Cropredy C of E Primary School

Curriculum Handbook

Key Stage 1 and Key Stage 2

Design Technology

Updated September 2025

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Curriculum Statement

INTENT

At Cropredy Church of England Primary School, we intend to build an exciting, inspiring and practical Design and Technology curriculum that encourages all pupils to use their creativity and imagination. In particular, children will design and make products that solve real and relevant problems within a variety of contexts, as well as consider their own and others' needs, wants and values.

At Cropredy Church of England Primary School, our Design and Technology curriculum builds upon children's prior learning through our progression documents and the use of Knowledge Concept and Vocabulary Organisers (KCVs) . To support teachers to deliver a broad and exciting curriculum, we use the scheme 'Kapow' to develop a set of well structured and sequenced lessons that deliver the aims of the National Curriculum.

A high quality Design and Technology lesson should engage, inspire and Implementation The teaching and implementation of Design and Technology is based on the National Curriculum objectives which are mapped out by 'Kapow'. Delivered weekly, Design and Technology challenge pupils, equipping them with the knowledge and skills to experiment, design and create their own pieces of work. As children progress through the small steps of learning, mapped out with the specific learning objectives, they should be able to think critically and develop a mastered understanding of Design and Technology.

In addition, throughout each lesson, the children not only develop their interest and curiosity about Design and Technology, they also develop their emotional resilience and expression to further enhance their personal, social development. and emotional development.

IMPLEMENTATION

The teaching and implementation of Design and Technology is based on the National Curriculum objectives which are mapped out by 'Kapow'. Delivered weekly, Design and Technology challenge pupils, equipping them with the knowledge and skills to experiment, design and create their own pieces of work. As children progress through the small steps of learning, mapped out with the specific learning objectives, they should be able to think critically and develop a mastered understanding of Design and Technology.

In addition, throughout each lesson, the children not only develop their interest and curiosity about Design and Technology, they also develop their emotional resilience and expression to further enhance their personal, social development. and emotional lessons follow the school's approach to the Rosenshine's Principles where content is regularly revisited and skills and knowledge built upon.

The learning outcomes are organised into different strands: Structures, Cooking and Nutrition, Electrical Systems and Mechanical Systems. The children will experience at least one of these units across the Key Stage. At the beginning of each unit, the children are introduced to a new KCV that provides an overview of the key learning, vocabulary and skills the children will be exposed to in order to achieve the end of unit outcomes.

The overview of each KCV provides the Teachers and Teaching Assistants with the required subject knowledge to deliver high quality lessons, as well as highlighting how each lesson is sequenced to achieve the final learning outcomes. The Kapow scheme is a helpful tool to support staff in feeling secure with the delivery of Design and Technology lessons.

IMPACT

Firstly, we want all children to understand that when they learn at Cropredy, they should all consider themselves Design Technicians.

Secondly, we want all children at Cropredy to understand that Design and Technology comes in a range of forms that include: Structures, Cooking and Nutrition, Electrical Systems and Mechanical Systems; they begin to differentiate between these different strands as they move through the school and have an understanding that Design and Technology is not the same as Art.

inally, as a result of the development of Design and Technology, it allows children to develop their problem solving and social skills which help to build resilience within the classroom.

RECORDING

Children have their own sketchbooks, in which they can record their own thoughts, ideas and opinions. They use the pages to develop their skills and the progression of these skills throughout the units is clear.

Teachers will take pictures of the children when they are using different tools and exploring different artistic techniques. These will either be stuck into the children's sketchbooks or put onto our school website for parents to see.

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ASSESSMENT

To assess Design and Technology at Cropredy, teachers determine whether the children have achieved the learning intentions mapped out in the KCV of each topic. Teachers then analyse how the children have applied these skills to their final piece of Design and Technology work.

In addition, Kapow has mapped out a clear and concise document that provides a range of examples of children's work that is graded as either 'below age expectations,' 'at age related expectations' and 'greater depth'. T
hese examples can be seen for each lesson/skill and aims to assist teacher assessment. Children are also encouraged to examine their own work and the work of others using peer assessment.

INCLUSION

Design and Technology at Cropredy is for everyone. To help promote inclusivity, the curriculum has been designed to deliver a range of Design and Technology lessons that can be accessed by all. Pupils will be given the opportunity to use a range of tools throughout each topic to achieve the learning intentions - no matter their need.

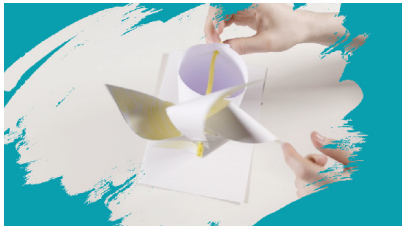
Lessons will be adapted and altered to enable all children to access each learning opportunity. Furthermore, the range of units provided by our curriculum will encourage all children to engage with Design and Technology.

Here at Cropredy, all Design and Technology lessons ensure every child has an equal chance of learning, regardless of whether they might have a disability or a special need. The ethos generated around our lessons develop and boost everyone's self confidence to accept themselves as Design Technicians and their strengths and weaknesses.

CULTURAL CAPITAL

Our school aims to engage all pupils in Design and Technology. When completing studies of existing Design Technicians, the children will be exposed to a range of people from different genders, social and educational backgrounds, ages and experience.

These will include people from our local community and also those from other countries. A wide range of techniques and materials will be used to ensure children from all back-grounds have exciting opportunities which they may not have access to outside of the school environment.



Curriculum Overview

Curriculum Overview

YEAR	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
1		Mechanisms: Moving storybook		Cooking adn Nutrition: Smoothies		Textiles: Puppets
2		Mechanisms: Fairgroudn Wheel		Textiles: Pouches		Mechanisms: Making a moving monster
3		Cooking and nutrition: Eating seasonally		Mechanisms: Pneumatic toys		Textiles: Cross Stitch & Applique
4		Structures: Pavilions		Mechanical systems: Making a slingshot car		Electrical Systems: Torches
5		Structure: Bridges		Mechanical systems: Gears and Pulleys		Cooking and nutrition: Developing a recipe
6		Structure: Design a New Playground		Electrical: Steady Hand Game		Textiles: Waistcoats

Skills Progression

STRUCTURES

FOUNDATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Pupils should be taught to: Return to and build on their previous learning, refining ideas and developing their ability to represent them. ELG: Creating with Materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	Learning the importance of a clear design criteria. Including individual preferences and requirements in a design. Making stable structures from card. 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. Finding the middle of an object. Puncturing holes. Adding weight to structures. Creating supporting structures. Cutting evenly and carefully. Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't. Suggest points for improvements.			Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. Creating a range of different shaped frame structures. Making a variety of free standing frame structures of different shapes and sizes. Selecting appropriate materials to build a strong structure and cladding. Reinforcing corners to strengthen a structure. Creating a design in accordance with a plan. Learning to create different textural effects with materials. Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs.	Designing a stable structure that is able to support weight. Creating a frame structure with a focus on triangulation. Making a range of different shaped beam bridges. Using triangles to create truss bridges that span a given distance and support a load. Building a wooden bridge structure. Independently measuring and marking wood accurately. Selecting appropriate tools and equipment for particular tasks. Using the correct techniques to saws safely. Identifying where a structure needs reinforcement and using card corners for support. Explaining why selecting appropriating materials is an important part of the design process. Understanding basic wood functional properties. Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary Suggesting points for improvements for own bridges and those designed by others.	Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs. Building a range of play apparatus structures drawing upon new and prior knowledge of structures. Measuring, marking and cutting wood to create a range of structures. Using a range of materials to reinforce and add decoration to structures. 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.

Skills Progression

TEXTILES

FOUNDATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Pupils should be taught to: Explore, use and refine a variety of artistic effects to express their ideas and feelings. ELG: Creating with materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. ELG: Creating with materials: Share their creations, explaining the process they have used.		Designing a pouch. Selecting and cutting fabrics for sewing. Decorating a pouch using fabric glue or running stitch. Threading a needle. Sewing running stitch, with evenly spaced, neat, even stitches to join fabric. Neatly pinning and cutting fabric using a template. 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.	Designing and making a template from an existing cushion and applying individual design criteria. Following design criteria to create a Egyptian collar. Selecting and cutting fabrics with ease using fabric scissors. Threading needles with greater independence. Tying knots with greater independence. Sewing cross stitch to join fabric. Decorating fabric using appliqué. Completing design ideas with stuffing and embellishing the collars based on design ideas (Egyptian collars). Evaluating an end product and thinking of other ways in which to create similar items.			Designing a waistcoat in accordance to a specification linked to set of design criteria. Annotating designs, to explain their decisions. Using a template when cutting fabric to ensure they achieve the correct shape. Using pins effectively to secure a template to fabric without creases or bulges. Marking and cutting fabric accurately, in accordance with their design. Sewing a strong running stitch, making small, neat stitches and following the edge. Tying strong knots. Decorating a waistcoat, attaching features (such as appliqué) using thread. Finishing the waistcoat with a secure fastening (such as buttons). Learning different decorative stitches. • Sewing accurately with evenly spaced, neat stitches.

Skills Progression

COOKING AND NUTRITION

FOUNDATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Pupils should be taught to: ELG: Speaking: Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. Personal, social and emotional development Know and talk about the different factors that support their overall health and wellbeing: healthy eating. ELG: Managing self: Manage their own basic hygiene and personal needs, including… understanding the importance of healthy food choices Explore, use and refine a variety of artistic effects to express ideas and feelings. ELG: Creating with materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	Designing smoothie carton packaging by-hand. Learning where and how fruits and vegetables grow. Chopping fruit and vegetables safely to make a smoothie. Juicing fruits safely to make a smoothie. Identifying if a food is a fruit. Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging. Comparing their own smoothie with someone else's.		Describing how climate affects where foods grow Identifying seasonal ingredients from the UK. Following the instructions within a recipe. Tasting seasonal ingredients. Peeling foods by hand or with a peeler. Cutting ingredients safely. Choosing ingredients based on a design brief. Describing the texture and flavour of ingredients. Describing the benefits of seasonal fruits and vegetables and the impact on the environment.		Researching existing recipes. Suggesting alternative ingredients. Designing a jar label. Writing an alternative recipe. Understanding cross-contamination. Using preparation skills. Making a developed recipe. Explaining the farm to fork process. Analysing nutritional content.	Pupils should be taught to: Beg

Skills Progression

MECHANISM

FOUNDATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Pupils should be taught to:	Explaining how to adapt mechanisms, using bridges or guides to control the movement. Designing a moving story book for a given audience. Following a design to create moving models that use levers and sliders. 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.	Conducting simple surveys or discussions to gather opinions on what others need or like in a design. Knowing that a survey is used to find out what people like. Using a simple design brief that outlines the intended use, target user, and key features of the product, to create simple design criteria. Knowing that a design brief helps to decide what to make. Knowing that design criteria are the steps for making a product successful. Creating ideas with design criteria in mind. Referring to specific parts of existing products when generating ideas. Knowing that the design criteria help when thinking of ideas. Using labels to explain parts of a design, label materials, etc. Using labels to explain parts of a design, label materials, etc. Knowing that drawings can help explain how something works. Knowing that a label explains part of a drawing. Discussing a range of existing products and saying what they like and dislike about them. ● Evaluating existing products against design criteria. ● Evaluating their ideas and creations against simple design criteria. ● Knowing that design criteria help to decide if their product is a success. ● Suggesting improvements to their peers' designs and products. ● Knowing that improve means to make something better. ● Knowing that their suggestions can improve someone else's work.	Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. Taking part in structured idea blasting sessions. Coming up with more ideas and considering the feasibility of their ideas in the classroom. Developing drawing and sketching skills with a focus on clarity and simplicity. Developing designs by adding detail and justifications about materials, tools, methods. Beginning to recognise the benefit of a range of diagram types or prototypes to communicate ideas. (eg. sketches, cross-sectional diagram, thumbnail sketches and exploded diagrams). Selecting equipment required for a series of tasks based on the plan. Explain why each piece is suitable for each stage. Suggesting simple safety rules based on their understanding of tool dangers. Participating in discussions about classroom safety procedures. Cutting out more complex shapes accurately. Handle different sizes and types of scissors with confidence.	Designing a shape that reduces air resistance. Drawing a net to create a structure from. Choosing shapes that increase or decrease speed as a result of air resistance. Personalising a design. Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design. Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	Noticing wider-reaching problems or needs in the community. Identifying a wide range of needs and potential barriers through market research. Writing more complex problem statements that consider multiple factors and constraints. Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. Using a series of prototypes to refine and improve their designs.	Pupils should be taught to:

Skills Progression

MECHANISM

FOUNDATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
		Creating a class design criteria for a moving monster. Designing a moving monster for a specific audience in accordance with a design criteria. Making linkages using card for levers and split pins for pivots. Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. Cutting and assembling components neatly. Evaluating own designs against design criteria. Using peer feedback to modify a final design.	Using PVA glue to join corrugated card and light wood (e.g. balsa wood). Choosing shapes to suit the function of a product. Painting or colouring precisely to improve the finish. Making facades from a range of materials. Sealing edges with tape to cover gaps in joins. Analysing why specific products, designers or inventors are successful. Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. Reflecting on feedback to decide if and how it could be used to improve future iterations.		Consistently apply safety instructions. Select appropriate scissors to handle delicate cutting tasks and challenging materials. Cutting patterns and drawings accurately. In supervised groups, using hot glue guns safely. Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly. Choosing PVA glue over hot glue for its safety when joining materials in less intensive projects. Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. Considering alternative materials, tools or techniques that could enhance the product. Providing feedback that is helpful, specific, and encouraging.	

Skills Progression

ELECTRICAL SYSTEMS

FOUNDATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
				Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. Making a torch with a working electrical circuit and switch. Using appropriate equipment to cut and attach materials. Assembling a torch according to the design and success criteria Evaluating electrical products. Testing and evaluating the success of a final product.		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. Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'. 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. Testing own and others finished games, identifying what went well and making suggestions for improvement. Gathering images and information about existing children's toys. Analysing a selection of existing children's toys.

YEAR 1

Mechanisms: Moving Storybook

PPRIOR LEARNING

Before undertaking the Making a Moving Story Book unit in Year 1, children in EYFS will have explored basic physical development through fine motor activities like cutting, folding, and joining materials. They will have experimented with construction kits and simple tools to build and explore how things move. Additionally, they will have developed creativity and early problem-solving by designing and making simple models during play-based learning.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- A mechanism is the parts of an object that move together.
- A slider mechanism moves an object from side to side or up and down.
- A slider mechanism has a slider, slots, guides and an object.
- Bridges and guides are bits of card that purposefully restrict the movement of the slider.

Key Skills:

- Explaining how to adapt mechanisms, using bridges or guides to control the movement.
- Designing a moving storybook for a given audience.
- Following a design to create moving models that use levers and sliders.
- 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.

SUBJECT SPECIFIC VOCABULARY

Mechanism
A system of parts that work together to produce movement.

Slider
A simple mechanism where a part moves from side to side or up and down in a slot.

Lever
A rigid bar that moves around a fixed point to make another part move.

Pivot
The fixed point that a lever turns or rotates around.

Storybook Page
A page in a book designed with moving parts that help tell a story.

Join
To connect two parts together using glue, tape, or other methods.

Template
A shape or pattern used as a guide to help make other shapes accurately.

IMPACT

Children working at the expected level can plan and make a moving storybook page using a simple slider or lever mechanism. They can explain how their mechanism works and identify ways to improve it through testing.

HIGH FREQUENCY VOCABULARY

Glue	Design	Problem	Improve
Design	Create	Idea	Help
Decorate	Change	Make	Try
Model	Test	Choose	Plan

KEY CONCEPT QUESTIONS

How does a slider help a picture move on a page?
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What is the difference between a lever and a slider?
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Why do we need to test and improve our designs?
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How do you decide where to place a pivot when making a lever?

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences.

SMSC LINKS

YEAR 1

Cooking and Nutrition: Fruit and Vegetables

PPRIOR LEARNING

Before starting the Smoothies unit in Year 1, children in EYFS should have experienced basic food preparation through play and adult-led activities, such as cutting soft foods with support or using role-play kitchens. They should be familiar with common fruits and vegetables and understand simple concepts like healthy eating and hygiene (e.g., washing hands before food). Additionally, they will have developed fine motor skills needed for safe handling of tools like plastic knives and peelers.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- That a blender is a machine which mixes ingredients together into a smooth liquid.
- That a fruit has seeds and a vegetable does not.
- That fruits grow on trees or vines.
- That vegetables can grow either above or below ground.
- That vegetables are any edible part of a plant.

Key Skills:

- Designing smoothie carton packaging by hand.
- Chopping fruit and vegetables safely to make a smoothie.
- Juicing fruits to make a smoothie.
- Identifying if a food is a fruit.
- Learning where and how fruits and vegetables grow.
- Tasting and evaluating different foods.
- Describing appearance, smell and taste.
- Suggesting information to be included on packaging.

SUBJECT SPECIFIC VOCABULARY

Blender
A machine that mixes soft foods into a smooth liquid.

Smoothie
A drink made by blending fruit and/or vegetables with liquid.

Juicer
A device used to extract juice from fruit or vegetables.

Ingredients
The different foods and liquids needed to make a recipe.

Taste test
Sampling foods to compare flavours before making a decision.

Fruit
The part of a plant that contains seeds and grows from a flower.

Vegetable
An edible part of a plant (leaf, root, stem, etc.) that is not fruit.

Chopping board
A flat board used to safely cut food on.

Table knife
A blunt-edged knife safe for children to use during food prep.

IMPACT

By the end of this unit, children who are working at the expected level can safely prepare and blend a simple fruit and/or vegetable smoothie using basic tools (table knife, chopping board, blender). They can name the ingredients they used, explain why they chose them, and evaluate their smoothie against their design choices.

HIGH FREQUENCY VOCABULARY

Seed	Select	Design
Leaf	Compare	Ingredients
Fruit	Evaluate	Recipe
Prepare	Healthy	

KEY CONCEPT QUESTIONS

Why do we taste-test different fruits and vegetables before selecting ingredients for our smoothie?

How does choosing healthy ingredients support a balanced diet?

What is the purpose of using a chopping board and table knife when preparing ingredients?

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How does using a blender change the ingredients into a smoothie?

SMSC LINKS

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Willingness to reflect on their experiences.

YEAR 1 Structures: Constructing a Windmill

PPRIOR LEARNING

Before starting the Structures: Constructing a Windmill unit in Year 1, children in EYFS should have regularly participated in junk-modelling activities using materials like cardboard, boxes, and tubes, exploring how to cut, join, and build 3D shapes. They will have improved their fine motor skills through scissor work, folding, sticking, and assembling, and begun to understand concepts like stability and balance in self-constructed models They will also have experienced simple planning—talking about what they're going to build and reflecting on how well it works .

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- That the sails or blades of a windmill are moved by the wind.
- That windmills are used to generate power and were used for grinding flour.
- That a structure is something built for a reason.
- That stable structures do not topple.
- That adding weight to the base of a structure can make it more stable.

Key skills:

- Finding the middle of an object.
- Puncturing holes.
- Adding weight to a structure.
- Creating supporting structures.
- Cutting evenly and carefully.
- Evaluating and improving a product.

SUBJECT SPECIFIC VOCABULARY

Windmill
A structure with sails that catch the wind to create movement

Sail
The part of the windmill that moves when the wind blows

Axle
A long, straight piece that connects the sails to the structure, allowing rotation

Structure
The supporting framework built to hold the sails and axle

Stable
Describes a structure that won't topple over easily

Net
A flattened 2D shape that can be folded and assembled into a 3D form

IMPACT

By the end of this unit, children working at ARE will have designed and built a free-standing windmill using card, tape, and glue, incorporating sails, an axle, and a stable base. They will have tested its functionality in the wind and evaluated their design, suggesting improvements based on how well it turned and stood.

HIGH FREQUENCY VOCABULARY

design	stable	Create	Stable
packaging	strong	Evaluate	Strong
unstable	weak	Test	Weak

KEY CONCEPT QUESTIONS

Why does the windmill need both a stable base and an axle?

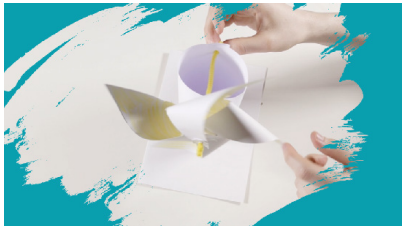
How does using a net help when building a 3D windmill structure?

What might you change if your windmill sails didn't turn?

How can you tell if your windmill is strong enough for the wind?

SMSC LINKS

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning.
Moral - Interest in investigating and offering reasoned views about moral and ethical issues and ability to understand and appreciate the viewpoints of others on these issues
Cultural - Willingness to participate in and respond positively toartistic, musical, sporting and cultural opportunities.



YEAR 2 Mechanisms: Fairground Wheel

PRIOR LEARNING

Before beginning the "Constructing a Windmill" unit, children will have explored simple mechanisms like wheels and axles, built basic structures through junk modelling, and learned to strengthen and stabilise them. They will also have developed practical skills such as safe tool use and following instructions through cooking activities, preparing them for more complex design and construction tasks.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- That the sails or blades of a windmill are moved by the wind.
- That windmills are used to generate power and were used for grinding flour.
- That a structure is something built for a reason.
- That stable structures do not topple.
- That adding weight to the base of a structure can make it more stable.

Key Skills;

- Finding the middle of an object.
- Puncturing holes.
- Adding weight to a structure.
- Creating supporting structures.
- Cutting evenly and carefully.
- Evaluating and improving a product.

HIGH FREQUENCY VOCABULARY

Design	Ferris WHeel	Function
Design Criteria	Purpose	Improve
Wheel	Evaluate	

KEY CONCEPT QUESTIONS

How do the pods will attach to the wheel?

How the axle will fit into the frame?

Are the materials strong or hard?

SUBJECT SPECIFIC VOCABULARY

Structure
Something that has been built or put together from different parts.

Axle
A rod or spindle that passes through the centre of a wheel, allowing it to rotate.

Windmill
A structure with blades that are turned by the wind to create movement.

Mechanism
A system of parts working together in a machine.

Stability
The ability of a structure to remain steady and not fall over.

SMSC LINKS

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences.

IMPACT

By the end of the unit, children working at the expected standard should be able to design and construct a windmill for a purpose, incorporating a rotating mechanism. They will select appropriate materials, assemble components with increasing accuracy, and evaluate the effectiveness of their design based on criteria.

YEAR 2 Textiles: Pouches

PRIOR LEARNING

Children should be familiar with using simple tools and materials, having practiced cutting with scissors, threading, stitching (e.g., running stitch), and joining fabrics or paper to create bookmarks or puppets. They need to have experience designing and exploring textiles, such as planning a stitch pattern or decorating fabric, and using templates to cut out repeated shapes . Finally, they should be able to evaluate their creations, talking about what they like and what they would change next time, forming the basis of design and improvement in Year 2 .

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- 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.

Key Skills:

- Designing a pouch.
- Selecting and cutting fabrics for sewing.
- Decorating a pouch using fabric glue or running stitch.
- Threading a needle.
- Sewing running stitch, with evenly spaced, neat, even stitches to join fabric.
- Neatly pinning and cutting fabric using a template.
- 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.

HIGH FREQUENCY VOCABULARY

Design criteria	Model	Decorate
Natural	Join	Design
Shape	Cut	Purpose
Man Made	Shape	Choose
Stable	Plan	Change

KEY CONCEPT QUESTIONS

What is a template, and how did it help you when making your pouch?

Can you show me your running stitch and explain how it joins two pieces of fabric together?

What did you add to your pouch to decorate it and make it special?

IIf you made your pouch again, what would you change or improve, and why?

SMSC LINKS

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences.

Social - Use of a range of social skills in different contexts, for example working and socialising with other pupils, including those from different religious, ethnic and socio-economic backgrounds

SUBJECT SPECIFIC VOCABULARY

Template
A shape or guide you draw around to help you cut out the right shape.

Running stitch
A simple sewing stitch that goes up and down through the fabric in a straight line.

Seam
The line where two pieces of fabric are sewn together.

Fabric
Material like cloth that we use to make things like clothes or bags.

Thread
A long, thin piece of cotton or wool used for sewing.

Needle
A small, pointed tool with a hole for thread used for sewing.

Knot
A loop in the thread that you tie so your stitches don't come undone.

Decoration
Things you add to your pouch (like buttons or patterns) to make it look nice.

Fastening
Something used to open or close the pouch, like Velcro or a button.

IMPACT

By the end of the unit, children should have designed, made, and decorated a simple fabric pouch using a running stitch to join two pieces of fabric together. Their finished pouch should show careful cutting, secure stitching, and a decoration or fastening chosen for a clear purpose.

YEAR 2

Mechanisms: Making a Moving Monster

PRIOR LEARNING

Children are able to consider the designs of others and make comments about their practicality or appeal. They can consider the materials, shape, construction and mechanisms of their design and label these. The children have also experienced testing and adapting their designs as necessary.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- To know that mechanisms are a collection of moving parts that work together as a machine to produce movement.
- To know that there is always an input and an 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.

Key Skills:

- Creating a design criteria for a moving monster as a class.
- Designing a moving monster for a specific audience in accordance with a design criteria.
- Making linkages using card for levers and split pins for pivots.
- Experimenting with linkages adjusting the widths, lengths and thicknesses of card used.
- Cutting and assembling components neatly.
- Evaluating own designs against design criteria.
- Using peer feedback to modify a final design.

HIGH FREQUENCY VOCABULARY

Axle
Design Criteria
Wheel
Evaluate
Select

KEY CONCEPT QUESTIONS

Explain how your monster's lever and pivot work together—what happens when you move one part?

What design criteria did you set at the beginning, and how does your monster meet each point?

How did you change your linkage during building to make the movement smoother or stronger?

If you had to improve your monster, what would you adjust in your materials or mechanism, and why?

SMSC LINKS

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences.

IMPACT

By the end of the unit, children working at Age-Related Expectations should be able to use levers, pivots, and linkages to design and build a simple moving monster that demonstrates input–output motion. They will select appropriate materials, follow their design brief, assemble the mechanism accurately, and evaluate their final monster against their set criteria.

SUBJECT SPECIFIC VOCABULARY

Lever
A rigid bar that moves around a fixed pivot point to create motion.

Pivot
A fixed point which a lever or linkage turns around.

Linkage
Several levers joined by pivots to transmit movement.

Input
The force or motion we apply to start the mechanism.

Output
The movement that results from the mechanism working.

YEAR 3

Cooking and Nutrition: Eating Seasonally

PRIOR LEARNING

During their unit of Food Technology in Year 1 children were taught to describe fruits and vegetables and explain why they are a fruit or a vegetable. Name a range of places that fruits and vegetables grow. They also had experiences of describing basic characteristics of fruit and vegetables.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- That seasonal means foods that grow in a given season in a given country.
- Some seasonal foods that grow in the UK and what season they grow in.
- That eating seasonal foods can have a positive impact on the environment.
- How to describe the flavour and texture of foods.
- How to cut and peel safely.
- That the appearance of food is as important as taste.
- That similar coloured fruits and vegetables often have similar nutritional benefits.

Key skills:

- Describing how climate affects where foods grow.
- Identifying seasonal ingredients from the UK.
- Tasting seasonal ingredients.
- Describing the texture and flavour of ingredients.
- Peeling foods by hand or with a peeler.
- Cutting ingredients safely.
- Choosing ingredients based on a design brief.
- Following the instructions within a recipe.
- Describing the benefits of seasonal fruits and vegetables and their impact on the environment.

HIGH FREQUENCY VOCABULARY

Weather	Fruits	Hot
Seasons	Countries	Cold

KEY CONCEPT QUESTIONS

Why are some fruits and vegetables best eaten in season, and how does that link to our climate?

What steps did you follow to prepare your seasonal ingredients safely and hygienically?

Which ingredients did you choose for your tart, and how do they meet your design criteria?

What would you change next time to improve the taste or appearance of your seasonal tart, and why?

SMSC LINKS

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences

Moral - Understanding of the consequences of their behaviour and actions. Interest in investigating and offering reasoned views about moral and ethical issues and ability to understand and appreciate the viewpoints of others on these issues.

Cultural - Understanding and appreciation of the wide range of cultural influences that have shaped their own heritage and that of others

SUBJECT SPECIFIC VOCABULARY

Seasonal
Foods that are grown and harvested at certain times of the year in specific climates.

Climate
The usual weather conditions in a place, which affect what can be grown there.

Hygiene
Practices that keep food safe and clean while preparing and cooking.

Ingredient
A food item used as part of a recipe.

Evaluate
To judge the quality or effectiveness of something based on criteria.

Names of a range of fruits such a lychees or strawberries

IMPACT

By the end of the unit, children working at age-related expectations should be able to explain the concept of seasonality—recognising which fruits and vegetables grow at different times of year and why that matters. They will design and prepare a simple seasonal tart using cutting, peeling, and tasting skills, applying food hygiene and evaluating their finished product.

YEAR 3 Mechanisms: Penumatic Toys

PRIOR LEARNING

In EYFS and KS1, pupils should already have used simple mechanisms like wheels & axles, sliders, levers, and pivots—giving them a foundation in how movement in toys is created •They should have experience designing and making prototypes, using annotated or exploded diagrams to plan how parts fit together—a key skill for sketching pneumatic systems Children need understanding of input and output, recognising that pushing, pulling, or trapping air (pneumatics) can produce movement, and should be able to talk through how these systems work in their creations.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- To understand how pneumatic systems work.
- To design a toy that uses a pneumatic system.
- To create a pneumatic system.
- To test and finalise ideas against design criteria.

Key Skills:

- Designing a toy that uses a pneumatic system.
- Developing design criteria from a design brief.
- Generating ideas using thumbnail sketches and exploded diagrams.
- Learning that different types of drawings are used in design to explain ideas clearly.
- Creating a pneumatic system to create a desired motion.
- Building secure housing for a pneumatic system.
- Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy.
- Selecting materials due to their functional and aesthetic characteristics.
- Manipulating materials to create different effects by cutting, creasing, folding and weaving.
- Using the views of others to improve designs.
- Testing and modifying the outcome, suggesting improvements.
- Understanding the purpose of exploded-diagrams through the eyes of a designer and their client.

HIGH FREQUENCY VOCABULARY

Product design	Move	Strength
Template	Change	Shape
Develop	Design	Control
Push	Plan	Improve
Pull	Purpose	

KEY CONCEPT QUESTIONS

What does pneumatic mean, and how does it help your toy move?

- Can you explain the difference between the input and output in your pneumatic toy?
- How does a syringe work to push air and create movement in your toy?
- What would you change in your design if your toy wasn't moving properly, and why?

SMSC LINKS

Spiritual - Ability to be reflective about their own beliefs (religious or otherwise) and perspective on life. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences.

Cultural - Understanding and appreciation of the wide range of cultural influences that have shaped their own heritage and that of others. Willingness to participate in and respond positively to artistic, musical, sporting and cultural opportunities

IMPACT

By the end of the unit, children should understand how pneumatic systems use compressed air to create movement in their toys. They will be able to design, build, and test a pneumatic toy, explaining how their mechanisms work and suggesting improvements.

SUBJECT SPECIFIC VOCABULARY

Pneumatic
Something that works using air or gas that is squeezed (compressed) inside some-thing.

System
A group of parts that work together to make something happen.

Mechanism
The parts of something that help it move or work.

Syringe
A plastic tube with a plunger that you can push or pull to move air or liquid.

Compressor
A tool or part that pushes air into something to make it move.

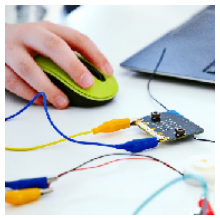
Input
The action you do to make a mechanism work, like pressing or pushing.

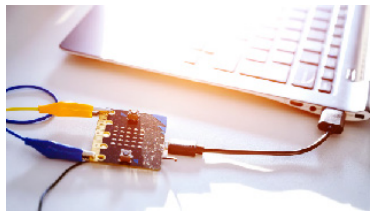
Output
What happens as a result of your action, like something popping up or moving.

Seal
Closing something tightly so that air or liquid can't escape.

Prototype
A first version of your model to test your ideas before making the final one.

Pressure
The force created when air is squeezed into a small space.





YEAR 3 Textiles: Cross Stitch and Applique

PRIOR LEARNING

Experience with basic sewing techniques: They should be familiar with using needles and thread to join fabrics, having practiced simple stitches like running stitch and backstitch in previous projects.Understanding of fabric manipulation: Children should have worked with various textiles, learning how to cut, fold, and assemble materials to create simple items such as pouches or small bags.Introduction to decorative techniques: They should have explored basic decoration methods, including appliqué and simple embroidery, to enhance the appearance of their textile projects.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- To learn how to sew cross-stitch and appliqué.
- To develop and use a template.
- To assemble fabric parts into a fabric product.
- To decorate fabric using appliqué and cross-stitch.

Key Skills:

•Designing and making a template for an Egyptian collar and applying individual design criteria.
•Following their design criteria to create an Egyptian collar.
•Selecting and cutting fabrics with ease using fabric scissors.
•Threading needles with greater independence.
•Tying knots with greater independence.
•Sewing cross stitch to decorate or join fabric.
•Decorating fabric using appliqué, beads (or other embellishments), ribbon and pinking scissors.
•Evaluating an end product.

HIGH FREQUENCY VOCABULARY

Design	Shape	Improve
Plan	Decorate	Change
Join	Choose	
Cut	Purpose	

KEY CONCEPT QUESTIONS

Can you explain what a running stitch is and show me how you used it in your project?

How did you join the pieces of fabric together to make your cushion or collar?

What decorations did you add to your textile, and why did you choose them?

If you made your cushion or collar again, what would you do differently to improve it?

Spiritual - Knowledge of, and respect for, different people's faiths, feelings and values. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences.
Social - Use of a range of social skills in different contexts, for example working and socialising with other pupils, including those from different religious, ethnic and socio-economic backgrounds. Acceptance and engagement with the fundamental British values of democracy, the rule of law, individual liberty and mutual respect and tolerance of those with different faiths and beliefs; they develop and demonstrate skills and attitudes that will allow them to participate fully in and contribute positively to life in modern Britain.
Cultural -Willingness to participate in and respond positively to artistic, musical, sporting and cultural opportunities

SMSC LINKS

SUBJECT SPECIFIC VOCABULARY

Appliqué
Sewing or sticking small pieces of fabric onto a bigger piece to make a design.

Embroidery
Decorating fabric by sewing patterns or pictures with thread.

Running stitch
A simple stitch that goes in and out of the fabric in a straight line.

Backstitch
A strong sewing stitch where the needle goes back into the fabric to make a solid line.

Seam
The line where two pieces of fabric are sewn together.

Stuffing
Soft material (like cotton or wool) put inside cushions to make them soft.

Textiles
Different types of cloth or fabric.

Fastening
Something used to open or close a cushion, like a button or zip.

IMPACT

By the end of the unit, children should be able to design, sew, and decorate a simple cushion or Egyptian collar using basic stitching techniques like running stitch and backstitch. Their finished textile product should show careful joining of fabrics, thoughtful decoration, and an understanding of its purpose and function.

YEAR 4

Structures: Pavillions

PRIOR LEARNING

Before starting this unit, children will be able to draw and label a simple pavilion that includes the most common features. They will be able to recognise that a pavillion is made up of multiple 3D shapes. They would have experienced designing a 3D model with key features which satisfy a given purpose. They have practised the skills of scoring or cutting along lines on the net of a 2D shape and use glue to securely assemble geometric shapes. They would have also evaluated their work by answering simple questions.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- Create a range of different shaped frame structures
- Design a structure
- Build a frame structure
- Add cladding to a frame structure

Key Skills:

- Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect.
- Building frame structures designed to support weight.
- Creating a range of different shaped frame structures.
- Making a variety of free-standing frame structures of different shapes and sizes.
- Selecting appropriate materials to build a strong structure and for the cladding.
- Reinforcing corners to strengthen a structure.
- Creating a design in accordance with a plan.
- Learning to create different textural effects with materials.

HIGH FREQUENCY VOCABULARY

Design Criteria	Customer	Stable
Evaluate	User	Firm
Structure	Audience	Strong

KEY CONCEPT QUESTIONS

What makes a secure structure?

Why does the design of your structure appeal to the target audience?

What is cladding?

How will you attach the cladding?

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences

SMSC LINKS

IMPACT

Children will be able to follow a design criteria to create a pavillion structure. This will involve creating a different style frame to previous years and looking at adding appropriate cladding for it. This free-standing structure shoud have a range of textural effects too.

SUBJECT SPECIFIC VOCABULARY

Aesthetic
A set of principles underlying the work of a particular artist or artistic movement.

Cladding
A covering or coating on a structure or material.

Frame structure
A structure that is made stable by a skeleton that is able to stand by itself as a rigid structure without depending on floors

Function
An activity that is natural to or the purpose of a person or thing.

Inspiration
The process of being mentally stimulated to do or feel something, especially to do something creative.

Pavilion
A summer house or other decorative building used as a shelter in a park or large garden.

Reinforce
Strengthen or support (an object or substance), especially with additional material.

Target audience
A particular group at which a product such as a film or advertisement is aimed.

Texture
The feel, appearance, or consistency of a surface or substance.

YEAR 4

Mechanical Systems: Making a Sligshot Car

PRIOR LEARNING

Children will be able to identify the correct terms for levers, linkages and pivots. They will have had experience of creating functional linkages that produce the desired input and output motions. They will be able to select and assemble materials.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- Build a car chassis.
- Design a shape that reduces air resistance.
- Make a model based on a chosen design.
- Assemble and test my completed product.

Key Skills:

- Designing a shape that reduces air resistance.
- Drawing a net to create a structure from.
- Choosing shapes that increase or decrease speed as a result of air resistance.
- Personalising a design.
- Measuring, marking, cutting and assembling with increasing accuracy.
- Making a model based on a chosen design.
- Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.

HIGH FREQUENCY VOCABULARY

Car
Energy
Net
Design
Design Criteria
Function

KEY CONCEPT QUESTIONS

Do you know any mechanisms that are in cars today?

What shape would your car need to be to reduce air resistance?

What is an effective way for your panels to join?

Spiritual - Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences.

SMSC LINKS

IMPACT

Children will be able to follow a design criteria to create a slingshot car. The car should have an effective chassis, and be as aerodynamic as possible and this should be taken into account when designing the slingshot car.

SUBJECT SPECIFIC VOCABULARY

Aesthetic
A set of principles underlying the work of a particular artist or artistic movement.

Air resistance
The forces that are in opposition to the relative motion of an object as it passesthrough the air

Chassis
The base frame of a car, carriage, or other wheeled vehicle.

Graphics
The products of the graphic arts, especially commercial design or illustration.

Kinetic energy
Energy which a body possesses by virtue of being in motion.

Mechanism
A system of parts working together in a machine; a piece of machinery.

Structure
A building or other object constructed from several parts.

YEAR 4

Electrical Systems: Torches

PRIOR LEARNING

During Science lessons, children would have explored light and the absence of it. They will also know that light is reflected from a surface. Children will have experienced creating electrical systems and know the equipment needed to do this.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- Learn about electrical items and how they work.
- Analyse and evaluate electrical products.
- Design a product to fit a set of specific user needs.
- Make and evaluate a torch.

Key Skills:

- Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.
- Making a torch with a working electrical circuit and switch.
- Using appropriate equipment to cut and attach materials.
- Assembling a torch according to the design and success criteria.
- Evaluating electrical products.
- Testing and evaluating the success of a final product.

HIGH FREQUENCY VOCABULARY

Battery	Design Criteria	Packaging
Bulb	Diagram	Sketch
Circuit	Evaluation	Test
Electricity	Model	Ingredients
Switch	Shape	Equipment
Design	Recyclw	

KEY CONCEPT QUESTIONS

How does an electrical system work?

What does a battery store in order for it to make products work?

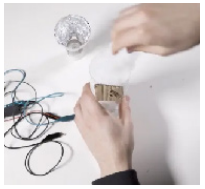
How does your torch meet your design brief?

Spiritual - Knowledge of, and respect for, different people's faiths, feelings and values. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences
Social - Use of a range of social skills in different contexts, for example working and socialising with other pupils, including those from different religious, ethnic and socio-economic backgrounds.

SMSC LINKS

IMPACT

Children will be able to follow a design criteria to create a torch. This should involve them having knowledge of how electrical circuits work. The torch should meet the design criteria and be made for the target audience.



SUBJECT SPECIFIC VOCABULARY

Buzzer
An electrical device that makes a buzzing noise and is used for signalling.

Conductor
A substance or material that allows electricity to flow through it

Circuit diagram
A simplified graphical representation of an electrical circuit.

Insulator
A substance or material that doesn't allows electricity to flow through it

Series Circuit
A single pathway through which electricity can flow.

Component
Constituting part of a larger whole

LED
A light-emitting diode (a semiconductor diode which glows when a voltage is applied).

Target audience
A particular group at which a product such as a film or advertisement is aimed.

Aesthetics
A set of principles underlying the work of a particular artist or artistic movement.

Assemble
Fit together the separate component parts of (a machine or other object).

YEAR 5

Structure: Bridges

PRIOR LEARNING

Before engaging with the Year 5 Structure: Bridges unit, children should have:
1.Explored basic structures and their properties, such as understanding how different materials can be used to create stable forms, which is foundational for grasping the principles of bridge construction.
2.Developed skills in designing and making simple models, including the use of tools and materials to create prototypes, which will aid in the practical aspects of building bridge models.
3.Learned about various types of bridges and their functions, gaining an appreciation for how different designs serve specific purposes in real-world applications.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- To explore how to reinforce a beam (structure) to improve its strength.
- To build a spaghetti truss bridge.
- To build a wooden truss bridge.
- To complete, reinforce and evaluate my truss bridge.

Key Skills:

•Designing a stable structure that is able to support weight.
•Creating a frame structure with focus on triangulation.
•Making a range of different shaped beam bridges.
•Using triangles to create truss bridges that span a given distance and support a load.
•Building a wooden bridge structure.
•Independently measuring and marking wood accurately.
•Selecting appropriate tools and equipment for particular tasks.
•Using the correct techniques to saw safely.
•Identifying where a structure needs reinforcement and using card corners for support.
•Explaining why selecting appropriate materials is an important part of the design process.
•Understanding basic wood functional properties.
•Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary.
•Suggesting points for improvements for own bridges and those designed by others.

HIGH FREQUENCY VOCABULARY

Design	Strength	Join
Plan	Shape	Improve
Build	Support	
Test	Change	

KEY CONCEPT QUESTIONS

What is the purpose of a truss in a bridge, and how does its shape help make the bridge stronger?

Can you explain the difference between tension and compression forces and give an example of where each might occur in a bridge?

Why is the foundation important for a bridge's stability?

If your bridge model started to bend or break, what changes would you make to improve its strength and support?

SMSC LINKS

Spiritual - Knowledge of, and respect for, different people's faiths, feelings and values. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences
Social - Willingness to participate in a variety of communities and social settings, including by volunteering, cooperating well with others and being able to resolve conflicts effectively.

IMPACT

By the end of the unit, children working at ARE should be able to design and build a stable bridge model that can support a load using appropriate structural features like arches or trusses. They should also understand and explain how forces like tension and compression affect their bridge's strength.

SUBJECT SPECIFIC VOCABULARY

Structure
Something that is built to support weight or hold things up, like a bridge or build-ing.

Load
The weight or force that a structure has to hold or carry.

Beam
A long, strong piece of wood or metal used to support weight across a space.

Arch
A curved structure that helps carry weight and adds strength to bridges.

Truss
A framework of triangles that helps make structures strong and stable.

Tension
A force that pulls or stretches something.

Compres-sion
A force that pushes or squashes something.

Prototype
A first version or model made to test ideas before making the final product.

Stability
How well a structure can stand without falling over or collapsing.

Foundation
The part of a structure that supports it on the ground.

YEAR 5

Mechanical Systems: Gears and Pulleys

PRIOR LEARNING

They should have hands on experience exploring simple mechanisms — especially axles, wheels fixed or free moving, and the principles of cutting, joining and reinforcing structures — and know that forces, motion, and mechanisms (levers, sliders, wheels and axles) can change direction or magnitude of movement.Pupils ought to recognise in science that gears, pulleys and levers are simple machines that allow smaller forces to produce larger effects, and be able to explain how and why that happens (e.g., gearing up/down, changing direction). They should have begun analysing real products (e.g., toys or tools) to see how mechanical systems work, including understanding vocabulary like gear ratio, driver/follower, drive belt and pulley types — in preparation for designing and building their own systems in the unit

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Knowledge:

- To create a working gear system and explain its function.
- To improve a working gear system and suggest some applications.
- To create a working pulley system and explain its function.
- To conduct market research to discover useful tasks an eco-gadget bike could perform.
- To design and evaluate an eco-gadget bike using design criteria.

Key Skills:

- Noticing wider-reaching problems or needs in the community.
- Identifying a wide range of needs and potential barriers through market research.
- Writing more complex problem statements that consider multiple factors and constraints.
- Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost.
- Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality.
- Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.
- Using a series of prototypes to refine and improve their designspositively or negatively affect an existing product.
- Peer evaluating a set of instructions to build a product.

HIGH FREQUENCY VOCABULARY

process	construct	structure
function	design	sequence
mechanism	evaluate	
system	analysis	

KEY CONCEPT QUESTIONS

Why might you use a pulley system instead of lifting something by hand, and how does it make the job easier?

If a small gear (driver) turns a large gear (follower), what happens to the speed and force of the movement? Why?

How does using more than one gear or pulley in a system help control the direction or speed of movement? Can you give an example?

What might happen if there is too much friction between the moving parts of a gear or pulley system? How could you solve the problem?

Spiritual - Knowledge of, and respect for, different people's faiths, feelings and values. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences
Cultural - Willingness to participate in and respond positively to artistic, musical, sporting and cultural opportunities

IMPACT

Children should be able to design, make, and evaluate a working mechanical system that uses gears or pulleys to achieve a specific purpose. They should confidently explain how the movement is transferred and altered by the mechanisms they have used, using key vocabulary like 'gear ratio', 'driver', and 'follower'.

SUBJECT SPECIFIC VOCABULARY

Gear
A toothed wheel that works with others to increase force or speed, or to change the direction of movement.

Pulley
A wheel with a groove along its edge for holding a rope or belt, used to lift or move loads more easily

Axle
A rod or spindle that passes through the center of a wheel or gear, allowing it to rotate.

Driver Gear
The gear that receives force first and transfers motion to other gears.

Follower Gear
The gear that is moved by the driver gear.

Gear Ratio
The relationship between the number of teeth on two meshing gears, used to determine how fast or slow they turn.

Mechanical Advantage
The benefit gained by using a machine to make a task easier, often by multiplying force.

Drive Belt
A looped belt used to connect two or more pulleys or gears, helping to transfer motion between them

Rotation
The action of turning around a center point or axis.

Transmission
The process of passing force or movement from one part of a machine to another.

Force
A push or pull that can make an object start moving, stop moving, or change direction.

Friction
The resistance that one surface or object encounters when moving over another, often slowing movement.

YEAR 5

Cooking and Nutrition: Developing a recipe (Tudor feast)

PRIOR LEARNING

Children should have explored simple mechanisms like levers, sliders, wheels, and axles, understanding that they help objects to move.They should have experience designing and making models using cutting, shaping, joining, and finishing skills. Children should know that forces (like pushes and pulls) can change the movement, speed, or direction of objects.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- To understand how ingredients are reared and processed.
- To make adaptations to design a recipe.
- To evaluate nutritional content.
- To practise food preparation skills.
- To design a product label.
- To follow and make an adapted recipe.

Key skills:

- Explaining the farm-to-fork process.
- Researching existing recipes.
- Suggesting alternative ingredients.
- Analysing nutritional content.
- Writing an alternative recipe.
- Understanding cross-contamination.
- Using preparation skills.
- Designing a jar label.
- Making a developed recipe.

HIGH FREQUENCY VOCABULARY

Modify	Safety	Suitable
Evaluate	Accurate	Source
Method	Ingredient	

KEY CONCEPT QUESTIONS

Why might you adapt a recipe, and what changes could you make to improve its nutritional value?

How can cross-contamination be avoided during food preparation, and why is it important?

What do food labels tell us about the ingredients and nutritional content of a product?

What skills did you use to safely prepare your dish, and how did you ensure accuracy in your measurements and methods?

SMSC LINKS

Spiritual - Knowledge of, and respect for, different people's faiths, feelings and values. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences. Ability to be reflective about their own beliefs (religious or otherwise) and perspective on life.

Moral - Interest in investigating and offering reasoned views about moral and ethical issues and ability to understand and appreciate the viewpoints of others on these issues.

Social - Use of a range of social skills in different contexts, for example working and socialising with other pupils, including those from different religious, ethnic and socio-economic backgrounds

Cultural -Understanding and appreciation of the range of different cultures in the school and further afield as an essential element of their preparation f
life in modern Britain

SUBJECT SPECIFIC VOCABULARY

Beef
Flash from a cow which is used for food

Reared
Bring up and care for (a child) until they are fully grown.

Ethical
Relating to moral principles or the branch of knowledge dealing with these.

Balanced
having different elements in the correct proportions.

Adaptation
The process of modifying a recipe (e.g., adding, substituting, or omitting ingredients) to meet dietary needs or preferences.

Cross-contamination
The transfer of harmful bacteria from one food item to another, prevented by using separate chopping boards and tools.

Nutrient
Any substance in food (such as protein, fibre, sugar) that the body requires to grow, stay healthy, and function.

Nutritional value
A measure of how healthy a food is, based on what nutrients it contains.

IMPACT

By the end of this unit, children working at the expected standard will understand how to adapt a recipe to suit taste, dietary needs, or health guidelines. They will be able to follow a recipe accurately, prepare food safely and hygienically, and evaluate the nutritional content of their final dish.

YEAR 6 Structure: Playgrounds

PRIOR LEARNING

Children would have produced a range of free-standing frame structures of different shapes and sizes. They would have experienced selecting appropriate materials and construction techniques to create a stable, free-standing frame structure.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- Design a playground with a variety of structures
- Build a range of structures
- Improve and add detail to structures
- Create the surrounding landscape

Key Skills:

- Designing a playground featuring a variety of different structures, giving consideration to how the structures will be used.
- Considering effective and ineffective designs.
- Building a range of play apparatus structures drawing upon new and prior knowledge of structures.
- Measuring, marking and cutting wood to create a range of structures.
- Using a range of materials to reinforce and add decoration to structures.
- 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.

HIGH FREQUENCY VOCABULARY

Design Criteria
Equipent
Playground
Cladding
Structure
Measure

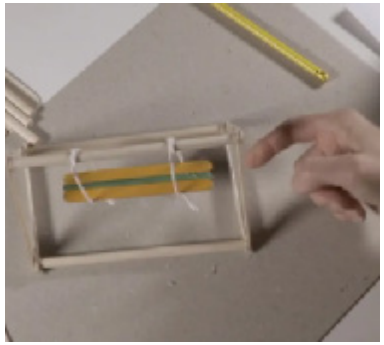
SUBJECT SPECIFIC VOCABULARY

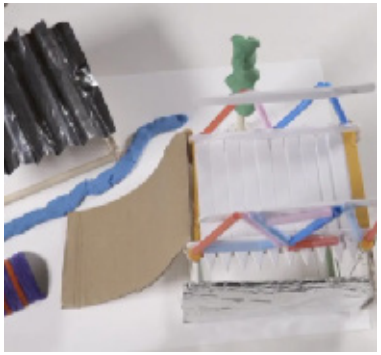
Apparatus
The technical equipment or machinery needed for a particular activity or purpose.

Landscape features
A detached decorative structure that is placed outside of any other structure.

IMPACT

Children will be able to design and create a playground. This will involve the children designing a new playground. They will need to create structures of play things before looking at surrounding areas and finer detail of the plyground.





KEY CONCEPT QUESTIONS

What structures would be effective in a play area?

What extra detail could you add to your structure to make it even more successful?

What would the surrounding area of your playground look like?

SMSC LINKS

Spiritual - Knowledge of, and respect for, different people's faiths, feelings and values. Knowledge of, and respect for, different people's faiths, feelings and values. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences

Social - Use of a range of social skills in different contexts, for example working and socialising with other pupils, including those from different religious, ethnic and socio-economic backgrounds. Willingness to participate in a variety of communities and social settings,including by volunteering, cooperating well with others and being able to resolve conflicts effectively.

YEAR 6 Electrical: Steady hand Game

PRIOR LEARNING

Children should understand basic electrical circuits (series), including how a battery, wires, switch, and buzzer/bulb connect. They should be confident using nets to create simple 3D structures and safely using tools like pliers, wire cutters, and scissors. Pupils need experience designing, making, and evaluating products—especially using criteria and considering how 'form follows function.'

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key knowledge:

- To research and analyse a range of children's toys.
- To design a steady hand game.
- To construct a stable base.
- To assemble electronics and complete their electronic game
-
- Skills
- 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.
- Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.
- 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.
- Testing their own and others' finished games, identifying what went well and making suggestions for improvement.
- Gathering images and information about existing children's toys.
- Analysing a selection of existing children's toys.

HIGH FREQUENCY VOCABULARY

form
function
design
criteria: The things
evaluate
assemble:
Component
structure

SUBJECT SPECIFIC VOCABULARY

Series circuit
A circuit where electricity flows in one path through all components

Battery
One or more cells that store electrical energy

Buzzer
A device that makes a sound when electricity passes through

Switch
A part that lets you open or close the circuit to turn it on/off

Wire
A conductive route that carries electricity between parts

Backboard:
The decorated background that supports the game's maze

Casing/base
The 3D box or case that holds the circuit and supports the game

Make and break
When the wand touches the maze wire it completes (makes) the circuit; moving away breaks it

KEY CONCEPT QUESTIONS

What is a series circuit, and why does your buzzer only sound when the wand touches the maze wire?

How does a switch help control the game, and why is it useful in a steady hand game design?

Why do we use a sturdy casing and backboard for our steady hand game, and what might happen if it's too weak?

If your buzzer is too quiet or doesn't buzz, what could be wrong with your circuit or assembly?

Moral -Understanding of the consequences of their behaviour and actions. Interest in investigating and offering reasoned views about moral and ethical issues and ability to understand and appreciate the viewpoints of others on these issues.
Spiritual - Knowledge of, and respect for, different people's faiths, feelings and values. Knowledge of, and respect for, different people's faiths, feelings and values. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences

IMPACT

Children should be able to design, build, and assemble a steady hand game with a working series circuit that completes when the wand touches the maze.
They should explain how current flows, what makes and breaks the circuit, and evaluate their final product against their original design criteria.

YEAR 6 Textiles: Waistcoats

PRIOR LEARNING

Children will have experienced joining fabrics together using pins, staples and glue. They would of designed and created a puppet and used a template to do so. Children would have decorated their piece of work to match their design.

KEY KNOWLEDGE & SKILLS

By the end of the term children will have gained the following knowledge and skills:

Key Knowledge:

- Design a waistcoat
- Mark and cut fabric according to a design
- Assemble a waistcoat
- Decorate your waistcoat

Key Skills:

- Designing a waistcoat in accordance with a specification and design criteria to fit a specific theme.
- Annotating designs.
- Using a template when pinning panels onto fabric.
- Marking and cutting fabric accurately, in accordance with a design.
- Sewing a strong running stitch, making small, neat stitches and following the edge.
- Tying strong knots.
- Decorating a waistcoat – attaching objects using thread and adding a secure fastening.
- Learning different decorative stitches.
- Sewing accurately with even regularity of stitches.
- Evaluating work continually as it is created.

HIGH FREQUENCY VOCABULARY

Decorate	Fabric	Waterproof
Design Criteria	Target customer	Template

SUBJECT SPECIFIC VOCABULARY

Annotate
Add notes to (a text or diagram) giving explanation or comment.

Waistcoat
A close-fitting waist-length garment, typically having no sleeves or collar and buttoning down the front, worn especially by men over a shirt and under a jacket.

Running Stitch
A simple needlework stitch consisting of a line of small even stitches which run back and forth through the cloth without overlapping.

KEY CONCEPT QUESTIONS

What is a waist coat?

What could you use to assemble your waistcoat?

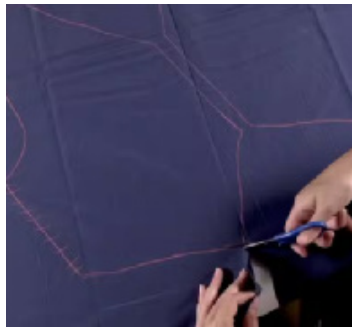
How could you decorate your waistcoat to meet your design brief?

Spiritual - Knowledge of, and respect for, different people's faiths, feelings and values. Sense of enjoyment and fascination in learning about themselves, others and the world around them. Use of imagination and creativity in their learning. Willingness to reflect on their experiences

SMSC LINKS

IMPACT

Children will be able to design and create a waistcoat. This will involve them cutting fabric in accordamce to the size design. Once completed it should be decorated appropriately. The main area to look at will be running stitch and the childrens ability to do a running stitch.



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