



Design Technology Curriculum: Long Term Planning

Nursery

Expressive Arts

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.

Give children an insight into new musical worlds. Invite musicians in to play music to children and talk about it. Encourage children to listen attentively to music. Discuss changes and patterns as a piece of music develops.

Painting, 3D modelling, messy play, collage, cutting, drama, role play, threading, moving to music, clay sculptures, following music patterns with instruments, singing songs linked to topics, making instruments, percussion.

Work will be displayed in the classroom.

Lots of links to Fine Motor Skills. Children to explain their work to others. Children will have opportunities to learn and perform songs, nursery rhymes and poetry linked to their work / interests and passions.

Autumn 1

All About Me

I can explore different materials freely, in order to develop my ideas about how to use them and what to make.
 I can use various construction materials
 I can manipulate play dough (roll, knead)

Autumn 2

Stories & Celebrations	I can use a variety of tools to apply paint (brushes of different sizes, sponges, fingers) I can recognise and name colours.
Spring 1	
Animal Fun	I can join different materials and explore different textures. I can draw identifiable pictures I can use a variety of tools to apply paint (brushes of different sizes, sponges, fingers) with increasing control
Spring 2	
Growing Up	I can talk about what I am creating I can begin to use representation to communicate, e.g. drawing a line and saying 'That's me.'
Summer 1	
Adventures Under the Sea	I can draw a person with identifiable features I can develop my own ideas and then decide which materials to use to express them.
Summer 2	
A Taste of the World	I have been exposed to a different range of artists I can show interest and describe the texture of things

Reception

Expressive A Creating with Materials

Being Imaginative and Expressive

Painting, 3D modelling, messy play, collage, cutting, drama, role play, threading, moving to music, clay sculptures, following music patterns with instruments, singing songs linked to topics, making instruments, percussion.

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frequency, repetition and depth of their experiences are fundamental to their progress in interpreting and appreciating what they hear, respond to and observe.

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Autumn 1

Who Helps Us?	<p>Join in with songs Beginning to mix colours Build stories around toys (small world) use available props to support role play Build models using construction equipment. Junk modelling, take picture of children's creations and record them explaining what they did. Exploring sounds and how they can be changed, tapping out of simple rhythms. Play pitch matching games, humming or singing To draw a self-portrait (enclosing lines): draw definite features Observational drawings Feelings: taking photos of children acting out emotions Drama conventions through literacy</p>
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Autumn 2

Into the Woods	<p>Use different textures and materials to make firework pictures Listen to music and make their own dances in response. Christmas decorations, Christmas cards, Christmas songs/poems The use of story maps, props, puppets & story bags will encourage children to retell, invent and adapt stories. Shadow Puppets Teach children different techniques for joining materials, such as how to use adhesive tape and different sorts of glue Role Play of The Nativity Music: Christmas Songs Drama conventions through literacy</p>
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Spring 1

Space	<p>Van Gogh Starry Night: I can produce a piece of artwork using an artists style as a stimulus I can explore how colour can be changed I can talk about a famous artist. Making lanterns, Chinese writing, puppet making, Chinese music and composition I can recognise, create and describe pattern: tiger skin Drama conventions through literacy</p>
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Spring 2

<p>Minibeasts and Megabeasts</p>	<p>Make different textures; make patterns using different colours Children will explore ways to protect the growing of plants by designing scarecrows. Mother's Day crafts Easter crafts printing, patterns on Easter eggs Rubbings of leaves/plants I can combine media to make a collage Andy Goldsworthy natural art Drama conventions through literacy</p>
<p>Summer 1</p>	
<p>Food Glorious Food</p>	<p>Collage Pastel drawings, Artist focus Junk modelling, houses, bridges boats and transport. Provide children with a range of materials for children to construct with. Create collaboratively: papier mache: working in pairs I can use various construction materials Drama conventions through literacy Exploration of other countries – dressing up in different costumes Learn a traditional song and dance and perform it / Encourage children to create their own music.</p>
<p>Summer 2</p>	
<p>Imagine</p>	<p>Water pictures, collage, shading by adding black or white, colour mixing. Colour mixing Father's Day Crafts Making models from recycled materials Using clay to make a coil pot Drama conventions through literacy</p>

Year 1	Learning Outcomes	Key Knowledge	Key Skills	Key Vocabulary
Autumn				
<p>Mechanisms: Making a moving story book</p>	<ul style="list-style-type: none"> Identify whether a mechanism is a side-to-side slider or an up-and-down slider and determine what movement the mechanism will make. Clearly label drawings to show which parts of their design will move and in which direction. Make a picture, which meets the design criteria, with parts that move purposefully as planned. Evaluate the main strengths and weaknesses of their design and suggest alterations. 	<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. 	<ul style="list-style-type: none"> 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. 	<p>sliders mechanism adapt design criteria design input model template assemble test</p>
Spring				
<p>Structures: Constructing a windmill</p>	<ul style="list-style-type: none"> Identify some features that would appeal to the client (a mouse) and create a suitable design. Explain how their design appeals to the mouse. Make stable structures, which will eventually support the turbine, out of card, tape and glue. Make functioning turbines and axles that are assembled into the main supporting structure. 	<ul style="list-style-type: none"> To understand that the shape of materials can be changed to improve the strength and stiffness of structures. To understand that cylinders are a strong type of structure (and, therefore, they are the main shape used for windmills and lighthouses). To understand that axles are used in structures and 	<ul style="list-style-type: none"> Learning the importance of a clear design criteria. Including individual preferences and requirements in a design. Making stable structures from card, tape and glue. Learning how to turn 2D nets into 3D structures. Following instructions to cut and assemble the supporting structure of a windmill. 	<p>axle bridge design design criteria model net packaging structure template unstable stable strong weak</p>

	<ul style="list-style-type: none"> • Say what is good about their windmill and what they could do better. 	<p>mechanisms to make parts turn in a circle.</p> <ul style="list-style-type: none"> • To begin to understand that different structures are used for different purposes. • To know that a structure is something that has been made and put together. 	<ul style="list-style-type: none"> • Making functioning turbines and axles which are assembled into a main supporting structure. 	
Summer				
<p>Mechanisms: Wheels and axles</p>	<ul style="list-style-type: none"> • Explain that wheels move because they are attached to an axle. • Recognise that wheels and axles are used in everyday life, not just in cars. • Identify and explain vehicle design flaws using the correct vocabulary. • Design a vehicle that includes functioning wheels, axles and axle holders. • Make a moving vehicle with working wheels and axles. • Explain what must be changed if there are any operational issues. 	<ul style="list-style-type: none"> • To know that wheels need to be round to rotate and move. • To understand 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. 	<ul style="list-style-type: none"> • Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move. • Creating clearly labelled drawings that illustrate movement. • Adapting mechanisms. • Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move. 	<p>axle axle holder chassis diagram dowel equipment mechanism wheel</p>

Year 2	Learning Outcomes	Key Knowledge	Key Skills	Key Vocabulary
Autumn				
<p>Food: A balanced diet</p>	<ul style="list-style-type: none"> • Name the main food groups and identify foods that belong to each group. • Describe the taste, texture and smell of a given food. • Think of four different wrap ideas, considering flavour combinations. • Construct a wrap that meets the design brief and their plan. 	<ul style="list-style-type: none"> • To know that ‘diet’ means the food and drink that a person or animal usually eats. • To understand what makes a balanced diet. • To know where to find the nutritional information on packaging. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that nutrients are substances in food that all living things need to make energy, grow and develop. • To know that ‘ingredients’ means the items in a mixture or recipe. • To know that I should only have a maximum of five 	<ul style="list-style-type: none"> • Name the main food groups and identify foods that belong to each group. • Describe the taste, texture and smell of a given food. • Think of four different wrap ideas, considering flavour combinations. • Construct a wrap that meets the design brief and their plan. 	<p>balanced diet balance carbohydrate dairy fruit ingredients oils sugar protein vegetable design criteria</p>

		<p>teaspoons of sugar a day to stay healthy.</p> <ul style="list-style-type: none"> To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'. 		
Moving Monsters	<ul style="list-style-type: none"> Identify the correct terms for levers, linkages and pivots. Analyse popular toys with the correct terminology. Create functional linkages that produce the desired input and output motions. Design monsters suitable for children, which satisfy most of the design criteria. Evaluate their two designs against the design criteria, using this information and the feedback of their peers to choose their best design. Select and assemble materials to create their planned monster features. Assemble the monster to their linkages without affecting their functionality. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<p>axle design criteria input linkage mechanical output pivot wheel</p>
Spring				
Textiles: Pouches	<ul style="list-style-type: none"> Sew a running stitch with regular-sized stitches and understand that both ends must be knotted. 	<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. 	<ul style="list-style-type: none"> Designing a pouch. Selecting and cutting fabrics for sewing. 	<p>decorate fabric fabric glue knot needle</p>

	<ul style="list-style-type: none"> • Prepare and cut fabric to make a pouch from a template. • Use a running stitch to join the two pieces of fabric together. • Decorate their pouch using the materials provided. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<p>needle threader running stitch sew template thread</p>
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Summer

Structures: Baby Bear's chair	<ul style="list-style-type: none"> • Identify man-made and natural structures. • Identify stable and unstable structural shapes. • Contribute to discussions. • Identify features that make a chair stable. • Work independently to make a stable structure, following a demonstration. • Explain how their ideas would be 	<ul style="list-style-type: none"> • To know that shapes and structures with wide, flat bases or legs are the most stable. • To understand that the shape of a structure affects its strength. • To know that materials can be manipulated to improve strength and stiffness. • To know that a structure is something which has been formed or made from parts. • To know that a 'stable' structure is one which is firmly 	<ul style="list-style-type: none"> • Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects. • Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper. 	<p>design criteria man-made natural properties structure stable shape model test</p>
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	<p>suitable for Baby Bear.</p> <ul style="list-style-type: none"> • Produce a model that supports a teddy, using the appropriate materials and construction techniques. • Explain how they made their model strong, stiff and stable. 	<p>fixed and unlikely to change or move.</p> <ul style="list-style-type: none"> • To know that a 'strong' structure is one which does not break easily. • To know that a 'stiff' structure or material is one which does not bend easily. 	<ul style="list-style-type: none"> • Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of their own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of their own structure. 	
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Year 3	Learning Outcomes	Key Knowledge	Key Skills	Key Vocabulary
Autumn				
Puppets	<ul style="list-style-type: none"> • Join fabrics together using pins, staples or glue. • Design a puppet and use a template. • Join their two puppets' faces together as one. • Decorate a puppet to match their design. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Using a template to create a design for a puppet. • Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing steps for construction. 	<p>decorate design fabric glue model</p> <p>hand puppet safety pin staple</p>

		<ul style="list-style-type: none"> • 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. • 	<ul style="list-style-type: none"> • Reflecting on a finished product, explaining likes and dislikes. 	stencil template
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Spring

Electrical systems: Electric poster	<ul style="list-style-type: none"> • Explain what 'information design' is and understand its impact, considering what could happen if we had no signage, posters, or written communication in public places of interest. • Research and choose a specific Ancient Roman topic on which to base their initial poster ideas. • Complete design criteria based on a client's request. • Roughly sketch four initial poster ideas, indicating where a bulb will be located for each. • Review their initial ideas against the design criteria and peer feedback, developing a final design. 	<ul style="list-style-type: none"> • To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit. • To understand common features of an electric product (switch, battery or plug, dials, buttons etc.) • To list examples of common electric products (kettle, remote control etc.) • To understand that an electric product uses an electrical system to work (function). • To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits. 	<ul style="list-style-type: none"> • Carrying out research based on a given topic (e.g. The Romans) to develop a range of initial ideas. • Generating a final design for the electric poster with consideration for the client's needs and design criteria. • Planning the positioning of the bulb (circuit component) and its purpose. • Mounting the poster onto corrugated card to improve its strength and withstand the weight of the circuit on the rear. • Measuring and marking materials out using a template or ruler. 	information design design public design criteria research initial ideas sketch bulb self-assessment peer assessment feedback develop final design electrical system electric product circuit circuit component bulb battery crocodile wires
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	<ul style="list-style-type: none"> Assemble an electric poster, including a functional simple circuit with a bulb, following a demonstration. Acknowledge, with a brief explanation, the need to mount the poster using corrugated card. Test that the simple circuit works by adding a battery. Evaluate their electric posters in a letter to a client. 		<ul style="list-style-type: none"> Fitting an electrical component (bulb). Learning ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge). Learning to give and accept constructive criticism on own work and the work of others. Testing the success of initial ideas against the design criteria and justifying opinions. Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs. 	
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Summer

<p>Mechanical Systems: Pneumatic toys</p>	<ul style="list-style-type: none"> Draw accurate diagrams with correct labels, arrows and explanations. Correctly identify definitions for key terms. Identify five appropriate design criteria. Communicate two ideas using thumbnail sketches. Communicate and develop one idea using an exploded diagram. Select appropriate equipment and materials to build a working pneumatic system. 	<ul style="list-style-type: none"> To understand how pneumatic systems work. To understand that pneumatic systems can be used as part of a mechanism. To know that pneumatic systems operate by drawing in, releasing and compressing air. 	<ul style="list-style-type: none"> 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. 	<p>mechanism lever pivot linkage system pneumatic system input output component thumbnail sketch research adapt properties reinforce motion</p>
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	<ul style="list-style-type: none"> Assemble their pneumatic system within the housing to create the desired motion. Create a finished pneumatic toy that fulfils the design brief. 		<ul style="list-style-type: none"> 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. 	
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Year 4	Learning Outcomes	Key Knowledge	Key Skills	Key Vocabulary
Autumn				
Textiles: Sewn Pictures	<ul style="list-style-type: none"> Use a back-stitch to work on a crewel picture Design the picture and cut fabric for mounting Use crewel stictch to decorate a the plastic canvas = apply decorations Make a finished plastic canvas which is mounted and framed 	<ul style="list-style-type: none"> Designing and making a template based on existing ideas and applying individual design criteria. Following design criteria to create a picture Selecting and cutting fabrics with ease using fabric scissors. Threading needles with greater independence. 	<ul style="list-style-type: none"> To know that crewel stitch wraps the canvas To know that it is important to leave space on the fabric for the seam. To use scissors to cut fabric to form a mount To create frames for finished products 	<ul style="list-style-type: none"> Crewel stitch design equipment fabric patch running stitch thread texture knot

		<ul style="list-style-type: none"> • Tying knots with greater independence. • Sewing crewel stitch • Decorating fabric • Completing design ideas and mounting and framing the finished piece • Evaluating an end product and thinking of other ways in which to create similar items. 		
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Spring

<p>Digital world: Mindful moments timer</p>	<ul style="list-style-type: none"> • State and/or describe the advantages and disadvantages of existing products (timers). • Understand how Micro:bit features could be used as part of a design idea. • Write a program that displays a timer on the Micro:bit based on their chosen seconds/minutes. • Suggest where the errors are, if testing is unsuccessful, by comparing the correct code to their own. • State key functions in the program editor (e.g. loops). • Cut out a box net carefully, assembling it securely into a box using tape or glue and tabs and ensuring it has a slot for the Micro:bit display. 	<ul style="list-style-type: none"> • Writing design criteria for a programmed timer (Micro:bit). • Exploring different mindfulness strategies and using this research to inform my design criteria. • Developing a prototype case for my mindful moment timer. • Using and manipulating shapes and clipart and using computer-aided design (CAD) to produce a logo. • Following a list of design requirements. Developing a prototype case for my mindful moment timer. • Creating a 3D structure using a net. • Programming a Micro:bit to time a set number of seconds/minutes upon button press. 	<ul style="list-style-type: none"> • To understand what variables are in programming. • To know some of the features of a Micro:bit. • To know that an algorithm is a set of instructions to be followed by the computer. • To know that it is important to check my code for errors (bugs). • To know that a simulator can be used as a way of checking that your code works before installing it onto an electronic device. 	<p>research advantage disadvantage criteria design ergonomic timer program loop coding block variable pause bug debug instructions net template develop join assemble test form function prototype</p>
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	<ul style="list-style-type: none"> • Evaluate the immediate appeal of the Micro:bit timer and how it might function. • Express which stages of the project they enjoyed or found more challenging. • Explain the need for a company to stand out against competition and/or state the importance of logos in business. • Recall and describe the name and use of key tools used in Sketchup (CAD) software. • Fulfil the design requirements of the logo. 	<ul style="list-style-type: none"> • Analysing a range of timers by comparing their advantages and disadvantages. • Evaluating my Micro:bit program against points on my design criteria and amending them to include any changes I made. • Documenting and evaluating my project. • Understanding what logos are and why they are important in the world of design and business. • Testing my program for bugs (errors in the code). Finding and fixing the bugs (debug) in my code. 		<p>process cheap</p>
Summer				
<p>Food: Adapting a recipe</p>	<ul style="list-style-type: none"> • Follow a recipe, with some support. • Describe some of the features of a biscuit based on taste, smell, texture and appearance. • Adapt a recipe by adding extra ingredients to it. • Plan a biscuit recipe within a budget. 	<ul style="list-style-type: none"> • Designing a biscuit within a given budget, drawing upon previous taste testing. • Following a baking recipe. • Cooking safely, following basic hygiene rules. • Adapting a recipe. • Evaluating a recipe, considering: taste, smell, texture and appearance. • Describing the impact of the budget on the selection of ingredients. • Evaluating and comparing a range of products. • Suggesting modifications. 	<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 understand the importance of budgeting while planning ingredients for biscuits. 	<p>design criteria research texture innovative aesthetic measure cross-contamination diet processed packaging</p>

<p>Structure: Pavilions</p>	<ul style="list-style-type: none"> • To create a range of different shaped frame structures • To design a structure • To build a frame structure • To add cladding to a frame structure 	<ul style="list-style-type: none"> • Know what the structure (pavilion) is used for. • Know that different materials can create different effects • Understand how to make a stable structure • Understand how to design a structure that is stable and aesthetically pleasing • Know how to build a free-standing structure • Select appropriate materials to build a strong structure • Know how to reinforce corners to strengthen a structure • Be able to refer to a design sheet to create a pavilion • I can select appropriate materials for my cladding • I can add cladding which reflects my design • I can create different textural effects with my chosen material 	<ul style="list-style-type: none"> • 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. 	<p>3D shapes design criteria natural cladding innovative structure reinforce</p>
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Year 5	Learning Outcomes	Key Knowledge	Key Skills	Key Vocabulary
Autumn				
<p>Mechanical systems: Making a pop-up book</p>	<ul style="list-style-type: none"> Produce a suitable plan for each page of their book. Produce the structure of the book. Assemble the components necessary for all their structures/mechanisms. Hide the mechanical elements with more layers using spacers where needed. Use a range of mechanisms and structures to illustrate their story and make it interactive for the users. Use appropriate materials and captions to illustrate the story. 	<ul style="list-style-type: none"> Designing a pop-up book which uses a mixture of structures and mechanisms. Naming each mechanism, input and output accurately. Storyboarding ideas for a book. Following a design brief to make a pop up book, neatly and with focus on accuracy. Making mechanisms and/or structures using sliders, pivots and folds to produce movement. Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement. 	<ul style="list-style-type: none"> To know that mechanisms control movement. To understand that mechanisms can be used to change one kind of motion into another. To understand how to use sliders, pivots and folds to create paper-based mechanisms. To know that a design brief is a description of what I am going to design and make. To know that designers often want to hide mechanisms to make a product more aesthetically pleasing. 	<p>design input motion mechanism criteria research reinforce model</p>
Spring				
<p>Electrical systems: Doodlers</p>	<ul style="list-style-type: none"> Identify simple circuit components (battery, bulb and switch) with a basic 	<ul style="list-style-type: none"> Identifying factors that could be changed on existing products and 	<ul style="list-style-type: none"> To know that, in a series circuit, electricity only flows in one direction. 	<p>circuit component configuration current</p>

	<p>explanation of their function.</p> <ul style="list-style-type: none"> • Explain that a series circuit is assembled in a loop to allow the electricity to flow along one path. • Describe a motor as a circuit component that changes electrical energy into movement. • Provide examples of motorised products that use movement to rotate or spin different parts. • Remove and replace different parts of a Doodler, as part of a team. • Suggest ways to switch the configuration to amend the form or function of the Doodler. • Explain, in an investigation report, each of the changes they made and the effect this had on the Doodler's ability to draw scribbles (function) and appearance (form). • Develop design criteria with consideration for the target user, the purpose of their Doodler, a key function and the Doodler's form and final appearance (e.g. fun, bright, soft). • Explain simply why their Doodler has a certain configuration based on the 	<p>explaining how these would alter the form and function of the product.</p> <ul style="list-style-type: none"> • Developing design criteria based on findings from investigating existing products. • Developing design criteria that clarifies the target user. • Altering a product's form and function by tinkering with its configuration. • Making a functional series circuit, incorporating a motor. • Constructing a product with consideration for the design criteria. • Breaking down the construction process into steps so that others can make the product. • Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. • Determining which parts of a product affect its function and which parts affect its form. • Analysing whether changes in configuration positively or negatively affect an existing product. 	<ul style="list-style-type: none"> • 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. 	<p>develop DIY investigate motor motorised problem solve product analysis series circuit stable target user</p>
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	<p>findings of their investigation (e.g. I used four pens because the Doodler would fall over with two).</p> <ul style="list-style-type: none"> • Create a functional Doodler that creates scribbles on paper with or without a switch. • Identify and list each of the required materials, tools and circuit components required to build a Doodler. • Explain simply the steps to assemble a Doodler as part of a set of instructions (or storyboard). • Write instructions to build a functional circuit, explaining how to identify if it is functional or not. • Provide suggestions to improve a peer's set of instructions after testing how effective they are at guiding someone. 	<ul style="list-style-type: none"> • Peer evaluating a set of instructions to build a product. 		
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Summer

<p style="text-align: center;">Cooking and Nutrition: What could be healthier?</p>	<ul style="list-style-type: none"> • To understand where meat comes from – learning that beef is from cattle and how beef is reared and processed, including key welfare issues. • To know that I can adapt a recipe to make it healthier by substituting ingredients. 	<ul style="list-style-type: none"> • To understand where meat comes from – learning that beef is from cattle and how beef is reared and processed, including key welfare issues. • To know that I can adapt a recipe to make it healthier by substituting ingredients. 	<ul style="list-style-type: none"> • Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • Writing an amended method for a recipe to 	<p>beef reared processed ethical diet</p> <p>ingredients supermarket farm</p>
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	<ul style="list-style-type: none"> • To know that I can use a nutritional calculator to see how healthy a food option is. • To understand 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 I can use a nutritional calculator to see how healthy a food option is. • To understand 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. 	<p>incorporate the relevant changes to ingredients.</p> <ul style="list-style-type: none"> • Designing appealing packaging to reflect a recipe. • Cutting and preparing recipes safely. • Using equipment safely, including knives, hot pans and hobs. • Knowing how to avoid cross-contamination. • Following a step-by-step method carefully to make a recipe. • Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups. 	<p>balanced</p>
<p>Structure: Bridges</p>	<ul style="list-style-type: none"> • Identify stronger and weaker shapes. • Recognise that supporting shapes can help increase the strength of a bridge, allowing it to hold more weight. • Identify beam, arch and truss bridges and describe their differences. • Use triangles to create simple truss bridges that support a load (weight). 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on their properties. 	<p>beam bridge arch bridge truss bridge strength technique corrugation lamination stiffness rigid factors stability visual appeal aesthetics joints</p>

	<ul style="list-style-type: none"> • Cut beams to the correct size, using a cutting mat. • Smooth down any rough cut edges with sandpaper. • Follow each stage of the truss bridge creation as instructed by their teacher. • Complete a bridge, with varying ranges of accuracy and finish, supported by the teacher. • Identify some areas for improvement, reinforcing their bridges as necessary. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • To understand the material (functional and aesthetic) properties of wood. 	<ul style="list-style-type: none"> mark out hardwood softwood wood file/rasp sandpaper/glasspaper bench hook/vice tenon saw/coping saw assemble material properties reinforce wood sourcing evaluate quality of finish accuracy
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Year 6	Learning Outcomes	Key Knowledge	Key Skills	Key Vocabulary
Autumn				
Design a new playground	<ul style="list-style-type: none"> • Create five apparatus designs, applying the 	<ul style="list-style-type: none"> • Designing a playground featuring a variety of 	<ul style="list-style-type: none"> • To know that structures can be strengthened by 	<ul style="list-style-type: none"> apparatus design criteria

	<p>design criteria to their work.</p> <ul style="list-style-type: none"> • Make suitable changes to their work after peer evaluation. • Make roughly three different structures from their plans using the materials available. • Complete their structures, improving the quality of their rough versions and applying some cladding to a few areas. • Secure their apparatus to a base. • Make a range of landscape features using a variety of materials which will enhance their apparatus. 	<p>different structures, giving consideration to how the structures will be used.</p> <ul style="list-style-type: none"> • 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. 	<p>manipulating materials and shapes.</p> <ul style="list-style-type: none"> • To understand what a 'footprint plan' is. • To understand that in the real world, design can impact users in positive and negative ways. • To know that a prototype is a cheap model to test a design idea. 	<p>equipment playground landscape features cladding</p>
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Spring

<p>Food: Come Dine with Me</p>	<ul style="list-style-type: none"> • Find a suitable recipe for their course. • Record the relevant ingredients and equipment needed. • Follow a recipe, including using the correct quantities of each ingredient. • Write a recipe, explaining the process taken. • Explain where certain key foods come from before 	<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 understand that it is important to wash fruit 	<ul style="list-style-type: none"> • Writing a recipe, explaining the key steps, method and ingredients. Including facts and drawings from research undertaken. • Following a recipe, including using the correct quantities of each ingredient. • Adapting a recipe based on research. Working to a given timescale. 	<p>equipment flavours ingredients method research recipe bridge method cookbook cross-contamination farm to fork preparation storyboard</p>
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	they appear on the supermarket shelf.	<p>and vegetables before eating to remove any dirt and insecticides.</p> <ul style="list-style-type: none"> To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork). 	<ul style="list-style-type: none"> Working safely and hygienically with independence. Evaluating a recipe, considering: taste, smell, texture and origin of the food group. Taste testing and scoring final products. Suggesting and writing up points of improvements in productions. Evaluating health and safety in production to minimise cross contamination. 	
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Summer

Digital world: Navigating the world	<ul style="list-style-type: none"> Incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief. Write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen. Identify errors (bugs) in the code and suggest ways to fix (debug) them. Self and peer evaluate a product concept against a list of design criteria with basic statements. 	<ul style="list-style-type: none"> Writing a design brief from information submitted by a client. Developing design criteria to fulfil the client's request. Developing a product idea through annotated sketches. Placing and manoeuvring 3D objects, using CAD. Changing the properties of, or combine one or more 3D objects, using CAD. Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). Explaining material choices and why they were chosen as part of a product concept. 	<ul style="list-style-type: none"> To know that accelerometers can detect movement. To understand that sensors can be useful in products as they mean the product can function without human input. 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 	<p>smart smartphone equipment navigation cardinal compass application (apps) pedometer GPS tracker design brief design criteria client function program duplicate replica loop variable value if statement boolean</p>
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	<ul style="list-style-type: none"> • Identify key industries that use 3D CAD modelling and why. • Recall and describe the name and use of key tools used in Tinkercad (CAD) software. • Combine more than one object to develop a finished 3D CAD model in Tinkercad. • Complete a product pitch plan that includes key information. 	<p>Programming an N,E, S,W cardinal compass.</p> <ul style="list-style-type: none"> • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Developing an awareness of sustainable design. • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. Demonstrating a functional program as part of a product concept. 	<p>Earth's magnetic field to determine which direction you are facing.</p>	<p>corrode mouldable lightweight sustainable design environmentally friendly biodegradable recyclable</p>
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