

St Michael's C.E Primary School

Design & Technology Curriculum 2024-2025

Design & Technology gives young people an opportunity to combine different skills, such as, logical, creative and practical skills. They also use elements that they have learnt in Maths and Science to understand how products work and to then use this knowledge to create their own products, using a variety of resources, to solve real-life problems.

At St Michaels, we believe that Design and Technology is an important part of our broad and balanced curriculum as it gives children the opportunity to become critical thinkers and to apply problem solving techniques. Design and Technology enables children to work creatively both individually and as part of a group, to solve real life problems in order to create a purposeful product fit for a specific user.

A Design Technologist uses their evaluation skills to look at existing products and to identify improvements that could be made. They then use their creative skills to design a product, for a specific user. Problem solving skills are then implemented when making and improving a product through a series of prototypes. Design Technologists are reflective in their practise.

Spirituality Across the Curriculum

Our definition of spirituality at St Michael's CE Primary School:

*To talk about spirituality is to talk about something which is **beyond words**.*

*Spirituality is linked to big **questions** about the **meaning and purpose of life**; it includes ideas relating to **oneself, others, the natural world and the transcendent**.*

We refer to this as:

The stillness of the mind

The settling of the soul

The uplifting of the spirit

Being at one in the world and finding meaning and purpose in life.

For some, but not all, this will be experienced, expressed or explained through faith or belief.

When discussing this with our pupils, we refer to spirituality as:

*The way **WOWS, OWS and NOWS** shape me into the person that I am and will become.*

Spiritual development contains many facets and it is concerned with a number of areas of an individual's life. Therefore, when developing spirituality in pupils and adults, we, in line with our distinctively Christian vision and our school's definition for spirituality, look at four key areas: self, others, transcendence (beyond), and nature.



Spirituality Opportunities

Self

Opportunities

- Opportunities to feel you're fully in the moment and doing something with care, can make you feel peaceful and calm.
- DT can help you feel connected to yourself and what you're doing in a mindful way.
- Have students design and create personal items that reflect their values, beliefs, and goals.
- Introduce activities that promote mindfulness and self-awareness.
- Encourage students to design and build projects that express their individuality.

Potential Question Prompts

- Reflect on the sources of inspiration in your life. How do these influences shape your designs and projects?
- Consider the ethical implications of your materials and processes. How do your personal values guide your decisions in DT?
- Reflect on what success means to you personally. Is it about functionality, aesthetics, or the impact on others?
- Consider the obstacles you encounter while designing. How do these experiences contribute to your growth and resilience?
- Reflect on the emotions you experience during the design process. What does creating mean to you on a personal level?
- Reflect on your attitudes toward mistakes in the design process. How can viewing failure as a learning opportunity help you grow?

Others

Opportunities

- Children being respectful of others creation, however remembering to give feedback is purposeful.
- Engage students in designing and creating items for community service.
- Organize group projects where students work together to solve a problem or create something meaningful that has an impact on others.
- Have students explore and create designs inspired by different cultures and religions, promoting understanding and respect for diversity.

Potential Question Prompts

- Reflect on how your creations address the needs or challenges faced by specific individuals or communities. What considerations do you take into account to ensure your designs are beneficial?
- Consider how your designs can be accessible to diverse groups of people. How can you ensure that your creations are welcoming and usable for everyone?
- Reflect on the importance of collaboration and input from peers or users. How do you incorporate their perspectives into your work?
- Consider the broader implications of your design choices. How can you create products that are sustainable and positively affect the community?
- Reflect on how your design capabilities can contribute to solving problems such as poverty, inequality, or health. What projects can you undertake that align with these goals?
- Consider how your creations can bring people together or enhance relationships. How can you design products that encourage collaboration and interaction among users?



Transcendence

Opportunities

- To explore the belief that this connects to something bigger than us.
- How creating is similar feeling to meditate or pray.
- To create or admire something that is well-designed and beautiful, it can make you feel connected to something greater, like the beauty of the world or even the creativity of others.
- Have students design models of spiritual spaces, such as meditation gardens or quiet reflection areas, to understand the importance of space in spiritual practices.
- Encourage students to design and create art pieces featuring inspirational quotes from various spiritual traditions, fostering a sense of connection to something greater.

Potential Question Prompts

- Reflect on the potential of your creations to challenge perceptions and provoke thought. What innovative ideas can you integrate to inspire change?
- Consider how your designs can address societal challenges or promote well-being. How can you ensure that your projects serve a higher purpose beyond personal gain?
- Think about the broader concepts your work might embody, such as love, justice, or sustainability. How can you incorporate these themes into your design process?
- Reflect on the long-term impact of your creations. How do you want your work to be remembered, and what values do you hope to pass on?
- Consider how your design process can serve as a medium for exploring deeper questions about existence, purpose, or the human experience. What themes resonate with you?
- Consider how you can create an experience through your work that invites reflection and connection. What elements can you incorporate to evoke emotions and thoughts?

Nature

Opportunities

- An understanding of where things come from and the impact this can have on the world. Eg paper from trees.
- Junk modelling to think about how we can reuse materials to create something new.
- Engage students in designing and building projects using recycled or natural materials, emphasizing the importance of sustainability and care for the environment.
- Involve students in designing and building elements for a school garden, such as planters, bird feeders, or compost bins, to connect with nature and learn about environmental stewardship.

Potential Question Prompts

- Could you be more environmentally friendly with the materials you have used?
- How can we use recycled or natural materials in our projects to show respect for the environment?
- What lessons can we learn from nature that can be applied to our design projects?
- How can we design projects that help protect and preserve natural habitats?
- In what ways can observing nature inspire your creativity and design ideas?
- What are some ways we can design products that reduce waste and promote sustainability?
- What role does nature play in different cultural and spiritual practices, and how can we reflect this in our designs?



St Michael's CE Primary DT Curriculum 2024-2025

	Autumn 1	Spring 1	Summer 1
Year 1	Food: Fruit and Veg	Mechanisms: Wheels and Axels	Textiles: Puppets
	Mechanisms: Moving Story Book	Structures: Constructing a windmill	
Year 2	Mechanisms: Fairground	Food: A balanced diet	Textiles: Pouches
		Structures: Big Bears chair	Mechanisms: Moving Monsters
Year 3	Food: Eating Seasonally	Mechanical Systems: Pneumatic Toys	Digital World: Electronic Charm
		Structures: Constructing a castle	Textiles: Cushions
Year 4	Mechanical Systems: Making a slingshot car	Structures: Pavilions	Food: Adapting a recipe
	Electrical Systems: Torches		Textiles: Fastenings
Year 5	Food: What could be healthier?	Mechanical Systems: Making a pop-up book	Structures: Bridges
	Electrical Systems: Doodlers	Digital World: Monitoring devices	
Year 6	Structures: Playgrounds	Digital World: Navigating the world	Food: Come dine with me
	Mechanical Systems: Automated toys		Electrical Systems: Steady hand game



Early Years Foundation Stage – Educational Programmes

Expressive Arts and Design

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.

National Curriculum – Aims and Purpose

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.

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

National Curriculum – 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

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:

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

National Curriculum - Key stage 2 - Years 3, 4, 5 and 6

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.

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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.



Progression Milestones for DT

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
		Food						
Design		To design smoothie carton packaging by-hand or on ICT software	<ul style="list-style-type: none"> To design a healthy wrap based on a food combination which work well together 	<ul style="list-style-type: none"> To create a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish 	<ul style="list-style-type: none"> To design a biscuit within a given budget, drawing upon previous taste testing 	<ul style="list-style-type: none"> To adapt a traditional recipe To understand that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients To write an amended method for a recipe to incorporate the relevant changes to ingredients To design appealing packaging to reflect a recipe 	<ul style="list-style-type: none"> To write a recipe, explaining the key steps, method and ingredients To include facts and drawings from research undertaken 	
	Make	Using Recipes		<ul style="list-style-type: none"> To construct a wrap that meets a design brief 	<ul style="list-style-type: none"> To follow the instructions within a recipe 	<ul style="list-style-type: none"> To follow a baking recipe To adapt a recipe 	<ul style="list-style-type: none"> To follow a step by step method carefully to make a recipe 	<ul style="list-style-type: none"> To follow a recipe, including using the correct quantities of each ingredient To adapt a recipe based on research To work to a given timescale
		Safety	<ul style="list-style-type: none"> To chop fruit and vegetables safely to make a smoothie 	<ul style="list-style-type: none"> To slice food safely using the bridge or claw grip 			<ul style="list-style-type: none"> To cut and prepare vegetables safely To use equipment safely, including knives, hot pans and hobs 	
		Hygiene			<ul style="list-style-type: none"> To know how to prepare themselves and a workspace to cook safely, in To learn the basic rules to avoid food contamination 	<ul style="list-style-type: none"> To cook safely, following basic hygiene rules 	<ul style="list-style-type: none"> To know how to avoid cross-contamination 	<ul style="list-style-type: none"> To work safely and hygienically, with independence



<p>Evaluate</p>	<ul style="list-style-type: none"> · To taste and evaluate different food combinations · To describe appearance, smell and taste · To suggest information to be included on packaging 	<ul style="list-style-type: none"> · To describe the taste, texture and smell of fruit and vegetables · To taste test food combinations and final products · To describe the information that should be included on a label · To evaluate which grip was most effective 	<ul style="list-style-type: none"> · To establish and using design criteria to help test and review dishes · To describe the benefits of seasonal fruits and vegetables and the impact on the environment · To suggest points for improvement when making a seasonal tart 	<ul style="list-style-type: none"> · To evaluate a recipe, considering; taste, smell, texture and appearance · To describe the impact of the budget on the selection of ingredients · To evaluate and compare a range of products · To suggest modifications 	<ul style="list-style-type: none"> · To identify the nutritional differences between different products and recipes · To identify and describe healthy benefits of food groups 	<ul style="list-style-type: none"> · To evaluate a recipe, considering; taste, smell, texture and origin of the food group · To taste test and score final products · To suggest and write up points of improvements in productions · To evaluate health and safety in production to minimise cross contamination
<p>Knowledge</p>	<ul style="list-style-type: none"> · To know the difference between fruits and vegetables · To know 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 what a smoothie is · 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) 	<ul style="list-style-type: none"> · To know that 'diet' means the food and drink that a person or animal usually eats · To know 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 know 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 	<ul style="list-style-type: none"> · 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 know 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 	<ul style="list-style-type: none"> · To know that the amount of an ingredient in a recipe is known as the 'quantity' · To know that it is important to use oven gloves when removing hot food from an oven · To know the following cooking techniques: sieving, creaming, rubbing method, cooling · To know the importance of budgeting while planning ingredients for biscuits 	<ul style="list-style-type: none"> · To know where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues · To know that a recipe can be adapted to make it healthier by substituting ingredients · To know that a nutritional calculator can be used to see how healthy a food option is · To know that 'cross-contamination' means that bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects 	<ul style="list-style-type: none"> · To know that 'flavour' is how a food or drink tastes · To know that many countries have 'national dishes' which are recipes associated with that country · To know that 'processed food' means food that has been put through multiple changes in a factory · To know that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides · To know what happens to a certain food before it appears on the supermarket shelf (Farm to Fork)



		<ul style="list-style-type: none"> · 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' · To know how to use bear and claw grips 	<ul style="list-style-type: none"> · To know 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 fruit and veg often have similar nutritional benefits 			
Mechanisms/Mechanical Systems						
Design	<ul style="list-style-type: none"> · To explain how to adapt mechanisms, using bridges or guides to control the movement · To design a moving story book for a given audience · To design a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move · To create clearly labelled drawings which illustrate movement 	<ul style="list-style-type: none"> · To select a suitable linkage system to produce the desired motions · To design a wheel selecting appropriate materials based on their properties · To create a class design criteria for a moving monster · To design a moving monster for a specific audience in accordance with a design criteria 	<ul style="list-style-type: none"> · To design a toy which uses a pneumatic system · To develop design criteria from a design brief · To generate ideas using thumbnail sketches and exploded diagrams · To learn that different types of drawings are used in design to explain ideas clearly 	<ul style="list-style-type: none"> · To design a shape that reduces air resistance · To draw a net to create a structure from · To choose shapes that increase or decrease speed as a result of air resistance · To personalise a design 	<ul style="list-style-type: none"> · To design a pop-up book which uses a mixture of structures and mechanisms · To name each mechanism, input and output accurately · To storyboard ideas for a book 	<ul style="list-style-type: none"> · To experiment with a range of cams · To create a design for an automata toy based on a choice of cam to create a desired movement · To understand how linkages change the direction of a force · To make things move at the same time · To understand and draw cross-sectional diagrams to show the inner-working
Make	<ul style="list-style-type: none"> · To follow a design to create moving models that use levers and sliders · To adapt mechanisms 	<ul style="list-style-type: none"> · To select materials according to their characteristics · To follow a design brief · To make linkages using card for levers and split pins for pivots · To experiment with linkages adjusting the 	<ul style="list-style-type: none"> · To create a pneumatic system to create a desired motion · To build secure housing for a pneumatic system · To use syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy 	<ul style="list-style-type: none"> · To measure, mark, cut and assemble with increasing accuracy · To make a model based on a chosen design 	<ul style="list-style-type: none"> · To follow a design brief to make a pop up book, neatly and with focus on accuracy · To make mechanisms and/or structures using sliders, pivots and folds to produce movement · To use layers and spacers to hide the 	<ul style="list-style-type: none"> · To measure, mark and check the accuracy of the jelutong and dowel pieces required · To measure, mark and cut components accurately using a ruler and scissors · To assemble components accurately to make a stable frame



		<ul style="list-style-type: none"> widths, lengths and thicknesses of card used To cut and assemble components neatly, 	<ul style="list-style-type: none"> To select materials due to their functional and aesthetic characteristics To manipulate materials to create different effects by cutting, creasing, folding, weaving 		<ul style="list-style-type: none"> workings of mechanical parts for an aesthetically pleasing result 	<ul style="list-style-type: none"> To understand that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles To select appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set
Evaluate	<ul style="list-style-type: none"> To test a finished product, seeing whether it moves as planned and if not, explaining why, and how it can be fixed To test mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move 	<ul style="list-style-type: none"> To evaluate different designs To test and adapt a design To evaluate own designs against design criteria To use peer feedback to modify a final design 	<ul style="list-style-type: none"> To use the views of others to improve designs To test and modify the outcome, suggesting improvements To understand the purpose of exploded-diagrams through the eyes of a designer and their client 	<ul style="list-style-type: none"> To evaluate the speed of a final product based on the effect of shape on speed To evaluate the speed of a final product based on the accuracy of workmanship on performance 		<ul style="list-style-type: none"> To evaluate the work of others and receive feedback on own work To apply points of improvements To describe changes they would make/do if they were to do the project again
Knowledge	<ul style="list-style-type: none"> 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 To know that in Design and technology we call a plan a 'design' To know that wheels need to be round to rotate and move 	<ul style="list-style-type: none"> To know that different materials have different properties and are therefore suitable for different uses To know the features of a ferris wheel include the wheel, frame, pods, a base and an axle and an axle holder To know that it is important to test my design as I go along so that I can solve any problems that may occur To know that mechanisms are a collection of moving parts that work together as a 	<ul style="list-style-type: none"> To know how pneumatic systems work To know that pneumatic systems can be used as part of a mechanism To know that pneumatic systems operate by drawing in, releasing and compressing air To know different ways to manipulate materials To know how sketches, drawings and diagrams can be used to communicate design ideas To know that exploded-diagrams are used to show how different parts of a product fit together 	<ul style="list-style-type: none"> To know that air resistance is the level of drag on an object as it is forced through the air To know that the shape of a moving object will affect how it moves due to air resistance. To know that aesthetics means how an object or product looks in design and technology To know that a template is a stencil you can use to help 	<ul style="list-style-type: none"> To know that mechanisms control movement To know that mechanisms that can be used to change one kind of motion into another To know 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 	<ul style="list-style-type: none"> To know how linkages change the direction of a force To know how to draw cross-sectional diagrams to show the inner-working To know that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles To know that the mechanism in an automata uses a system of cams, axles and followers To know that different shaped cams produce different outputs



	<ul style="list-style-type: none"> To know that for a wheel to move it must be attached to a rotating axle To know that an axle moves within an axle holder which is fixed to the vehicle or toy To know that the frame of a vehicle (chassis) needs to be balanced To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles 	<p>machine to produce movement</p> <ul style="list-style-type: none"> To know that there is always an input and output in a mechanism To know that an input is the energy that is used to start something working To know that an output is the movement that happens as a result of the input To know that a lever is something that turns on a pivot To know that a linkage mechanism is made up of a series of levers To know some real-life objects that contain mechanisms 	<ul style="list-style-type: none"> To know that thumbnail sketches are small drawings to get ideas down on paper quickly 	<p>you draw the same shape accurately</p> <ul style="list-style-type: none"> To know that a birds-eye view means a view from a high angle (as if a bird in flight) To know that graphics are images which are designed to explain or advertise something To know that it is important to assess and evaluate design ideas and models against a list of design criteria 	<p>make a product more aesthetically pleasing</p> <ul style="list-style-type: none"> To know how to use layers and spacers to hide mechanisms 	<ul style="list-style-type: none"> To know that an automata is a hand powered mechanical toy To know that a cross-sectional diagram shows the inner workings of a product To know how to use a bench hook and saw safely To know that a set square can be used to help mark 90° angles
Structures						
Design	<ul style="list-style-type: none"> To understand the importance of a clear design criteria To include individual preferences and requirements in a design 	<ul style="list-style-type: none"> To generate and communicate ideas using sketching and modelling 	<ul style="list-style-type: none"> To design a castle with key features to appeal to a specific person/purpose To draw a castle design using 2D shapes To label the 3D shapes that will create the features, the materials needed and the colours To design and/or decorate a castle tower on CAD software 	<ul style="list-style-type: none"> To design a stable pavilion structure that is aesthetically pleasing To select materials to create a desired effect To build frame structures designed to support weight 	<ul style="list-style-type: none"> To design a stable structure that is able to support weight To create frame structure with focus on triangulation 	<ul style="list-style-type: none"> To design a playground featuring a variety of different structures To give careful consideration to how the structures will be used, considering effective and ineffective designs
Make	<ul style="list-style-type: none"> To make stable structures from card, tape and glue To turn 2D nets into 3D structures To follow instructions to cut and assemble the supporting structure of a windmill 	<ul style="list-style-type: none"> To make a structure according to design criteria To create joints and structures from paper/card and tape 	<ul style="list-style-type: none"> To construct a range of 3D geometric shapes using nets To create special features for individual designs To make facades from a range of recycled materials 	<ul style="list-style-type: none"> To create a range of different shaped frame structures To make a variety of free-standing frame structures of different shapes and sizes 	<ul style="list-style-type: none"> To make a range of different shaped beam bridges To use triangles to create truss bridges that span a given distance and supports a load 	<ul style="list-style-type: none"> To build a range of play apparatus structures drawing upon new and prior knowledge of structures



	<ul style="list-style-type: none"> To make functioning turbines and axles which are assembled into a main supporting structure 	<ul style="list-style-type: none"> To build a strong and stiff structure by folding paper 		<ul style="list-style-type: none"> To select appropriate materials to build a strong structure and for the cladding To reinforce corners to strengthen a structure To create a design in accordance with a plan To learn to create different textural effects with materials 	<ul style="list-style-type: none"> To build a wooden bridge structure To independently measure and mark wood accurately To select appropriate tools and equipment for particular tasks To use the correct techniques to saw safely To identify where a structure needs reinforcement and using card corners for support To explain why selecting appropriating materials is an important part of the design process To understand basic wood functional properties 	<ul style="list-style-type: none"> To measure, mark and cut wood to create a range of structures To use a range of materials to reinforce and add decoration to structures
Evaluate	<ul style="list-style-type: none"> To evaluate a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't To suggest points for improvements 	<ul style="list-style-type: none"> To test the strength of own structures To identify the weakest part of a structure To evaluate the strength, stiffness and stability of own structure 	<ul style="list-style-type: none"> To evaluate own work and the work of others based on the aesthetic of the finished product and in comparison to the original design To suggest points for modification of the individual designs 	<ul style="list-style-type: none"> Evaluating structures made by the class Describing what characteristics of a design and construction made it the most effective Considering effective and ineffective designs 	<ul style="list-style-type: none"> To adapt and improve own bridge structure by identifying points of weakness and reinforcing them as necessary To suggest points for improvements for own bridges and those designed by others 	<ul style="list-style-type: none"> To improve a design plan based on peer evaluation To test and adapt a design to improve it as it is developed To identify what makes a successful structure
Knowledge	<ul style="list-style-type: none"> To know that the shape of materials can be changed to improve the strength and stiffness of structures To know that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses) 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> To know that wide and flat based objects are more stable To know the importance of strength and stiffness in structures To know the following features of a castle; flags, 	<ul style="list-style-type: none"> To know what a frame structure is To know that a 'free-standing' structure is one which can stand on its own To know that a pavilions is a 	<ul style="list-style-type: none"> To know some different ways to reinforce structures To know how triangles can be used to reinforce bridges To know that properties are words 	<ul style="list-style-type: none"> To know that structures can be strengthened by manipulating materials and shapes To know what a 'footprint plan' is To know that in the real world, design, can impact



	<ul style="list-style-type: none"> · To know that axles are used in structures and mechanisms to make parts turn in a circle · To begin to know that different structures are used for different purposes · To know that a structure is something that has been made and put together · To know that a client is the person I am designing for · To know that design criteria is a list of points to ensure the product meets the clients needs and wants · To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity · To know that windmill turbines use wind to turn and make the machines inside work · To know that a windmill is a structure with sails that are moved by the wind · To know the three main parts of a windmill are the turbine, axle and structure 	<ul style="list-style-type: none"> · 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 	<p>towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose</p> <ul style="list-style-type: none"> · To know that a façade is the front of a structure · To know that a castle needed to be strong and stable to withstand enemy attack · To know that a paper net is a flat 2D shape that can become a 3D shape once assembled · To know that a design specification is a list of success criteria for a product 	<p>decorative building or structure for leisure activities</p> <ul style="list-style-type: none"> · To know that cladding can be applied to structures for different effects. · To know that aesthetics are how a product looks · To know that a product's function means its purpose · To know that the target audience means the person or group of people a product is designed for · To know that architects consider light, shadow and patterns when designing 	<p>that describe the form and function of materials</p> <ul style="list-style-type: none"> · To know why material selection is important based on their properties · To know the material (functional and aesthetic) properties of wood · To know the difference between arch, beam, truss and suspension bridges · To know how to carry and use a saw safe 	<p>users in positive and negative ways</p> <ul style="list-style-type: none"> · To know that a prototype is a cheap model to test a design idea · To know how to measure, mark and cut wood safely
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Textiles

	<p>Make</p> <ul style="list-style-type: none"> · To cut fabric neatly with scissors · To use joining methods to decorate a puppet · To sequence steps for construction 	<ul style="list-style-type: none"> · To select and cut fabrics for sewing · To thread a needle · To sew running stitch, with evenly spaced, neat, even stitches to join fabric 	<ul style="list-style-type: none"> · To follow a design criteria to create a cushion · To select and cut fabrics with ease using fabric scissors 	<ul style="list-style-type: none"> · To make and test a paper template with accuracy and in keeping with the design criteria 		
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		<ul style="list-style-type: none">· To neatly pin and cut fabric using a template	<ul style="list-style-type: none">· To thread needles with greater independence· To tie knots with greater independence· To sew cross stitch to join fabric· To decorate fabric using appliqué· To complete design ideas with stuffing and sewing the edges	<ul style="list-style-type: none">· To measure, mark and cut fabric using a paper template· To select a stitch style to join fabric, working neatly, sewing small neat stitches· To incorporate a fastening into a design		
Evaluate	<p>To reflect on a finished product, explaining likes and dislikes</p>	<ul style="list-style-type: none">· To troubleshoot scenarios posed by teacher	<ul style="list-style-type: none">· To evaluate an end product and thinking of other ways in which to create similar items	<ul style="list-style-type: none">· To test and evaluate an end product against the original design criteria· To decide how many of the criteria should be met for the product to be considered successful· To suggest modifications for improvement· To articulate the advantages and disadvantages of different fastening types		
Knowledge	<ul style="list-style-type: none">· To know that 'joining technique' means connecting two pieces of material together· To know that there are various temporary methods of joining fabric by using staples, glue or pins· To know that different techniques for joining	<ul style="list-style-type: none">· To know that sewing is a method of joining fabric· To know that different stitches can be used when sewing· To know the importance of tying a knot after sewing the final stitch	<ul style="list-style-type: none">· To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric· To know what a cross stitch is· To know that when two edges of fabric have been	<ul style="list-style-type: none">· 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		



		<p>materials can be used for different purposes</p> <ul style="list-style-type: none"> · To know that a template (or fabric pattern) is used to cut out the same shape multiple times · To know that drawing a design idea is useful to see how an idea will look 	<ul style="list-style-type: none"> · To know that a thimble can be used to protect my fingers when sewing 	<p>joined together it is called a seam</p> <ul style="list-style-type: none"> · To know that it is important to leave space on the fabric for the seam · To know that some products are turned inside out after sewing so the stitching is hidden 	<p>useful for different purposes</p> <ul style="list-style-type: none"> · To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions 		
Digital World							
	Design			<ul style="list-style-type: none"> · To problem solve by suggesting potential features on a Micro: bit and justifying my ideas · To develop design ideas for a technology pouch · To draw and manipulate 2D shapes, using computer-aided design, to produce a point of sale badge 		<ul style="list-style-type: none"> · To research (books, internet) for a particular (user's) animal's needs · To develop design criteria based on research · To generate multiple housing ideas using building bricks · To understand what a virtual model is and the pros and cons of traditional and CAD modelling · To place and manoeuvre 3D objects, using CAD · To change the properties of, or combine one or more 3D objects, using CAD 	<ul style="list-style-type: none"> · To write a design brief from information submitted by a client · To develop design criteria to fulfil the client's request · To consider and suggest additional functions for my navigation tool · To develop a product idea through annotated sketches · To place and manoeuvre 3D objects, using CAD · To change the properties of, or combine one or more 3D objects, using CAD
	Make			<ul style="list-style-type: none"> · To use a template when cutting and assembling the pouch 		<ul style="list-style-type: none"> · To understand the functional and aesthetic properties of plastics 	<ul style="list-style-type: none"> · To consider materials and their functional properties, especially those that are sustainable and recyclable



			<ul style="list-style-type: none"> · To follow a list of design requirements · To select and using the appropriate tools and equipment for cutting, joining, shaping, and decorating a foam pouch · To apply functional features such as using foam to create soft buttons 		<ul style="list-style-type: none"> · To programme to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range 	<p>(for example, cork and bamboo)</p> <ul style="list-style-type: none"> · To explain material choices and why they were chosen as part of a product concept · To programme an N.E, S,W cardinal compass
Evaluate			<ul style="list-style-type: none"> · To analyse and evaluating an existing product · To identify the key features of a pouch 		<ul style="list-style-type: none"> · To state an event or fact from the last 100 years of plastic history · To explain how plastic is affecting planet Earth and suggesting ways to make more sustainable choices · To explain key functions in my program (audible alert, visuals) · To explain how my product would be useful for an animal carer including programmed features 	<ul style="list-style-type: none"> · To explain how my program fits the design criteria and how it would be useful as part of a navigation tool · To develop an awareness of sustainable design · To identify key industries that utilise 3D CAD modelling and explain why · To describe how the product concept fits the client's request and how it will benefit the customers · To explain the key functions in my program, including any additions · To explain how my program fits the design criteria and how it would be useful as part of a navigation tool · To explain the key functions and features of my navigation tool to the client as part of a product concept pitch · To demonstrate a functional program as part of a product concept
Knowledge			<ul style="list-style-type: none"> · To know that in programming a 'loop' is code that repeats something again and again until stopped 		<ul style="list-style-type: none"> · To know the functional and aesthetic properties of plastics · To know that a 'device' means equipment created for a certain purpose or job 	<ul style="list-style-type: none"> · To know that accelerometers can detect movement · To know that sensors can be useful in products as they mean the product can function without human input



				<ul style="list-style-type: none"> · To know that a Micro:bit is a pocket-sized, codeable computer · To know how to write a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm · To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result · To know that in Design and technology the term 'smart' means a programmed product · To know the difference between analogue and digital technologies · To know what is meant by 'point of sale display' · To know that CAD stands for Computer-aided design 		<p>and that monitoring devices observe and record</p> <ul style="list-style-type: none"> · To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose · To know that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met · To know key developments in thermometer history · To know events or facts that took place over the last 100 years in the history of plastic and how this is changing our outlook on the future · To know the 6Rs of sustainability · To know what CAD is and how to use it · To know what a virtual model is and the pros and cons of traditional vs CAD modelling 	<ul style="list-style-type: none"> · To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request · To know that 'multifunctional' means an object or product has more than one function · To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing
<h2>Electrical Systems</h2>							
	<h3>Design</h3>				<ul style="list-style-type: none"> · To design a torch, giving consideration to the target audience 	<ul style="list-style-type: none"> · To identify factors that could be changed on existing products · To explain how these would alter the form 	<ul style="list-style-type: none"> · To design a steady hand game - identifying and naming the components required



				<ul style="list-style-type: none">· To create both design and success criteria focusing on features of individual design ideas	<p>and function of the product</p> <ul style="list-style-type: none">· To develop design criteria based on finding from investigating existing products· To develop design criteria that clarifies the target user	<ul style="list-style-type: none">· To draw a design from three different perspectives· To generate ideas through sketching and discussion· To model ideas through prototypes
Make				<ul style="list-style-type: none">· To make a torch with a working electrical circuit and switch· To use appropriate equipment to cut and attach materials· To assemble a torch according to the design and success criteria	<ul style="list-style-type: none">· To alter a product's form and function by tinkering with its configuration· To make a functional series circuit incorporating a motor· To construct a product with consideration for the design criteria	<ul style="list-style-type: none">· To construct a stable base for a game· To accurately cut, fold and assemble a net· Decorate the base of the game to a high quality finish· To make and test a circuit incorporating a circuit into a base
Evaluate				<ul style="list-style-type: none">· To test and evaluate the success of a final product	<ul style="list-style-type: none">· To carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses· To determine which parts of a product affect its function and which parts affect its form· To analyse whether changes in configuration positively or negatively affect an existing product	<ul style="list-style-type: none">· To test own and others finished games· To identify what went well and making suggestions for improvement



	Knowledge				<ul style="list-style-type: none">• To know that an electrical circuit must be complete for electricity to flow• To know that a switch can be used to complete and break an electrical circuit• To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens• To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison	<ul style="list-style-type: none">• To know that series circuits only have one direction for the electricity to flow• To know when there is a break in a series circuit, all components turn off• To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin• To know a motorised product is one which uses a motor to function• To know that product analysis is critiquing the strengths and weaknesses of a product• To know that 'configuration' means how the parts of a product are arranged	<ul style="list-style-type: none">• 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 know the diagram perspectives 'top view', 'side view' and 'back'• To know how to construct a net accurately
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