use to express them. • Join different materials and explore different textures • Create closed shapes with continuous lines and begin to use these shapes to represent objects. • Draw with increasing complexity and detail, such as representing a face with a circle and including details. • Use drawing to represent ideas like movement or loud noises. • Show different emotions in their drawings and paintings, like happiness, sadness, fear, etc. • Explore colour and colour mixing. • Show different emotions in their drawings – happiness, sadness, fear, etc
Reception	**Expressive Art and Design**	• Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills.
ELG	**Expressive Art and Design**	• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function; • Share their creations, explaining the process they have used; • Make use of props and materials when role playing characters in narratives and stories

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Key stage 1

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 and school, gardens and playgrounds, the local community, industry and the wider environment].

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

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:
Key stage 1

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

Key stage 2

- 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

Through our Design and technology scheme, pupils respond to design briefs and scenarios that require consideration of the needs of others, developing their skills in six key areas:

- Mechanisms
- Structures
- Textiles
- Food
- Electrical systems (KS2) and
- Digital world (KS2)

Each of our 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. The scheme is a spiral curriculum, with key areas revisited again and again with increasing complexity, allowing pupils to revisit and build on their previous learning.
Lessons incorporate a range of teaching strategies from independent tasks, paired and group work including practical hands-on, computer-based and inventive tasks. This variety means that lessons are engaging and appeal to those with a variety of learning styles. We aim to differentiate every lesson to ensure that lessons can be accessed by all pupils and opportunities to stretch pupils' learning are available when required. Knowledge organisers for each unit support pupils in building a foundation of factual knowledge by encouraging recall of key facts and vocabulary.

Unit Overview

	Unit 1	Unit 2	Unit 3
EYFS: Reception	**Textiles**: Puppets	**Structures**: junk modelling transport	**Food: Fruit** and Vegetables
Year 1	**Mechanisms**: Making a moving story book	**Structures:** Constructing a windmill	**Food**: Smoothies
Year 2	**Textiles:** Pouches	**Structures:** Baby bear's chair (lego)	**Food:** A balanced diet
Year 3	**Structures**: Constructing a castle	**Textile:** Cushion	**Food:** Eating seasonally
Year 4	**Digital World:** Wearable technology	**Mechanical systems**: Pneumatic toy	**Electrical systems:** Electric Poster
Year 5	**Textiles**: Fastenings Make a fabric phone case. Stitch a design on the front. TC	**Mechanical systems:** Making a pop-up book	**Food:** What could be healthier?
Year 6	**Structures:** Playground design - TC	**Electrical systems:** Steady hand game (Switches+)	**Food:** Come Dine with Me

EYFS Textiles: puppets	Key Concepts			
	Pupils develop and practise threading and weaving techniques using various materials and objects. They look at the history of the puppet from Victorian times versus modern-day styles. The pupils apply their knowledge and skills to design and sew their own puppet.			
	Links to prior learning			
	Knowledge	Skills		
	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.	Design	Make	Evaluate
		Discussing what a good design needs. Designing a simple pattern with paper. Designing a puppet. Choosing from available materials.	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.	Reflecting on a finished product and comparing to their design.
	Vocabulary			
	Sew, glue, join, cut, thread, needle, string, buttons, sequins, material, puppet, wool, design			

<table>
<tr><td rowspan="6">EYFS Structures: Junk Boats</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Pupils explore what is meant by ‘waterproof’, ‘floating’ and ‘sinking’, then experiment and make predictions with various materials to carry out a series of tests. They learn about the different features of boats and ships before investigating their shape and structures to build their own.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>To know that ‘waterproof’ materials are those which do not absorb water.

Additional knowledge:
To know that some objects float and others sink.

To know the different parts of a boat.</td><td>Design</td><td>Make</td><td>Evaluate</td></tr>
<tr><td></td><td>Designing a junk model boat.

Using knowledge from exploration to inform design.</td><td>Making a boat that floats and is waterproof, considering material choices.</td><td>Making predictions about, and evaluating different materials to see if they are waterproof.

Making predictions about, and evaluating existing boats to see which floats best.

Testing their design and reflecting on what could have been done differently.

Investigating the how the shapes and structure of a boat affect the way it moves.</td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Design, float, sink, test, waterproof, shape, structure, plastic, metal, wood and paper</td></tr>
</table>

Year 1/Reception Food: Fruit and Vegetables Master chef	Key Concepts			
	Pupils will describe fruits and vegetables and explain why they are a fruit or a vegetable. They will learn the names of a range of places that fruits and vegetables grow. Pupils will learn to describe basic characteristics of fruit and vegetables and will prepare fruits and vegetables to make a smoothie.			
	Links to prior learning			
	Knowledge	Skills		
		Design	Make	Evaluate
	Understanding the difference between fruits and vegetables. To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber). To know that a blender is a machine which mixes ingredients together into a smooth liquid. To know that a fruit has seeds and a vegetable does not. To know that fruits grow on trees or vines. To know that vegetables can grow either above or below ground. To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).	Designing smoothie carton packaging by-hand or on ICT software.	Chopping fruit and vegetables safely to make a smoothie. Identifying if a food is a fruit or a vegetable. Learning where and how fruits and vegetables grow.	Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging.
	Vocabulary			
	Fruit, vegetable, seed, leaf, root, stem, smoothie, healthy, carton, design, flavour, peel, slice			

<table>
<tr><td rowspan="7">Year 1
Structures:
Windmills</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Pupils will learn to identify some features that would appeal to the client (a mouse) and create a suitable design. They will explain how their design appeals to the mouse. Pupils will make stable structures, which will eventually support the turbine, out of card, tape and glue. They will make functioning turbines and axles that are assembled into the main supporting structure.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td rowspan="2">To understand that the shape of materials can be changed to improve the strength and stiffness of structures.

To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses).

To understand that axles are used in structures and mechanisms to make parts turn in a circle.

To begin to understand that different structures are used for different purposes.

To know that a structure is something that has been made and put together.</td><td>Design</td><td>Make</td><td>Evaluate</td></tr>
<tr><td>Learning the importance of a clear design criteria.

Including individual preferences and requirements in a design.</td><td>Making stable structures from card, tape and glue.

Learning how to turn 2D nets into 3D structures.

Following instructions to cut and assemble the supporting structure of a windmill.

Making functioning turbines and axles which are assembled into a main supporting structure.</td><td></td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Axle, bridge, design, design criteria, model, net, packaging, structure, template, unstable, stable, strong, weak</td></tr>
</table>

<table>
<tr><td rowspan="6">Year 1
Mechanisms
:
Making a moving storybook</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Pupils identify whether a mechanism is a side-to-side slider or an up-and-down slider and determine what movement the mechanism will make. They learn to clearly label drawings to show which parts of their design will move and in which direction. Pupils make a picture, which meets the design criteria, with parts that move purposefully as planned. They evaluate the main strengths and weaknesses of their design and suggest alterations.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>To know that a mechanism is the parts of an object that move together.

To know that a slider mechanism moves an object from side to side.

To know that a slider mechanism has a slider, slots, guides and an object.

To know that bridges and guides are bits of card that purposefully restrict the movement of the slider.</td><td>Design

Explaining how to adapt mechanisms, using guides to control the movement.

Designing a Christmas card to a given audience.</td><td>Make

Following a design to create moving models that use levers and sliders.</td><td>Evaluate

Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed.

Reviewing the success of a product by testing it with its intended audience.</td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Sliders, mechanism, adapt, design criteria, design, input, model, template, assemble, test</td></tr>
</table>

Year 2 Food: A Balanced Diet Master chef	**Key Concepts** Learn about the food groups (carbohydrates, proteins, fruits and vegetables, dairy, oils and spreads) to understand a balanced diet to develop a healthy wrap.			
	Links to prior learning Pupils have explored the difference between fruit and vegetables and how we identify them (seeded and non-seeded). They have created smoothies using a mixture of fruit and vegetables and evaluated the finished product in relation to colour, taste and texture.			
	Knowledge	**Skills**		
		Design	**Make**	**Evaluate**
	To know that 'diet' means the food and drink that a person or animal usually eats. To understand what makes a balanced diet. To know where to find the nutritional information on packaging. To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. To understand that I should eat a range of different foods from each food group, and roughly how much of each food group. To know that nutrients are substances in food that all living things need to make energy, grow and develop. To know that 'ingredients' means the items in a mixture or recipe. To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy. To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'.	Designing a healthy wrap based on a food combination which works well together.	Slicing food safely using the bridge or claw grip. Constructing a wrap that meets a design brief.	Describing the taste, texture and smell of fruit and vegetables. Taste testing food combinations and final products. Describing the information that should be included on a label. Evaluating which grip was most effective.
	Vocabulary Alternative, diet, balanced diet, evaluation, expensive, healthy, ingredients, nutrients, packaging, refrigerator, sugar, substitute			

<table>
<tr><td rowspan="6">Year 2
Structures:
Baby Bear's
chair</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Explore stability and methods to strengthen structures, to understand Baby Bear's chair weaknesses and develop an improved solution for him to use.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4">In Year 1, pupils explored what makes a stable structure subsequently make their own stable structure to support a turbine, out of card, tape and glue. They made functioning turbines and axles that are assembled into the main supporting structure.</td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>To know that materials can be manipulated to improve strength and stiffness.

To know that a structure is something which has been formed or made from parts.

To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move.

To know that a 'strong' structure is one which does not break easily.

To know that a 'stiff' structure or material is one which does not bend easily.</td><td>Design

Generating and communicating ideas using sketching and modelling.</td><td>Make

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.</td><td>Evaluate

Testing the strength of own structure.

Identifying the weakest part of a structure.

Evaluating the strength, stiffness and stability of own structure.</td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Function, man-made, mould, natural, stable, stiff, strong, structure, test, weak</td></tr>
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<table>
<tr><td rowspan="6">Year 2
Textiles:
Pouches</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Learn how to sew a running stitch ready to design, make and decorate a pouch using a template.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4">In Year 1, pupils have explored methods of joining fabric and designed and made a character-based hand puppet using a preferred joining technique, before decorating. Pupils attempted to thread a needle and sewed along a line by trying to use a running stitch.</td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>To know that sewing is a method of joining fabric.

To know that different stitches can be used when sewing.

To understand the importance of tying a knot after sewing the final stitch.

To know that a thimble can be used to protect my fingers when sewing.</td><td>Design
D2.7 Designing a pouch</td><td>Make
M2.11 Selecting and cutting fabrics for sewing.

M2.12 Decorating a pouch using fabric glue or running stitch.

M2.13 Threading a needle.

M2.14 Sewing running stitch, with evenly spaced, neat, even stitches to join fabric.

M2.15 Neatly pinning and cutting fabric using a template.</td><td>Evaluate
Troubleshooting scenarios posed by teacher.

Evaluating the quality of the stitching on others' work.

Discussing as a class, the success of their stitching against the success criteria.

Identifying aspects of their peers' work that they particularly like and why.</td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Accurate, Fabric, Knot, Running-stitch, Sew, Shape, Stencil, Template,Thimble</td></tr>
</table>

Year 3 Structures: Constructing a castle	**Key Concepts**			
	Identify and learn about the key features of a castle, before designing and making a recycled-material cast (structure).			
	Links to prior learning			
	Pupils explored stability, strength and stiffness in Y1 when designing and making a windmill. They learnt that a structure is made up of more than one part and that a 'stable' structure is one which is firmly fixed and unlikely to change or move; a 'strong' structure is one which does not break easily and a 'stiff' structure or material is one which does not bend easily.			
	Knowledge	**Skills**		
		Design	**Make**	**Evaluate**
	To understand that wide and flat based objects are more stable. To understand the importance of strength and stiffness in structures. To know the following features of a photo frame To know that a façade is the front of a structure. To understand that a frame needed to be strong and stable to withstand homelife To know that a design specification is a list of success criteria for a product.	D3.1 Designing a castle with key features to appeal to a specific person/purpose. D3.2 Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours.	M3.1 Constructing a range of 3D geometric shapes using nets . M3.2 Creating special features for individual designs. M3.3 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.
	Vocabulary			
	2D shapes ● 3D shapes ● castle ● Design criteria ● net ● Facade ● key features ● shape ● stable ● Stiff ● Strong ● Structure ● Tab			

Year 3 Food: Eating Seasonally Master Chef	**Key Concepts**
	Learn about various fruits and vegetables, and when, where and why they are grown in different seasons. Discover the relationship between colour and health benefits.
	Links to prior learning
	In Year 1, pupils explored the difference between fruit and vegetables and how we identify them (seeded and non-seeded). They created smoothies using a mixture of fruit and vegetables and evaluated the finished product in relation to colour, taste and texture.

In Year 2, pupils learnt about what constitutes a balanced diet and what the five main food groups are. Pupils designed a healthy wrap based on a combination of foods that work well together.

Knowledge	Skills		
	Design	Make	Evaluate
To know that not all fruits and vegetables can be grown in the UK. To know that climate affects food growth. To know that vegetables and fruit grow in certain seasons. To know that cooking instructions are known as a 'recipe'. To know that imported food is food which has been brought into the country. To know that exported food is food which has been sent to another country. To understand that imported foods travel from far away and this can negatively impact the environment. To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre. To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health. To know safety rules for using, storing and cleaning a knife safely. To know that similar coloured fruits and vegetables often have similar nutritional benefits	Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.	Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination. Following the instructions within a recipe.	Establishing and using design criteria to help test and review dishes. Describing the benefits of seasonal fruits and vegetables and the impact on the environment. Suggesting points for improvement when making a seasonal tart.

Vocabulary

Climate ● Dry climate ● Exported ● Imported ● Mediterranean climate ● Nationality ● Nutrients ● Polar climate ● Recipe ● Seasonal food ● Seasons ● Temperate climate ● Tropical climate

Year 3 Textiles: Cushion	Key Concepts			
	Links to prior learning			
	Pupils explored stability, strength and stiffness in Y1 when designing and making a windmill. They learnt that a structure is made up of more than one part and that a 'stable' structure is one which is firmly fixed and unlikely to change or move; a 'strong' structure is one which does not break easily and a 'stiff' structure or material is one which does not bend easily.			
	Knowledge	Skills		
		Design	Make	Evaluate
	Appliqué is a way of mending or decorating a textile by applying smaller pieces of fabric. When two edges of fabric have been joined together, it is called a seam. It is important to leave space on the fabric for the seam. Some products are turned inside out after sewing so the stitching is hidden.	D3.8 Designing and making a template from an existing cushion and applying individual design criteria.	Following design criteria to create a cushion M3.12 Selecting and cutting fabrics with ease using fabric scissors. M3.13 Threading needles with greater independence. M3.14 Tying knots with greater independence. M3.15 Sewing cross stitch to join fabric. M3.16 Decorate fabric using appliqué. M3.17 Completing design ideas with stuffing and sewing the edges	E3.9 Evaluating an end product and thinking of other ways in which to create similar items.
	Vocabulary			
	Accurate, appliqué, cross-stitch, cushion design, embellish, fabric, patch, running stitch, seam, stuffing, template, thread			

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<table>
<tr><td rowspan="6">Year 4 Digital World: tech wearables</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Explore pneumatic systems, then apply this understanding to design and make a pneumatic toy including thumbnail sketches and exploded diagrams.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>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 know what the ‘Digital revolution’ is and features of some of the products that have evolved as a result.

To understand what is meant by ‘point of sale display.’</td><td>Design

Problem solving by suggesting potential features on a Micro: bit and justifying my ideas.

Developing design ideas for a technology pouch.

Drawing and manipulating 2D shapes, using computer-aided design, to
produce a point of sale badge.</td><td>Make

Using a template when cutting and assembling the pouch.

Following a list of design requirements.

Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch.

Applying functional features such as using foam to create soft buttons.</td><td>Evaluate

Analysing and evaluating an existing product.

Identifying the key features of a pouch.</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Vocabulary
Analogue, analyse, annotate, badge, computer-aided design (CAD), control, design criteria, develop, digital, digital revolution, digital world, display, electronic, electronic products, fastening, feature, feedback, form, function, initiate, layers, monitor, net, Opinion, point of sale, product, product design, program, sense, simulator, smart, technology, test, user</td></tr>
</table>

Year 4 Electrical Systems: Poster	Key Concepts			
	Links to prior learning			
	This is the first unit on electrical systems.			
	Knowledge	Skills		
		Design	Make	Evaluate
	To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit. To understand common features of an electric product (switch, battery or plug, dials, buttons, etc.) To list examples of common electric products (kettle, remote control, etc.) To understand that an electric product uses an electrical system to work (function). To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits. To understand the importance and purpose of information design.	Carry out research based on a given topic (e.g. The Romans) to develop a range of initial ideas. Generate a final design for the electric poster with consideration to the client's needs and design criteria. Design an electric poster that fits the requirements of a given brief. Plan the positioning of the bulb (circuit component) and its purpose.	Create a final design for the electric poster. Mount the poster onto corrugated card to improve its strength and allow it to withstand the weight of the circuit on the rear. Measure and mark materials out using a template or ruler. Fit an electrical component (bulb). • Learn ways to give the final p	Learning to give and accept constructive criticism on own work and the work of others. Testing the success of initial ideas against the design criteria and justifying opinions. Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs.

	To understand how material choices (such as mounting paper to corrugated card) can improve a product to serve its purpose (remain rigid without bending when the electrical circuit is attached).			
	Vocabulary			
	Battery, bulb, circuit, circuit component, crocodile wire, design, design criteria, develop, electric product, electrical system, feedback, final design, information design, initial ideas, peer-assessment, public, research, self-assessment, sketch			

<table>
<tr><td rowspan="6">Year 5
Textiles:
Fastenings
and fabric
organiser/
Phone case</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Analyse and evaluate a range of existing fastenings, then devise a list of design criteria to design, generate templates and make a fabric organiser</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4">Pupils were introduced to sewing in Y1 when they used a running stitch to sew along a pre-drawn line. They further developed this skill in Y2 when they used running stitch to join two pieces of fabric together to make a pouch.
In Year 3, learnt and applied two new sewing techniques – cross-stitch and appliqué. They utilised these new skills to design and make a cushion.</td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro.

To know that different fastening types are useful for different purposes.

To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.</td><td>Design

Writing design criteria for a product, articulating decisions made.

Designing a personalised fabric organiser</td><td>Make

Making and testing a paper template with accuracy and in keeping with the design criteria.

Measuring, marking and cutting fabric using a paper template.

Selecting a stitch style to join fabric, working neatly by sewing small, straight stitches.

Incorporating fastening to a design.</td><td>Evaluate

Testing and evaluating an end product against the original design criteria.

Deciding how many of the criteria should be met for the product to be considered successful.

Suggesting modifications for improvement.

Articulating the advantages and disadvantages of different fastening types</td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Aesthetic ● Assemble ● Book sleeve ● Design criteria ● Evaluation ● Fabric ● Fastening ● Mock-up ● Net ● Running-stitch ● Stencil ● Target audience ● Target customer ● Template</td></tr>
</table>

Year 5 Food: What could be healthier? Master chef	**Key Concepts**			
	Discover the farm to fork process, understand the key welfare issues for rearing cattle. Compare the nutritional value of existing sauces and develop a healthier recipe.			
	Links to prior learning			
	In Year 3, pupils learnt about various fruits and vegetables, and when, where and why they are grown in different seasons. They discovered the relationship between colour and health benefits.			
	Knowledge	**Skills**		
		Design	**Make**	**Evaluate**
	To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. To know that I can adapt a recipe to make it healthier by substituting ingredients. To know that I can use a nutritional calculator to see how healthy a food option is. To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects.	Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. Writing an amended method for a recipe to incorporate the relevant changes to ingredients. Designing appealing packaging to reflect a recipe	Cutting and preparing vegetables safely. Using equipment safely, including knives, hot pans and hobs. Knowing how to avoid cross-contamination. Following a step by step method carefully to make a recipe.	Identifying the nutritional differences between different products and recipes. Identifying and describing healthy benefits of food groups.
	Vocabulary			
	Beef ● Cross-contamination ● Diet ● Ethical issues ● Farm ● Healthy ● Ingredients ● Method ● Nutrients ● Packaging ● Reared ● Recipe ● Research ● Substitute ● Supermarket ● Vegan ● Vegetarian ● Welfare			

<table>
<tr><td rowspan="6">Year 5 Mechanical System: Pop-up book</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">This unit allows the children to design a pop-up book, which uses a mixture of structures and mechanisms (that they can name). Following the design brief to create a storyboard and neatly/ accurately make the mechanisms using sliders, pivots and folds to produce the movement. They will hide the workings of the mechanical parts so that the result is aesthetically pleasing.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4">In Year 4, pupils identified the difference between electrical and electronic products. They also evaluated a range of existing torches and their features, then developed a new functional torch design.</td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>To know that mechanisms control movement.

To understand that mechanisms can be used to change one kind of motion into another.

To understand how to use sliders, pivots and folds to create paper-based mechanisms.

To know that a design brief is a description of what I am going to design and make.

To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.</td><td>Design

Designing a pop-up book which uses a mixture of structures and mechanisms.

Naming each mechanism, input and output accurately.

Storyboarding ideas for a book.</td><td>Make

Following a design brief to make a pop-up book, neatly and with focus on accuracy.

Making mechanisms and/or structures using sliders, pivots and folds to produce movement.

Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.</td><td>Evaluate

Evaluating the work of others and receiving feedback on own work.

Suggesting points for improvement.</td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Criteria, design, input, mechanism, model, motion, reinforce, research</td></tr>
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<table>
<tr><td rowspan="6">Year 6
Structures:
Playground
design</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Research existing playground equipment and their different forms, before designing and developing a range of apparatus to meet a list of specified design criteria.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4">In Year 3, pupils identified and learnt about the key features of a castle, before designing and making a recycled-material castle (structure). In Year 4, pupils investigated and modelled frame structures to improve their stability, then applied this research to design and create a stable, decorated pavilion. In Year 5, pupils tested and analysed various types of bridge to determine their strength and stability. They explored material properties and sources, before marking, sawing and assembling a wooden truss bridge.</td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>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 idea.</td><td>Design
Designing a playground featuring a variety of different structures, giving careful, consideration to how the structures will be used, considering effective and ineffective designs</td><td>Make
Designing a playground featuring a variety of different structures, giving careful, consideration to how the structures will be used, considering effective and ineffective designs</td><td>Evaluate
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.</td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Adapt ● Apparatus ● Bench hook ● Cladding ● Coping saw ● Design ● Dowel ● Evaluation ● Feedback ● Idea ● Jelutong ● Landscape ● Mark out ● Measure ● Modify ● Natural materials ● Plan view ● Playground ● Prototype ● Reinforce ● Sketch ● Strong ● Structure ● Tenon saw ● Texture ● User ● Vice ● Weak</td></tr>
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<table>
<tr><td rowspan="6">Year 6 Electrical Systems: Steady Hand Game</td><td colspan="4">Key Concepts</td></tr>
<tr><td colspan="4">Understand what is meant by fit for purpose design and form follows function. Design and develop a steady hand game using a series circuit, including housing and backboard.</td></tr>
<tr><td colspan="4">Links to prior learning</td></tr>
<tr><td colspan="4">In Year 4, pupils identified the difference between electrical and electronic products. They also evaluated a range of existing torches and their features, then developed a new functional torch design. In Year 5, pupils explored series circuits further and were introduced to motors. They explored how the design cycle can be approached at a different starting point, by investigating an existing product, which uses a motor, and were encouraged to problem-solve and work out how the product had been constructed, ready to develop their own.</td></tr>
<tr><td>Knowledge</td><td colspan="3">Skills</td></tr>
<tr><td>To know that batteries contain acid, which can be dangerous if they leak.

To know the names of the components in a basic series circuit, including a buzzer.

To understand the diagram perspectives 'top view', 'side view' and 'back'</td><td>Design

Designing a steady hand game - identifying and naming the components required.

Drawing a design from three different perspectives.

Generating ideas through sketching and discussion.

Modelling ideas through prototypes.</td><td>Make

Constructing a stable base for a game.

Accurately cutting, folding and assembling a net.

Decorating the base of the game to a high quality finish.

Making and testing a circuit.

Incorporating a circuit into a base.</td><td>Evaluate

Testing own and others finished games, identifying what went well and making suggestions for improvement</td></tr>
<tr><td colspan="4">Vocabulary</td></tr>
<tr><td colspan="4">Assemble ● Battery ● Battery pack ● Benefit ● Bulb ● Bulb holder ● Buzzer ● Circuit ● Circuit symbol ● Component ● Conductor ● Copper ● Design ● Design criteria ● Evaluation ● Fine motor skills ● Fit for purpose ● Form ● Function ● Gross motor skills ● Insulator ● LED● User</td></tr>
</table>

<table>
<tr><td rowspan="3">Year 6 Food: Come dine with me</td><td>Key Concepts</td></tr>
<tr><td>Discover the farm to fork process, understand the key welfare issues for rearing cattle. Compare the nutritional value of existing sauces and develop a healthier recipe.</td></tr>
<tr><td>Links to prior learning</td></tr>
</table>

In Year 3, pupils learnt about various fruits and vegetables, and when, where and why they are grown in different seasons. They discovered the relationship between colour and health benefits.

Knowledge	Skills		
	Design	Make	Evaluate
To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. To know that I can adapt a recipe to make it healthier by substituting ingredients. To know that I can use a nutritional calculator to see how healthy a food option is. To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects.	D6.6 Writing a recipe, explaining the key steps, method and ingredients. D6.7 Including facts and drawings from research undertaken.	M6.9 Following a recipe, including using the correct quantities of each ingredient. M6.10 Adapting a recipe based on research. M6.11 Working to a given timescale. M6.12 Working safely and hygienically with independence.	E6.7 Evaluating a recipe, considering: taste, smell, texture and origin of the food group. E6.8 Taste testing and scoring final products. E6.9 Suggesting and writing up points of improvements when scoring others' dishes, and when evaluating their own throughout the planning, preparation and cooking process. E6.10 Evaluating health and safety in production to minimise cross contamination.

Vocabulary
Beef ● Cross-contamination ● Diet ● Ethical issues ● Farm ● Healthy ● Ingredients ● Method ● Nutrients ● Packaging ● Reared ● Recipe ● Research ● Substitute ● Supermarket ● Vegan ● Vegetarian ● Welfare