



Aiskew, Leeming Bar
Church of England Primary School

*'Rooted in love and growing together
to become lifelong learners'*

Design & Technology Key Learning

Our overall intent is that pupils when they leave Y6 are innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation and evaluation. They have an awareness of the impact of design and technology on our lives and that they will become resourceful, enterprising citizens who have the skills to contribute to future design advancements to help our world.

Our golden thread is: caretakers

We teach our units using a cyclic curriculum. This grid shows how we build progression into our learning and provide further opportunities to build upon knowledge gained. KS1 pupils enter a 2 year rolling programme at different points and KS2 pupils enter the 4 year rolling programme at different points; it is important that children have the opportunity to revisit learning in order to help it become 'sticky knowledge', to further develop skills when using this knowledge and purposefully recap on learning. Not only does this ensure our curriculum fulfils the distinct needs of our learners, it also supports children in being able to remember more because revisiting learning helps it transfer to the long-term memory. In order to do this effectively, we use the Bloom's rainbow steps to success to ensure children can use knowledge in a variety of higher order ways appropriate to their stage of learning. This way of working is successful for our mixed-aged classes.

The six key areas for design and technology are: cooking and nutrition, mechanisms/mechanical systems, structures, textiles, electrical systems and the digital world.

Cooking and nutrition

Where food comes from, balanced diet, preparation and cooking skills

Kitchen hygiene and safety

Following recipes

Mechanisms/Mechanical systems

Mimic natural movements using mechanisms such as: cams, followers, levers and sliders

Structures

Material functional and aesthetic properties, strength and stability, stiffen and reinforce structures

Textiles

Fastening, sewing, decorative and functional fabric techniques including cross stitch, blanket stitch and appliqué

Electrical systems

Operational series circuits, circuit components, circuit diagrams and symbols, combined to create various electrical products.

Digital world

Program products to monitor and control, develop designs and virtual models using 2D and 3D CAD software

Only pupils in KS2 will cover Electrical systems and Digital world.

The design process has three main stages: design, make and evaluate. Each stage of the design process is underpinned by technical knowledge which encompasses the contextual, historical and technical understanding required to be successful.

Design

- Research
- Design criteria (e.g. tailoring to an audience/user)
- Idea generation (e.g. annotated sketches)
- Idea development (e.g. templates, pattern pieces.)
- Models and prototypes (both virtual and physical)
- Cross-sectional and exploded diagrams
- Innovative, fit-for-purpose and functional product solutions to design problems

Make

- Select and use appropriate tools and equipment
- Understand and select materials and components (including ingredients) based on their aesthetic and functional properties
- Carry out practical tasks with increasing accuracy and precision
- Understand the importance of, and follow the health and safety rules

Evaluate

- Explore existing products
- Evaluate against a list of design criteria
- Evaluate, investigate and analyse existing products
- Evaluate their own and others' ideas
- Understand how key events and individuals have helped to shape the world of D&T
- Consider feedback to make improvements

Cooking and nutrition

This has a separate section in the D&T national curriculum, with additional focus on specific principles, skills and techniques in food, including where food comes from, diet and seasonality. Food units follow the design process for example by tasking the pupils to develop recipes for a specific set of requirements (design criteria) and to suggest methods of packaging the food product including the nutritional information.

The Characteristics of Effective Learning are the bedrock of children's experiences within EYFS in all areas of learning. They include:

Playing and exploring

- finding out and exploring
- using what they know in their play
- being willing to have a go

Active learning

- being involved and concentrating
- keeping on trying
- enjoying achieving what they set out to do

Creating and thinking critically

- having their own ideas
- using what they already know to learn new things
- choosing ways to do things and finding new ways

These characteristics form the first steps in preparing our youngest children in their learning about our Building Learning Power skills and link EYFS learning to that which follows in Key Stage 1 and Key Stage 2 where we continue to develop these skills further. The chart below shows how these link.

We believe that in order to help children to be effective learners and remember more, we use Bloom's Taxonomy throughout school as a way of effectively deepening children's understanding. Children are introduced to this in EYFS through the Characteristics of Effective Learning. This hierarchical structure links well with the Characteristics of Effective Learning and therefore links the EYFS curriculum to the curriculums taught in Key Stage 1 and 2. The table below shows how Bloom's Taxonomy links to these characteristics.

Characteristics of Effective Learning	Building Learning Power	Bloom's Taxonomy
Finding out and exploring	This links to the Cognitive and Emotional Mind Noticing: really sensing what's out there Questioning: playing with situations Imagining: using the mind's eye as a learning theatre Capitalising: making good use of resources Making links: seeking coherence, relevance and meaning	Remember: Can the student recall or remember the information?
Using what they know in their play	This links to the Cognitive Mind Making links: seeking coherence, relevance and meaning Capitalising: making good use of resources Reasoning: thinking rigorously and methodically	Remember: Can the student recall or remember the information? Understand: Can the student explain ideas or concepts? Apply: Can the student use the information in a new way?
Being willing to have a go	This links to the Emotional Mind Perseverance: stickability; tolerating the feeling of learning	
Being involved and concentrating	This links to the Emotional and Social Mind Absorption: flow; the pleasure of being rapt in learning Managing distractions: recognising and reducing interruptions Collaboration: the skills of learning with others	
Keeping on trying	This links to the Emotional and Social Mind Perseverance: stickability; tolerating the feeling of learning Interdependence: balancing self-reliance and sociability	
Enjoying achieving what they set out to do	This links to the Strategic Mind Planning: working learning out in advance Revising: monitoring and adapting along the way	Apply: Can the student use the information in a new way?
Having their own ideas	This links to the Strategic Mind Planning: working learning out in advance Revising: monitoring and adapting along the way	Apply: Can the student use the information in a new way? Create: Can the student create a new product or point of view?
Using what they already know to learn new things	This links to the Strategic and Cognitive Mind Distilling: drawing out the lessons from experience Capitalising: making good use of resources	Apply: Can the student use the information in a new way?
Choosing ways to do things and finding new ways	This links to the Strategic and Cognitive Mind Distilling: drawing out the lessons from experience Capitalising: making good use of resources Planning: working learning out in advance Revising: monitoring and adapting along the way	Analyse: Can the student distinguish between the different parts? Create: Can the student create a new product or point of view?

Reception Development Matters 2020 (Children in Reception)	<p>Personal, Social and Emotional Development Show resilience and perseverance in the face of challenge Manage their own needs. - personal hygiene Know and talk about the different factors that support their overall health and wellbeing: - healthy eating</p> <p>Physical Development Develop their small motor skills so that they can use a range of tools competently, safely and confidently. Suggested tools: pencils for drawing and writing, paintbrushes, scissors, knives, forks and spoons</p> <p>Expressive Arts and Design Return to and build on their previous learning, refining ideas and developing their ability to represent them Create collaboratively, sharing ideas, resources and skills</p>
Early Learning Goals	<p>Personal, Social and Emotional Development Self -Regulation Set and work towards simple goals</p> <p>Managing Self</p>

Persevere in the face of challenge
 Manage their own basic hygiene and personal needs
 Understanding the importance of healthy food choices
Physical Development
Fine Motor Skills
 Use a range of small tools, including scissors, paintbrushes and cutlery
 Begin to show accuracy and care when drawing
Understanding the World
The Natural World
 Understand some important processes and changes in the natural world around them
Expressive Arts and Design
Creating with materials
 Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function
 Share their creations, explaining the process they have used
 Make use of props and materials when role playing characters in narratives and stories

D - Design

M - Make

E - Evaluate

Kapow Unit of Learning KS1	KS2 Units of Learning which extend this learning	How KS1 units revisit key learning	How DT will help in life.	Key substantive knowledge	Key disciplinary knowledge	Key learning opportunities with other curriculum areas
Fruit Smoothie (1) Cooking and Nutrition	Eating seasonally Adapting a recipe What could be healthier Come dine with me	A balanced diet	Healthy food choices Need for hygiene when handling and preparing food	Understand the difference between fruits and vegetables Understand that some foods typically known as vegetables are actually fruits (e.g. cucumber) Know that a blender is a machine which mixes ingredients together into a smooth liquid A fruit has seeds and a vegetable does not Fruits grow on trees or vines vegetables can grow either above or below ground Vegetables can come from different parts of the plant (e.g., roots: potatoes, leaves: lettuce, fruit: cucumber)	D - Design smoothie carton packaging by-hand or on ICT software M - Chop fruit and vegetables safely to make a smoothie Identifying if a food is a fruit or a vegetable (bridge grip) Learn where and how fruits and vegetables grow E - Taste and evaluate different food combinations Describe appearance, smell and taste Suggest information to be included on packaging	Science – Animals including humans (2) Hygiene Classifying fruit and vegetables Outdoor – Gardening PSHE – Healthy Living/Healthy Eating PE – Striver, keeping healthy
Baby bear's chair (2) Structure	Playgrounds Castles Pavilions Bridges	Constructing a windmill	Basic understanding of structures	Technical Materials can be manipulated to improve strength and stiffness A structure is something which has been formed or made from parts A 'stable' structure is one which is firmly fixed and unlikely to change or move A 'strong' structure is one which does not break easily	D – Generate and communicate ideas using sketching and modelling M – Make a structure according to design criteria Create joints and structures from paper/card and tape Build a strong and stiff structure by folding paper E – Test the strength of own structures	English – The Jolly Pocket Postman, Goldilocks and the Three Bears Maths – Statistics – tally chart 3D shapes Science – Interpret test results Properties of materials Geography – Natural and man-made structures

				A 'stiff' structure or material is one which does not bend easily	Identify the weakest part of a structure Evaluate the strength, stiffness and stability of own structure	
Making a moving storybook (1) Mechanisms	Pop-up books Automata Toys Pneumatic toys Slingshot cars	Fairground Wheel Making a moving monster Wheels and axels	Love of reading Understanding of how things work	Technical A mechanism is the parts of an object that move together A slider mechanism moves an object from side to side A slider mechanism has a slider, slots ,guides and, an object Know that bridges and guides are bits of card that purposefully restrict the movement of the slider Additional In Design and technology we call a plan a 'design'	D – Explain how to adapt mechanisms, use bridges or guides to control the movement Design a moving story book for a given audience M – Follow a design to create moving models that use levers and sliders E – Test a finished product, seeing whether it moves as planned and if not, explain why and how it can be fixed	English – nursery rhymes such as 'Humpty Dumpty' Art & design – draw on background of their design along with the moving parts
Puppets (1) Textiles	Fastenings Cross-stitch and applique	Pouches	How to sew	'Joining technique' means connecting two pieces of material together Know that there are various temporary methods of joining fabric by using staples, glue or pins Understand that different techniques for joining materials can be used for different purposes Understand that a template (or fabric pattern) is used to cut out the same shape multiple times Drawing a design idea is useful to see how an idea will look	D – Use a template to create a design for a puppet M – Cut fabric neatly with scissors Use joining methods to decorate a puppet Sequence steps for construction E – Reflect on a finished product, explaining likes and dislikes	English – Knowledge of book characters History – The seaside, Punch and Judy
Fairground Wheel (2) Mechanisms	Pop-up books Automata Toys Pneumatic toys Slingshot cars	Making a moving storybook Making a moving monster Wheels and axels	Understanding of how things work	Technical Different materials have different properties and are therefore suitable for different uses Additional Features of a Ferris wheel include the wheel, frame, pods, a base an axle and an axle holder Know that it is important to test a design as you go along so that I can solve any problems that may occur	D – Select a suitable linkage system to produce the desired motions Design a wheel, selecting appropriate materials based on their properties M – Select materials according to their characteristics Follow a design brief E – Evaluate different designs Test and adapt a design	Maths – 3D shapes Science – Properties of materials History – The seaside
Constructing a windmill (1) Structure	Playgrounds Castles Pavilions Bridges	Baby bear's chair	Conservation	Technical The shape of materials can be changed to improve the	D – Learn the importance of a clear design criteria	Maths – 2D and 3D shapes 3D nets

				<p>strength and stiffness of structures</p> <p>Cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses)</p> <p>Axles are used in structures and mechanisms to make parts turn in a circle</p> <p>Begin to understand that different structures are used for different purposes</p> <p>A structure is something that has been made and put together</p> <p>Additional</p> <p>A client is the person I am designing for</p> <p>Design criteria is a list of points to ensure the product meets the clients needs and wants</p> <p>A windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity</p> <p>Windmill turbines use wind to turn and make the machines inside work</p> <p>A windmill is a structure with sails that are moved by the wind</p> <p>The three main parts of a windmill are the turbine, axle and structure</p>	<p>Include individual preferences and requirements in a design</p> <p>M – Make a stable structure from card, tape and glue</p> <p>Learn how to turn 2D nets into 3D structures</p> <p>Follow instructions to cut and assemble the supporting structure of a windmill</p> <p>Make functioning turbines and axles which are assembled into a main supporting structure</p>	<p>Geography – Windmills are used to make energy</p> <p>Golden thread: caretaker of the world</p>
<p>Making a moving monster (2)</p> <p>Mechanisms</p>	<p>Pop-up books</p> <p>Automata Toys</p> <p>Pneumatic toys</p> <p>Slingshot cars</p>	<p>Making a moving storybook</p> <p>Fairground wheel</p> <p>Wheels and axels</p>	<p>Understanding of how things work</p>	<p>Technical</p> <p>Mechanisms are a collection of moving parts that work together as a machine to produce movement</p> <p>To know that there is always an input and output in a mechanism</p> <p>An input is the energy that is used to start something working</p> <p>An output is the movement that happens as a result of the input</p> <p>A lever is something that turns on a pivot</p> <p>A linkage mechanism is made up of a series of levers</p> <p>Additional</p>	<p>D – Create a class design criterion for a moving monster</p> <p>Design a moving monster for a specific audience in accordance with a design criterion</p> <p>M – Make linkages using card for levers and split pins for pivots</p> <p>Experiment with linkages adjusting the widths, lengths and thicknesses of card used</p> <p>Cut and assemble components neatly</p> <p>E – Evaluate own designs against design criteria</p> <p>Use peer feedback to modify a final design</p>	<p>Maths – Recording a tally survey</p> <p>Art – Sketching design ideas</p>

				To know some real-life objects that contain mechanisms		
Pouches (2) Textiles	Fastenings Cross-stitch and applique	Puppets	How to sew	Sewing is a method of joining fabric Different stitches can be used when sewing Understand the importance of tying a knot after sewing the final stitch A thimble can be used to protect my fingers when sewing	D – Design a pouch M – Select and cut fabrics for sewing Decorate a pouch using fabric glue or running stitch Thread a needle Sew running stitch, with evenly spaced, neat, even stitches to join fabric Neatly pin and cut fabric using a template E – Troubleshoot scenarios posed Evaluate the quality of the stitching on others' work Discuss as a class, the success of their stitching against the success criteria Identify aspects of peers' work that you particularly like and why	Art & design – decorating using a range of materials
A balanced diet (2) Cooking and nutrition	Eating seasonally Adapting a recipe What could be healthier Come dine with me	Fruit smoothie	Healthy food choices Need for hygiene when handling and preparing food	'Diet' means the food and drink that a person or animal usually eats Understand what makes a balanced diet Know where to find the nutritional information on packaging The five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar Understand that you should eat a range of different foods from each food group, and roughly how much of each food group Nutrients are substances in food that all living things need to make energy, grow and develop 'Ingredients' means the items in a mixture or recipe You should only have a maximum of five teaspoons of sugar a day to stay healthy Many foods and drinks we do not expect to contain sugar do; we call these 'hidden sugars'	D – Design a healthy wrap based on a food combination that works well together M – Slice food safely using the bridge or claw grip Construct a wrap that meets a design brief E – Describe the taste, texture and smell of fruit and vegetables Taste test food combinations and final products Describe the information that should be included on a label Evaluate which grip was most effective	Maths - < > and grams Science – senses Hygiene PSHE – Healthy Living/Healthy Eating PE – Striver, keeping healthy

Wheels and axels (1) Mechanisms	Pop-up books Automata Toys Pneumatic toys Slingshot cars	Making a moving storybook Fairground wheel Making a moving monster	Understanding of how things work	Technical Wheels need to be round to rotate and move Understand that for a wheel to move it must be attached to a rotating axle An axle moves within an axle holder which is fixed to the vehicle or toy The frame of a vehicle (chassis) needs to be balanced Additional Know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles	D – Design a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move Create clearly labelled drawings which illustrate movement M – Adapt mechanisms E - Test mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move	Maths - measurement
------------------------------------	---	--	----------------------------------	--	---	---------------------

D - Design

M – Make

E - Evaluate

Kapow Unit of Learning KS2	KS1 Units of Learning which form the basis of this learning	How KS2 units revisit key learning	How DT will help in life.	Key substantive knowledge	Key disciplinary knowledge	Key learning opportunities with other curriculum areas
Electronic Charm (3) Digital World (KS2 only)		Monitoring Devices Navigating the world	Understand that posters are a source of information	Technical In programming a 'loop' is code that repeats something again and again until stopped A 'Micro:bit' is a pocket-sized, codable computer Write a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm Additional The 'Digital Revolution' is and features of some of the products that have evolved as a result In Design and technology, the term 'smart' means a programmed product Know the difference between analogue and digital technologies What is meant by 'point of sale display' CAD stands for Computer-aided design	D – Problem solve, by suggesting potential features on a Micro: bit and justifying ideas Develop design ideas for a technology pouch Draw and manipulate 2D shapes, using computer-aided design, to produce a point-of-sale badge M – Use a template when cutting and assembling the pouch Follow a list of design requirements Select and use the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch Apply functional features such as using foam to create soft buttons E – Analyse and evaluate an existing product Identify the key features of a pouch	History – Roman Empire's impact on Britain Science - Electricity
Fastenings (4) Textiles	Puppets Pouches	Cross-stitch and applique	How to sew The range of ways clothing can be joined	A fastening is something which holds two pieces of material together for example, a zipper, toggle, button, press stud and Velcro	D – Write design criterion for a product, articulating decisions made Design a personalised book sleeve	Art & design – decorating using a range of materials

				<p>Different fastening types are useful for different purposes A mock up (prototype) of their design is useful for checking ideas and proportions</p>	<p>M – Make and test a paper template with accuracy and in keeping with the design criteria Measure, mark and cut fabric using a paper template Select a stitch style to join fabric, working neatly sewing small, neat stitches Incorporate a fastening to a design</p> <p>E – Test and evaluate an end product against the original design criteria Decide how many of the criteria should be met for the product to be considered successful Suggest modifications for improvement Articulate the advantages and disadvantages of different fastening types</p>	
<p>Pop up book(5) Mechanical systems</p>	<p>Making a moving storybook Fairground wheel Wheels and axels</p>	<p>Pop-up books Automata Toys Pneumatic toys Slingshot cars</p>	<p>Understanding of how things work</p>	<p>Technical Mechanisms control movement Mechanisms that can be used to change one kind of motion into another Understand how to use sliders, pivots and folds to create paper-based mechanisms Additional A design brief is a description of what I am going to design and make Designers often want to hide mechanisms to make a product more aesthetically pleasing</p>	<p>D – Design a pop-up book which uses a mixture of structures and mechanisms Name each mechanism, input and output accurately Storyboard ideas for a book</p> <p>M – Follow a design brief to make a pop up book, neatly and with focus on accuracy Make mechanisms and/or structures using sliders, pivots and folds to produce movement Use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result</p> <p>E – Evaluate the work of others and receive feedback on own work Suggest points for improvement</p>	<p>English – different types of books Art – drawing</p>
<p>Eating seasonally (3) Cooking and nutrition</p>	<p>Fruit smoothie A balanced diet</p>	<p>Adapting a recipe What could be healthier Come dine with me</p>	<p>Healthy food choices Local/British food choices Need for hygiene when handling and preparing food</p>	<p>Not all fruits and vegetables can be grown in the UK Climate affects food growth Vegetables and fruit grow in certain seasons Cooking instructions are known as a 'recipe' Imported food is food which has been brought into the country</p>	<p>D – Create a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish</p> <p>M – Know how to prepare themselves and a workspace to cook safely in, learning the</p>	<p>English – Reading recipes Non-fiction layout Science – Hygiene PSHE – Healthy Living/Healthy Eating Geography – Climate & Food growth</p>

				<p>Exported food is food which has been sent to another country</p> <p>Imported foods travel from far away and this can negatively impact the environment</p> <p>Each fruit and vegetable give us nutritional benefits because they contain vitamins, minerals and fibre</p> <p>Vitamins, minerals and fibre are important for energy, growth and maintaining health</p> <p>Know safety rules for using, storing and cleaning a knife safely</p> <p>Similar coloured fruits and vegetables often have similar nutritional benefits</p>	<p>basic rules to avoid food contamination</p> <p>Follow the instructions within a recipe</p> <p>E – Establish and use design criteria to help test and review dishes</p> <p>Describe the benefits of seasonal fruits and vegetables and the impact on the environment</p> <p>Suggest points for improvement when making a seasonal tart</p>	<p>Environmental impact of importing food</p> <p>PSHE – Looking after our world</p> <p>Golden thread: caretaker of the world</p>
<p>Playgrounds (6)</p> <p>Structures</p>	<p>Baby bear's chair</p> <p>Constructing a windmill</p>	<p>Castles</p> <p>Pavilions</p> <p>Bridges</p>	<p>Understanding of structures</p>	<p>Technical</p> <p>Structures can be strengthened by manipulating materials and shapes</p> <p>Additional</p> <p>Understand what a 'footprint plan' is</p> <p>In the real world, design , can impact users in positive and negative ways</p> <p>A prototype is a cheap model to test a design idea</p>	<p>D – Design a playground featuring a variety of different structures, give careful consideration to how the structures will be used, considering effective and ineffective designs</p> <p>M – Build a range of play apparatus structures drawing upon new and prior knowledge of structures</p> <p>Measure, mark and cut wood to create a range of structures</p> <p>Use a range of materials to reinforce and add decoration to structures</p> <p>E – Improve a design plan based on peer evaluation</p> <p>Test and adapt a design to improve it as it is developed</p> <p>Identify what makes a successful structure</p>	<p>Maths – Measurement</p> <p>Art & design - texture</p>

<p>Constructing a castle (3) Structures</p>	<p>Baby bear's chair Constructing a windmill</p>	<p>Playgrounds Pavilions Bridges</p>	<p>Understanding of structures</p>	<p>Technical Wide and flat based objects are more stable The importance of strength and stiffness in structures Additional Know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose A façade is the front of a structure A castle needed to be strong and stable to withstand enemy attack A paper net is a flat 2D shape that can become a 3D shape once assembled A design specification is a list of success criteria for a product</p>	<p>D – Design a castle with key features to appeal to a specific person/purpose Draw and label a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours Design and/or decorate a castle tower on CAD software M – Construct a range of 3D geometric shapes using nets Create special features for individual designs Make facades from a range of recycled materials E – Evaluate own work and the work of others based on the aesthetic of the finished product and in comparison to the original design Suggest points for modification of the individual designs</p>	<p>Maths - 3D nets 2D and 3D shapes Computing – Purple Mash</p>
<p>Adapting a recipe (4) Cooking and nutrition</p>	<p>Fruit smoothie A balanced diet</p>	<p>Eating seasonally What could be healthier Come dine with me</p>	<p>Healthy food choices Need for hygiene when handling and preparing food Budgeting</p>	<p>The amount of an ingredient in a recipe is known as the 'quantity' It is important to use oven gloves when removing hot food from an oven Know the following cooking techniques: sieving, creaming, rubbing method, cooling The importance of budgeting while planning ingredients for biscuits</p>	<p>D – Design a biscuit within a given budget, drawing upon previous taste testing M – Follow a baking recipe Cook safely, following basic hygiene rules Adapt a recipe E – Evaluate a recipe, considering: taste, smell, texture and appearance Describe the impact of the budget on the selection of ingredients Evaluate and comparing a range of products Suggest modifications</p>	<p>English – Reading recipes Non-fiction layout Science – Hygiene PSHE – Healthy Living Maths – Real life application, budgeting</p>
<p>Doodlers (5) Electrical Systems (Year 3 & 4 only)</p>		<p>Torches Steady hand game</p>	<p>Understanding of electricity</p>	<p>Technical Series circuits only have one direction for the electricity to flow When there is a break in a series circuit, all components turn off An electric motor converts electrical energy into rotational movement, causing the motor's axle to spin</p>	<p>D – Identify factors that could be changed on existing products and explain how these would alter the form and function of the product Develop design criteria based on findings from investigating existing products Develop design criteria that clarifies the target user</p>	<p>English – Instructions Science – Electricity</p>

				<p>A motorised product is one which uses a motor to function</p> <p>Additional Product analysis is critiquing the strengths and weaknesses of a product 'Configuration' means how the parts of a product are arranged</p>	<p>M – Alter a product's form and function by tinkering with its configuration Make a functional series circuit, incorporating a motor Construct a product with consideration for the design criteria</p> <p>E – Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses Determine which parts of a product affect its function and which parts affect its form Analyse whether changes in configuration positively or negatively affect an existing product</p>	
<p>Steady hand game (6) Electrical Systems (Year 5 & 6 only)</p>		<p>Torches Doodlers</p>	<p>Understanding of electricity Reading diagrams</p>	<p>Technical Batteries contain acid, which can be dangerous if they leak now the names of the components in a basic series circuit including a buzzer</p> <p>Additional Understand diagram perspectives 'top view', 'side view' and 'back'</p>	<p>D – Design a steady hand game - identifying and naming the components required Draw a design from three different perspectives Generate ideas through sketching and discussion Model ideas through prototypes</p> <p>M – Construct a stable base for a game Accurately cut, fold and assemble a net Decorate the base of the game to a high-quality finish Make and test a circuit Incorporating a circuit into a base</p> <p>E – Test own and others finished games, identifying what went well and making suggestions for improvement</p>	<p>Maths – 3D nets</p> <p>Science – Electricity Circuit diagrams</p> <p>Computing/PSHE – Online safety</p>
<p>Monitoring devices (5) Digital World</p>		<p>Electronic charm Navigating the world</p>	<p>Sustainability</p>	<p>Technical A 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record A sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose Conditional statements</p>	<p>D – Research (books, internet) for a particular (user's) animal's needs Develop design criteria based on research Generate multiple housing ideas using building bricks Understand what a virtual model is and the pros and cons of traditional and CAD modelling</p>	<p>Computing – coding Research</p> <p>Science – Animals including humans</p> <p>Science – Materials (History of scientists and inventions)</p> <p>Geography –Conservation, six Rs of sustainability</p>

				<p>(and, or, if Booleans – <i>data with only 2 possible values</i>) in programming are a set of rules which are followed if certain conditions are met</p> <p>Additional Understand key developments in thermometer history Know events or facts that took place over the last 100 years in the history of plastic, and how this is changing our outlook on the future Know the 6Rs of sustainability: Rethink Refuse Reduce Reuse Recycle Repair Understand what a virtual model is and the pros and cons of traditional vs CAD modelling</p>	<p>Place and manoeuvre 3D objects, using CAD Change the properties of, or combine one or more 3D objects, using CAD</p> <p>M – Understand the functional and aesthetic properties of plastics Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range</p> <p>E – State an event or fact from the last 100 years of plastic history Explain how plastic is affecting planet Earth and suggesting ways to make more sustainable choices Explain key functions in my program (audible alert, visuals) Explain how my product would be useful for an animal carer including programmed features</p>	<p>PSHE – Looking after our world</p> <p>Golden thread: caretaker of the world</p>
<p>Automata toys (6) Mechanical systems</p>	<p>Making a moving storybook Fairground wheel Making a moving monster Wheels and axles</p>	<p>Pop-up books Pneumatic toys Slingshot cars</p>	<p>Understanding of how things work</p>	<p>Technical The mechanism in an 'automata' uses a system of cams, axles and followers Different shaped cams produce different outputs</p> <p>Additional An 'automata' is a hand powered mechanical toy Cross-sectional diagrams show the inner workings of a product Know how to use a bench hook and saw safely A set square can be used to help mark 90° angles</p>	<p>D – Experiment with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement Understand how linkages change the direction of a force Make things move at the same time Understand and draw cross-sectional diagrams to show the inner-working</p> <p>M – Measure, mark and check the accuracy of the jelutong and dowel pieces required Measure, mark and cut components accurately using a ruler and scissors Assemble components accurately to make a stable frame Understand that for the frame to function effectively the components must be cut accurately and the joints of</p>	<p>Maths – Measurement</p> <p>History – Seaside – Victorian/Edwardian toys</p>

					<p>the frame secured at right angles Select appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set</p> <p>E – Evaluate the work of others and receive feedback on own work Apply points of improvements Describe changes you would make/do if you were to do the project again</p>	
<p>Pneumatic toys (3) Mechanical systems</p>	<p>Making a moving storybook Fairground wheel Making a moving monster Wheels and axles</p>	<p>Pop-up books Automata Toys Slingshot cars</p>	<p>Understanding of how things work</p>	<p>Technical Understand how pneumatic systems work Pneumatic systems can be used as part of a mechanism Pneumatic systems operate by drawing in, releasing and compressing air Additional Sketches, drawings and diagrams can be used to communicate design ideas Exploded-diagrams are used to show how different parts of a product fit together Thumbnail sketches are small drawings to get ideas down on paper quickly</p>	<p>D – Design a toy which uses a pneumatic system Develop design criteria from a design brief Generate ideas using thumbnail sketches and exploded diagrams Learn that different types of drawings are used in design to explain ideas clearly</p> <p>M – Create a pneumatic system to create a desired motion Build secure housing for a pneumatic system Use syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy Select materials due to their functional and aesthetic characteristics Manipulate materials to create different effects by cutting, creasing, folding, weaving</p> <p>E – Use the views of others to improve designs Test and modify the outcome, suggesting improvements Understand the purpose of exploded-diagrams through the eyes of a designer and their client</p>	<p>Art and design – decorating toys</p> <p>Geography – Wind and sea power, alternative energy sources</p> <p>PSHE – Looking after our world</p> <p>Golden thread: caretaker of the world</p>
<p>Pavilions (4) Structures</p>	<p>Baby bear's chair Constructing a windmill</p>	<p>Playgrounds Constructing a castle Bridges</p>	<p>Understanding of structures</p>	<p>Technical Understand what a frame structure is</p>	<p>D – Design a stable pavilion structure that is aesthetically pleasing and selecting</p>	<p>Maths – measurement 3D Shapes</p> <p>Science - Materials</p>

				<p>A 'free-standing' structure is one which can stand on its own</p> <p>Additional A pavilion is a decorative building or structure for leisure activities Cladding can be applied to structures for different effects Aesthetics are how a product looks A product's function means its purpose Target audience means the person or group of people a product is designed for Architects consider light, shadow and patterns when designing</p>	<p>materials to create a desired effect Build frame structures designed to support weight</p> <p>M – Create a range of different shaped frame structures Make a variety of free-standing frame structures of different shapes and sizes Select appropriate materials to build a strong structure and for the cladding Reinforce corners to strengthen a structure Create a design in accordance with a plan Learn to create different textural effects with materials</p> <p>E – Evaluate structures made by the class Describe what characteristics of a design and construction made it the most effective Consider effective and ineffective designs</p>	
Torches (4) Electrical Systems		Doodlers 3/4 Steady hand game 5/6 Doodlers 3/4 Steady hand game 5/6	Electrical safety	<p>Technical An electrical circuit must be complete for electricity to flow A switch can be used to complete and break an electrical circuit</p> <p>Additional Know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens Know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison</p>	<p>D – Design a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas</p> <p>M – Make a torch with a working electrical circuit and switch Use appropriate equipment to cut and attach materials Assemble a torch according to the design and success criteria</p> <p>E – Test and evaluate the success of a final product whilst considering the views of others</p>	<p>Science – Materials (History of scientists and inventions) Electricity</p> <p>History – early life before electricity</p> <p>PSHE – Keeping/Staying Safe</p>
What could be healthier (5) Cooking and nutrition	Fruit smoothie A balanced diet	Eating seasonally Adapting a recipe Come dine with me	Healthy food choices Need for hygiene when handling and preparing food	<p>Understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues Know that you can substitute ingredients in a recipe to make it healthier</p>	<p>D – Adapt a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients Write an amended method for a recipe to incorporate the relevant changes to ingredients</p>	<p>English – Reading recipes Non-fiction layout</p> <p>Science – Hygiene</p> <p>PSHE – Healthy Living</p> <p>Art and design – design, colour</p>

				<p>Know you can use a nutritional calculator to see how healthy a food option is</p> <p>'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>	<p>Design appealing packaging to reflect a recipe</p> <p>M – Cut and prepare vegetables safely Use equipment safely, including knives, hot pans and hobs Know how to avoid cross-contamination Follow a step-by-step method carefully to make a recipe</p> <p>E – Identify the nutritional differences between different products and recipes Identify and describe healthy benefits of food groups</p>	
<p>Navigating the world (6) Digital world</p>		<p>Electronic charm Monitoring devices</p>		<p>Technical Accelerometers can detect movement Sensors can be useful in products as they mean the product can function without human input</p> <p>Additional Designers write design briefs and develop design criteria to enable them to fulfil a client's request 'Multifunctional' means an object or product has more than one function Magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing</p>	<p>D – Write a design brief from information submitted by a client Develop design criteria to fulfil the client's request Consider and suggest additional functions for my navigation tool Develop a product idea through annotated sketches Place and manoeuvre 3D objects, using CAD Change the properties of, or combine one or more 3D objects, using CAD</p> <p>M – Consider materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo) Explain material choices and why they were chosen as part of a product concept Programme a N,E, S,W cardinal compass</p> <p>E – Explain how my program fits the design criteria and how it would be useful as part of a navigation tool Develop an awareness of sustainable design Identify key industries that utilise 3D CAD modelling and explain why</p>	<p>Science – Materials</p> <p>Computing – programming</p> <p>Geography – Compass points</p>

					Describe how the product concept fits the client's request and how it will benefit the customers Explain the key functions in my program, including any additions Explain how my program fits the design criteria and how it would be useful as part of a navigation tool Explain the key functions and features of my navigation tool to the client as part of a product concept pitch Demonstrate a functional program as part of a product concept	
Making a slingshot car (4) Mechanical systems	Making a moving storybook Fairground wheel Making a moving monster Wheels and axles	Pop-up books Automata Toys Pneumatic toys	Understanding of how things work	Technical Air resistance is the level of drag on an object as it is forced through the air The shape of a moving object will affect how it moves due to air resistance Additional Aesthetics means how an object or product looks in design and technology A template is a stencil you can use to help you draw the same shape accurately Birds-eye view means a view from a high angle (as if a bird in flight) Graphics are images which are designed to explain or advertise something It is important to assess and evaluate design ideas and models against a list of design criteria.	D – Design a shape that reduces air resistance Draw a net to create a structure from Choose shapes that increase or decrease speed as a result of air resistance Personalise a design M – Measure, mark, cut and assemble with increasing accuracy Make a model based on a chosen design E – Evaluate the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance	Maths – 3D nets Science – Forces, air resistance History – transport, pre cars
Cross-stitch and applique – Cushions (3) Textiles	Puppets Pouches	Fastenings	How to sew – repairs such as putting a button on Conservation - repair rather than buying new	Applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces When two edges of fabric have been joined together it is called a seam Know that it is important to leave space on the fabric for the seam Understand that some products are turned inside out after sewing so the stitching is hidden	D – Design and make a template from an existing cushion and apply individual design criteria M – Follow design criteria to create a cushion Select and cut fabrics with ease using fabric scissors Thread needles with greater independence Tie knots with greater independence Sew cross stitch to join fabric Decorate fabric using appliqué	Maths – Measurement Shape Art and design – design

					Complete design ideas with stuffing and sewing the edges (Cushions) E – Evaluate an end product and think of other ways in which to create similar items	
Bridges (5) Structures	Baby bear's chair Constructing a windmill	Playgrounds Constructing a castle Pavilions	Understanding of structures	Technical Understand some different ways to reinforce structures Triangles can be used to reinforce bridges Properties are words that describe the form and function of materials Material selection is important based on their properties The material (functional and aesthetic) properties of wood Additional Understand the difference between arch, beam, truss and suspension bridges How to carry and use a saw safely	D – Design a stable structure that is able to support weight Create frame structure with focus on triangulation M – Make a range of different shaped beam bridges Use triangles to create truss bridges that span a given distance and support a load Build a wooden bridge structure Independently measure and mark wood accurately Select appropriate tools and equipment for particular tasks Use the correct techniques to saws safely Identify where a structure needs reinforcement and use card corners for support Explain why selecting appropriate materials is an important part of the design process Understand basic wood functional properties E – Adapt and improve own bridge structure by identifying points of weakness and reinforcing them as necessary Suggest points for improvements for own bridges and those designed by others	Maths – Measurement Science – Materials Investigation skills
Doodlers (5) Electrical Systems (Year 3 & 4 only)		Torches Steady hand game	Understanding of electricity	Technical Series circuits only have one direction for the electricity to flow When there is a break in a series circuit, all components turn off An electric motor converts electrical energy into rotational movement, causing the motor's axle to spin	D – Identify factors that could be changed on existing products and explain how these would alter the form and function of the product Develop design criteria based on findings from investigating existing products Develop design criteria that clarifies the target user	English – Instructions Science – Electricity

				<p>A motorised product is one which uses a motor to function</p> <p>Additional Product analysis is critiquing the strengths and weaknesses of a product 'Configuration' means how the parts of a product are arranged</p>	<p>M – Alter a product's form and function by tinkering with its configuration Make a functional series circuit, incorporating a motor Construct a product with consideration for the design criteria</p> <p>E – Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses Determine which parts of a product affect its function and which parts affect its form Analyse whether changes in configuration positively or negatively affect an existing product</p>	
<p>Steady hand game (6) Electrical Systems (Year 5 & 6 only)</p>		<p>Torches Doodlers</p>	<p>Understanding of electricity Reading diagrams</p>	<p>Technical Batteries contain acid, which can be dangerous if they leak now the names of the components in a basic series circuit including a buzzer</p> <p>Additional Understand diagram perspectives 'top view', 'side view' and 'back'</p>	<p>D – Design a steady hand game - identifying and naming the components required Draw a design from three different perspectives Generate ideas through sketching and discussion Model ideas through prototypes</p> <p>M – Construct a stable base for a game Accurately cut, fold and assemble a net Decorate the base of the game to a high-quality finish Make and test a circuit Incorporating a circuit into a base</p> <p>E – Test own and others finished games, identifying what went well and making suggestions for improvement</p>	<p>Maths – 3D nets</p> <p>Science – Electricity Circuit diagrams</p> <p>Computing/PSHE – Online safety</p>
<p>Come dine with me (6) Cooking and nutrition</p>	<p>Fruit smoothie A balanced diet</p>	<p>Eating seasonally Adapting a recipe What could be healthier</p>	<p>Healthy food choices</p> <p>Need for hygiene when handling and preparing food</p>	<p>'Flavour' is how a food or drink tastes Many countries have 'national dishes' which are recipes associated with that country 'Processed food' means food that has been put through multiple changes in a factory It is important to wash fruit and vegetables before eating to</p>	<p>D – Write a recipe, explaining the key steps, method and ingredients Include facts and drawings from research undertaken</p> <p>M – Follow a recipe, including using the correct quantities of each ingredient</p>	<p>English – Reading recipes Non-fiction layout</p> <p>Science – Diet Hygiene</p> <p>PSHE – Healthy Living Different cultures have own speciality dishes</p>

				<p>remove any dirt and insecticides Understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork)</p>	<p>Adapt a recipe based on research Work to a given timescale Work safely and hygienically with independence</p> <p>E – Evaluate a recipe, consider: taste, smell, texture and origin of the food group Taste test and score final products Suggest and write up points of improvements in productions Evaluate health and safety in production to minimise cross contamination</p>	
--	--	--	--	---	--	--