COTHERSTONE
PRIMARY SCHOOL

A member of
Bowes Cotherstone Federation

Design and Technology
Cotherstone Primary School

Rationale

Our Design and Technology (DT) curriculum intent is to develop pupils who are confident and innovative designers, with a wide variety of design skills that they can use across the curriculum and for their own enjoyment. We develop our children to be creative critical thinkers underpinned by strong basic skills.

We inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners, who evaluate their work and the work of others. Through our scheme of work, we build an awareness of the impact of DT on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.

At Cotherstone Primary School, we want our pupils to:

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

Rationale

At Cotherstone Primary School we recognise prior learning and build on it with memorable learning experiences with targeted support where necessary. We believe children learn best by having opportunities to revisit previous learning. Learning is sequenced to build knowledge, skills and vocabulary.

The knowledge and skills required to achieve in this subject are set out in the DT progression of knowledge and skills document. This document has been developed so that each member of teaching staff has access to the document as a supportive tool when planning in order to review previous learning; ensure a coherent curriculum that outlines essential knowledge and skill development; and as an accurate assessment tool.

The progression of knowledge and skills document is broken down into the different areas of the Design and Technology process; design, make and evaluate. It is then broken into the 5 areas of DT which allows staff to teach the key knowledge and skills for each of these areas.

Cultural Capital:

Cultural capital is ‘the essential knowledge that pupils need to be educated citizens, introducing them to the best that has been thought and said and helping to engender an appreciation of human creativity and achievement.’ Ofsted 2019.

We link our DT curriculum to real life experiences and famous engineering experts through STEM and communicating ideas and developing prototypes using CAD.

Rationale

The DT national curriculum outlines the three main stages of the design process: design, make and evaluate. Each stage of the design process is underpinned by technical knowledge which encompasses the contextual, historical and technical understanding required for each strand.

The National curriculum organises DT attainment targets under five subheadings:

- Deisgn
- Make
- Evaluate
- Technical knowledge
- Cooking and nutrition

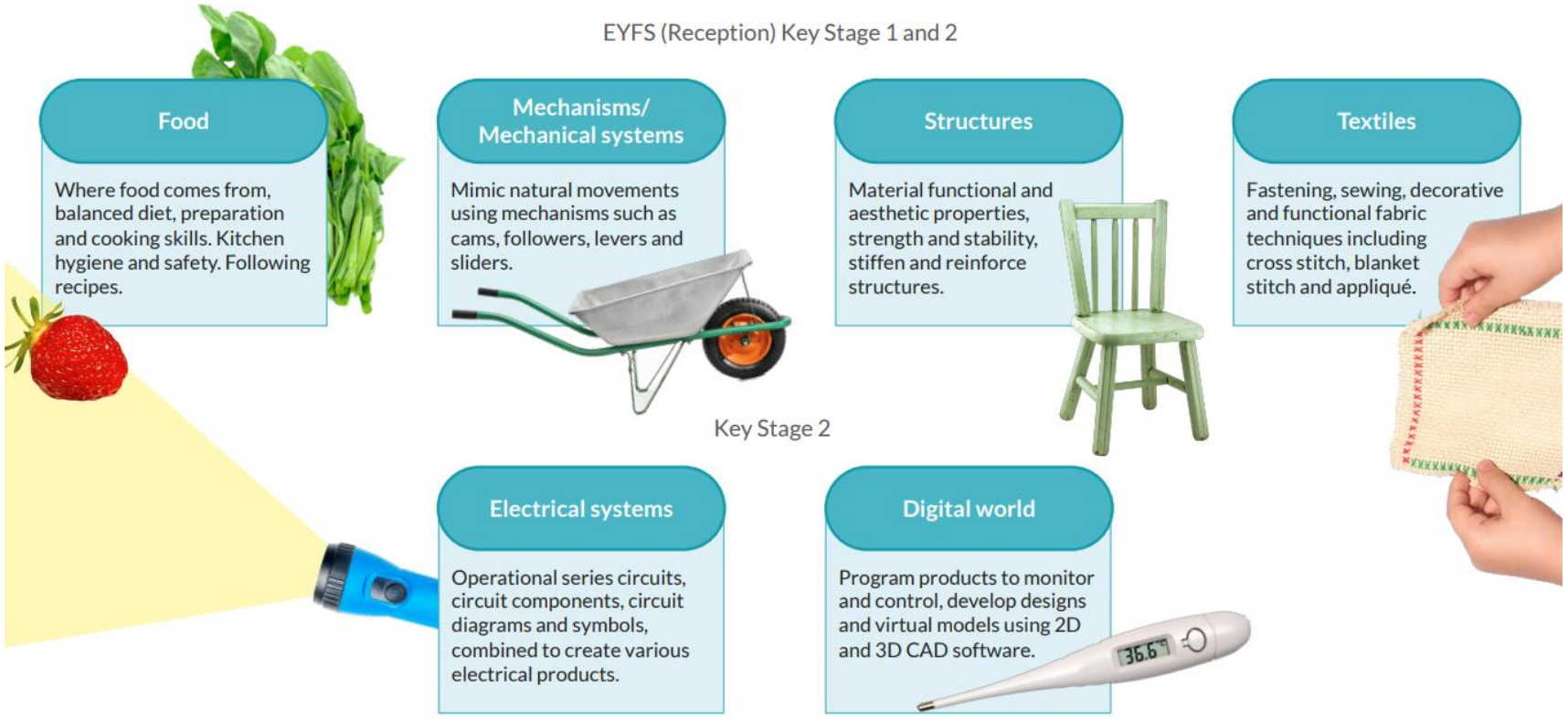
Our progression of knowledge and skills has a clear progression within these five strands across each year group.

Rationale

We use Kapow as a resource for our DT lessons. We have carefully selected the topics to fit with the needs of our individual school curriculum. We have linked DT topics where there is a valuable link to our History/Geography/Science topics. We have selected the content which best fits the needs of our pupils.

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

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



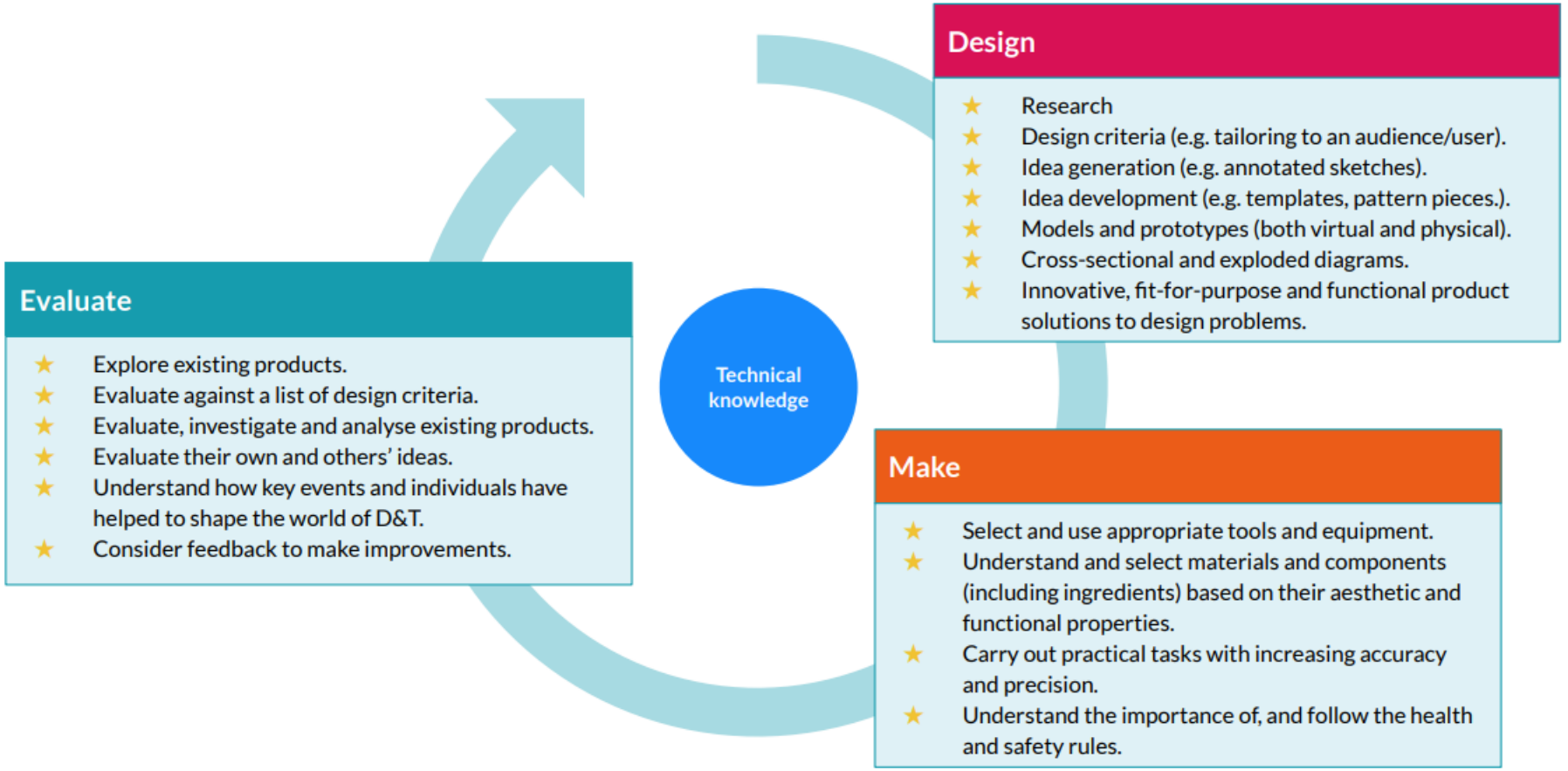
Rationale

Each of the key areas follows the design process (design, make and evaluate) and has a particular theme and focus from the technical knowledge or cooking and nutrition section of the curriculum. Our curriculum is a spiral, with key areas revisited again and again with increasing complexity, allowing our pupils to revisit and build on their previous learning. It is cyclical: pupils return to the key areas again and again during their time at Cotherstone. It increases in depth: each time a key area is revisited it is covered with greater coxplexity. Pupils build on prior knowledge: Upon returning to each area, prior knowledge is utilised so pupils can build on previous foundations, rather than start again.

Lessons incorporate a range of teaching strategies from independent, tasks, paired and group work for opportunities to collaborate with others, listening to other children's ideas and treating these with respect as we believe in Equality and opportunity for all, and respect of diversity, inclusivity and team work. Lessons offer practical hands-on, computer-based and inventive tasks. This variety means that lessons are engaging and appeal to those with a variety of learning styles. Differentiation is available in every lesson to ensure that lessons can be accessed by all pupils and opportunities to stretch pupils' learning are available. The use of knowledge organisers for each unit supports pupils in building a foundation of factual knowledge by encouraging recall of key facts and vocabulary.

Our DT curriculum is on a 2 year rolling cycle. On cycle A the whole school is involved in the 'Farmvention' project which links all STEM subjects.

DT will be taught during one half of each term. The progression of knowledge and skills are built upon to ensure children will develop as citizens which can contribute to the well-being of the nation. Children will be taught technical knowledge throughout each unit which they will evaluate.


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.
Technical knowledge

Spiral Curriculum

	Structures	Mechanisms	Textiles	Electrical systems	Digital world	Cooking and nutrition
EYFS	Explore junk modelling, tinkering with temporary and permanent joins, and a range of materials. Create basic models to test in different conditions.	Explore a simple paper slider mechanism.	Explore and develop threading and weaving skills with different materials and objects.			Explore and become familiar with different fruits and vegetables, using their senses.
KS1	Build structures such as windmills and chairs, exploring how they can be made stronger, stiffer and more stable. Recognise areas of weakness through trial and error.	Introduce and explore simple mechanisms, such as sliders, wheels and axles in their designs. Recognise where mechanisms such as these exist in toys and other familiar products.	Explore different methods of joining fabrics and experiment to determine the pros and cons of each technique.	**KS2 only*** Create functional electrical products that use series circuits, incorporating different components such as bulbs, LEDs, switches, buzzers and motors. Consider how the materials used in these products can: • Protect the circuitry. • Reflect light. • Conduct electricity. • Insulate.	**KS2 only*** Learn how to develop an electronic product with processing capabilities. Apply Computing principles to program functions within a product including to control and monitor it. Understand how the history and evolution of product design lead to the on-going Digital revolution and the impact it is having in the world today.	Learn about the basic rules of a healthy and varied diet to create dishes. Understand where food comes from, for example plants and animals.
KS2	Continue to develop KS1 exploration skills, through more complex builds such as pavilion and bridge designs. Understand material selection and learn methods to reinforce structures.	**Mechanical systems** Extend pupils understanding of individual mechanisms, to form part of a functional system, for example: Automatas, that use a combination of cams, followers, axles/shaft, cranks and toppers.	Understand that fabric can be layered for effect, recognising the appearance and technique for different stitch and fastening types, including their: • Strength. • Appropriate use. • Design.			Understand and apply the principles of a healthy and varied diet to prepare and cook a variety of dishes using a range of cooking techniques and methods. Understand what is meant by seasonal foods. Know where and how ingredients are sourced.

Rationale

The impact of our DT curriculum is that children build knowledge and skills, make connections between this and prior learning and use this to explore and create. Our DT curriculum allows us to support the social development of our children through the way they work together during lessons. Children are expected to discuss their ideas and feelings about their own work and the work of others. Through this collaborative work the children develop respect for the abilities of other children and are able to celebrate the achievements of themselves and others. They also develop a respect for the environment, for their own health and safety and for that of others. Our Design and Technology curriculum contributes to our PHSE curriculum as children develop a sense of responsibility in following safe procedures and they learn about the importance of a healthy diet. Their DT work also encourages them to be responsible and to set their own personal targets to create a finished product.

Computing enhances the teaching of Design and Technology, wherever appropriate, in all key stages. Children use software to enhance their skills in designing and making things. Children are given the opportunity to use ICT to control mechanisms and to get them to move in different ways. The children also use ICT to collect information and to present their designs through a range of design and presentation software.

Rationale

Children will leave our school equipped with a range of skills to enable them to succeed in their secondary education and be innovative and resourceful members of society.

Our impact is that children will:

- ✓ Understand the functional and aesthetic properties of a range of materials and resources.
- ✓ Understand how to use and combine tools to carry out different processes for shaping, decorating and manufacturing products.
- ✓ Build and apply a repertoire of skills, knowledge and understanding to produce high quality, innovative outcomes, including models, prototypes, CAS and products to fulfil the needs of users.
- ✓ Understand and apply the principles of healthy eating, diets, and recipes, including key processes, food groups and cooking equipment.
- ✓ Have an appreciation for key individuals, inventions and events in history and of today that impact our world.
- ✓ Self-evaluate and reflect on learning at different stages and identify areas to improve.
- ✓ Meet the end of key stage expectations outlined in the NC for DT
- ✓ Meet the end of key stage expectations outlined in the NC for Computing.

Long Term Plan– Year 1 and 2

Design and Technology
Long Term Plan

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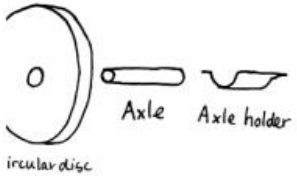
Year 1 and 2 Cycle A	Cooking and Nutrition Food Fruit and Vegetables: **Holidays- where shall we go?** **(Where do fruit and vegetables come from?)** **Design, make and evaluate a smoothie** Learn to distinguish between fruit and vegetables and where they grow around the world. Design a fruit and vegetable smoothie and accompanying packaging.   	Mechanism Wheels and axles: Great Fire of London **Design, make and evaluate a Fire Engine** Learn about the key parts of a wheeled vehicle, to develop an understanding of how wheels, axles and axle holders work. Design and make a moving vehicle.   	Structures Baby Bear's Chair **Design, make and evaluate Baby Bear's Chair.** Using the tale of Goldilocks and the Three Bears as inspiration, children help Baby Bear by making him a brand new chair. When designing the chair, they consider his needs and what he likes and explore ways of building it so that it is strong.   **Farmvention- Whole school DT Project** 

Long Term Plan– Year 1 and 2

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Year 1 and 2 Cycle B	Mechanism **Make a moving story book.** Explore slider mechanisms and the movement they output, to design, make and evaluate a moving storybook from a range of templates.   	**Textiles** **Puppets** **Design, make and evaluate a Puppet.** Explore methods of joining fabric. Design and make a character-based hand puppet using a preferred joining technique, before decorating.  	**Structures** **Constructing a windmill** Inspired by the song, 'Mouse in a windmill', design and construct a windmill for a client (mouse) to live in. Explore various types of windmill, how they work and their key features.  

Long Term Plan– Year 3 and 4

Design and Technology
Long Term Plan

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Year 3 and 4 Cycle A	**Mechanical Systems** **Pneumatic Toys** Explore pneumatic systems, then apply this understanding to design and make a pneumatic toy including thumbnail sketches and exploded diagrams.  	**Textiles** **Cross-stich and applique** Egyptian Collars Learn and apply two new sewing techniques – cross-stitch and appliqué. Utilise these new skills to design and make an Egyptian collar. 	**Electrical systems** **Electric Poster** Explore various forms of 'Information design' before being briefed to develop an electric museum display. **Farmvention- Whole School DT Project** 
	Digital world **Electronic charm** Design, code, make and promote a Micro:bit electronic charm to use in low-light conditions, developing their understanding of programming to monitor and control products to solve a design scenario.  		

Long Term Plan– Year 3 and 4

Design and Technology
Long Term Plan

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Year 3 and 4 Cycle B	**Structures** **Pavillions** Investigate and model frame structures to improve their stability, then apply this research to design and create a stable, decorated pavilion.    	**Food and Nutrition** **Eating seasonally** Learn about various fruits and vegetables, and when, where and why they are grown in different seasons. Discover the relationship between colour and health benefits. Italian food study- Link to Geography/History. 	**Mechanical systems** **Make a slingshot car** Using a range of materials, design and make a car with a working slingshot mechanism and house the mechanism using a range of nets.   
	Digital World **Mindful Moments Timer** Design, program, prototype and brand a Micro:bit timer to a specified amount of minutes. Pupils carry out research and existing product analysis to determine how a programmable product could be personalised to their needs  		

Long Term Plan– Year 5 and 6

Design and Technology
Long Term Plan

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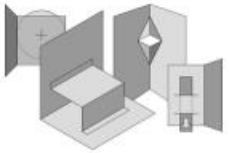
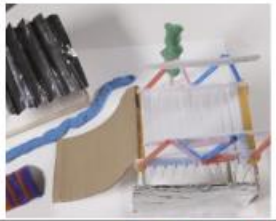
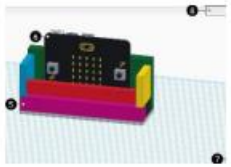
Year 5 and 6 Cycle A	**Mechanical systems** **Pop-up book** Create a functional four-page pop-up storybook design, using lever, sliders, layers and spacers to create paper-based mechanisms.  	**Structures** **Playgrounds** Research existing playground equipment and their different forms, before designing and developing a range of apparatus to meet a list of specified design criteria.  	**Food and Nutrition:** **Come Dine with Me-** Develop a three-course menu focused on three key ingredients. Explore each key ingredient's farm to fork process.   **Farmvention- Whole School DT Project** 
	 	**Digital World** **Monitoring Devices** Program a Micro: bit animal monitoring device that will alert the owner when the temperature is not optimal. Develop 3D CAD skills by learning how to navigate the Tinkercad interface and essential tools.	

Long Term Plan– Year 5 and 6

Design and Technology
Long Term Plan

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Year 5 and 6 Cycle B	**Electrical systems** **Steady hand game** Understand what is meant by fit for purpose design and form follows function. Design and develop a steady hand game using a series circuit, including housing and backboard.  **Electrical systems** **Doodlers** Explore series circuits further and introduce motors. Explore how the design cycle can be approached at a different starting point, by investigating an existing product, which uses a motor, to encourage pupils to problem-solve and work out how the product has been constructed, ready to develop their own.  	**Textiles** **Stuffed toys** Design a stuffed toy for an evacuee and make decisions on materials, decorations and attachments (appendages), after learning how to sew a blanket stitch.   	**Mechanical Systems** **Automata Toys** Develop a functional automata window display, to meet the requirements in a design brief. Explore and create cam, follower and axle mechanisms to mimic different movements.   
Digital world **Navigating the world** Design and program a navigation tool to produce a multifunctional device for trekkers using CAD 3D modelling software. Pitch and explain the product to a guest panel.  			

Progression of Knowledge and Skills

Structures

		Year 1 and 2	Year 1 and 2
		Constructing a windmill	Baby bear's chair
Skills	Design	• Learning the importance of a clear design criteria • Including individual preferences and requirements in a design	• Generating and communicating ideas using sketching and modelling
	Make	• Making stable structures from card, tape and glue • Learning how to turn 2D nets into 3D structures • Following instructions to cut and assemble the supporting structure of a windmill • Making functioning turbines and axles which are assembled into a main supporting structure	• 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
	Evaluate	• Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't • Suggest points for improvements	• Testing the strength of own structures • Identifying the weakest part of a structure • Evaluating the strength, stiffness and stability of own structure
Knowledge	Technical	• To understand that the shape of materials can be changed to improve the strength and stiffness of structures • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses) • To understand that axles are used in structures and mechanisms to make parts turn in a circle • To begin to understand that different structures are used for different purposes • To know that a structure is something that has been made and put together	• To know that materials can be manipulated to improve strength and stiffness • To know that a structure is something which has been formed or made from parts • To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move • To know that a 'strong' structure is one which does not break easily • To know that a 'stiff' structure or material is one which does not bend easily
	Additional	• To know that a client is the person I am designing for • To know that design criteria is a list of points to ensure the product meets the clients needs and wants • To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity • To know that windmill turbines use wind to turn and make the machines inside work • To know that a windmill is a structure with sails that are moved by the wind • To know the three main parts of a windmill are the turbine, axle and structure	N/A

Progression of Knowledge and Skills

Structures

		Year 3 and 4	Year 5 and 6
		Pavilions	**Playgrounds**
Skills	**Design**	• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs	• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect • Building frame structures designed to support weight
	Make	• 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	• 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
	Evaluate	• Improving a design plan based on peer evaluation • Testing and adapting a design to improve it as it is developed • Identifying what makes a successful structure	• Evaluating structures made by the class • Describing what characteristics of a design and construction made it the most effective • Considering effective and ineffective designs
Knowledge	**Technical**	• To know that structures can be strengthened by manipulating materials and shapes	• To understand what a frame structure is • To know that a 'free-standing' structure is one which can stand on its own
	Additional	• 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	• To know that a pavilion is a decorative building or structure for leisure activities • To know that cladding can be applied to structures for different effects. • To know that aesthetics are how a product looks • To know that a product's function means its purpose • To understand that the target audience means the person or group of people a product is designed for • To know that architects consider light, shadow and patterns when designing

Progression of Knowledge and Skills

Mechanisms / Mechanical systems

		Year 1 & 2		
		Making a moving storybook	Wheels and axles	Fairground wheel
Skills	Design	• Explaining how to adapt mechanisms, using bridges or guides to control the movement • Designing a moving story book for a given audience	• Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move • Creating clearly labelled drawings which illustrate movement	• Selecting a suitable linkage system to produce the desired motions • Designing a wheel Selecting appropriate materials based on their properties
	Make	• Following a design to create moving models that use levers and sliders	• Adapting mechanisms	• Selecting materials according to their characteristics • Following a design brief
	Evaluate	• Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed	• Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move	• Evaluating different designs • Testing and adapting a design
Knowledge	Technical	• To know that a mechanism is the parts of an object that move together • To know that a slider mechanism moves an object from side to side • To know that a slider mechanism has a slider, slots , guides and an object • To know that bridges and guides are bits of card that purposefully restrict the movement of the slider	• To know that 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 that different materials have different properties and are therefore suitable for different uses
	Additional	• To know that in Design and technology we call a plan a 'design'	• To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles	• To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder •

Progression of Knowledge and Skills

Mechanisms / Mechanical systems

		Year 3 and 4	Year 3 and 4
		Pneumatic toys	Making a slingshot car
Skills	Design	• Designing a toy which 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	• Designing a shape that reduces air resistance • Drawing a net to create a structure from • Choosing shapes that increase or decrease speed as a result of air resistance • Personalising a design
	Make	• Creating a pneumatic system to create a desired motion • Building secure housing for a pneumatic system • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy • Selecting materials due to their functional and aesthetic characteristics • Manipulating materials to create different effects by cutting, creasing, folding, weaving	• Measuring, marking, cutting and assembling with increasing accuracy • Making a model based on a chosen design
	Evaluate	• 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	• Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance
Knowledge	Technical	• 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	• To know that air resistance is the level of drag on an object as it is forced through the air • To understand that the shape of a moving object will affect how it moves due to air resistance.
	Additional	• To understand how sketches, drawings and diagrams can be used to communicate design ideas • To know that exploded-diagrams are used to show how different parts of a product fit together • To know that thumbnail sketches are small drawings to get ideas down on paper quickly	• To know that aesthetics means how an object or product looks in design and technology • To know that a template is a stencil you can use to help you draw the same shape accurately • To know that a birds-eye view means a view from a high angle (as if a bird in flight) • To know that graphics are images which are designed to explain

Progression of Knowledge and Skills

Mechanisms / Mechanical systems

		Year 5 & 6	Year 5 & 6
		Pop up book	Automata toys
Skills	Design	• Designing a pop-up book which uses a mixture of structures and mechanisms • Naming each mechanism, input and output accurately • Storyboarding ideas for a book	•Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement • Understanding how linkages change the direction of a force • Making things move at the same time • Understanding and drawing cross-sectional diagrams to show the inner-working
	Make	• Following a design brief to make a pop up book, neatly and with focus on accuracy • Making mechanisms and/or structures using sliders, pivots and folds to produce movement • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result	• Measuring, marking and checking the accuracy of the jelutong and dowel pieces required • Measuring, marking and cutting components accurately using a ruler and scissors • Assembling components accurately to make a stable frame • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set
	Evaluate	N/A	• Evaluating the work of others and receiving feedback on own work • Applying points of improvements • Describing changes they would make/do if they were to do the project again
Knowledge	Technical	• To know that mechanisms control movement • To understand that mechanisms that 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 understand that the mechanism in an automata uses a system of cams, axles and followers • To understand that different shaped cams produce different outputs
	Additional	• 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	• To know that an automata is a hand powered mechanical toy • To know that a cross-sectional diagram shows the inner workings of a product • To understand how to use a bench hook and saw safely • To know that a set square can be used to help mark 90° angles

Progression of Knowledge and Skills

Electrical systems (KS2 only)

		Year 3 & 4
		Electric Poster
Skills	Design	• Carry out research based on a given topic (e.g. The Romans) to develop a range of initial ideas • Generate a final design for the electric poster with consideration to the client's needs and design criteria • Design an electric poster that fits the requirements of a given brief Plan the positioning of the bulb (circuit component) and its purpose
	Make	• Create a final design for the electric poster • Mount the poster onto corrugated card to improve its strength and withstand the weight of the circuit on the rear • Measure and mark materials out using a template or ruler • Fit an electrical component (bulb) • Learn ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge)
	Evaluate	• 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
Knowledge	Technical	• 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
	Additional	• To understand the importance and purpose of information design • To understand how material choices (such as mounting paper to corrugated card) can improve a product to serve its purpose (remain rigid without bending when the electrical circuit is attached).

Progression of Knowledge and Skills

Electrical systems (KS2 only)

		Year 5 & 6
		Steady hand game
Skills	Design	• Designing a steady hand game - identifying and naming the components required • Drawing a design from three different perspectives • Generating ideas through sketching and discussion • Modelling ideas through prototypes
	Make	• Constructing a stable base for a game • Accurately cutting, folding and assembling a net • Decorating the base of the game to a high quality finish • Making and testing a circuit Incorporating a circuit into a base
	Evaluate	• Testing own and others finished games, identifying what went well and making suggestions for improvement
Knowledge	Technical	• To know that batteries contain acid, which can be dangerous if they leak • To know the names of the components in a basic series circuit including a buzzer
	Additional	• To understand the diagram perspectives 'top view', 'side view' and 'back'

Progression of Knowledge and Skills

		Year 1 & 2
		Fruit and vegetables
Skills	Design	• Designing smoothie carton packaging by-hand or on ICT software
	Make	• Chopping fruit and vegetables safely to make a smoothie • Identifying if a food is a fruit or a vegetable • Learning where and how fruits and vegetables grow
	Evaluate	• Tasting and evaluating different food combinations • Describing appearance, smell and taste • Suggesting information to be included on packaging
Knowledge	Cooking and nutrition	• Understanding the difference between fruits and vegetables • To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber) • To know that a blender is a machine which mixes ingredients together into a smooth liquid • To know that a fruit has seeds and a vegetable does not • To know that fruits grow on trees or vines • To know that vegetables can grow either above or below ground • To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber)

Progression of Knowledge and Skills

Cooking and nutrition

		Year 3 & 4
		Eating seasonally
Skills	Design	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish
	Make	• Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination • Following the instructions within a recipe
	Evaluate	• Establishing and using design criteria to help test and review dishes • Describing the benefits of seasonal fruits and vegetables and the impact on the environment • Suggesting points for improvement when making a seasonal tart
Knowledge	Cooking and nutrition	• To know that not all fruits and vegetables can be grown in the UK • To know that climate affects food growth • To know that vegetables and fruit grow in certain seasons • To know that cooking instructions are known as a 'recipe' • To know that imported food is food which has been brought into the country • To know that exported food is food which has been sent to another country. • To understand that imported foods travel from far away and this can negatively impact the environment • To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health • To know safety rules for using, storing and cleaning a knife safely • To know that similar coloured fruits and vegetables often have similar nutritional benefits

Progression of Knowledge and Skills

Cooking and nutrition

		Year 5 & 6
		Come dine with me
Skills	Design	• Writing a recipe, explaining the key steps, method and ingredients • Including facts and drawings from research undertaken
	Make	• Following a recipe, including using the correct quantities of each ingredient • Adapting a recipe based on research • Working to a given timescale • Working safely and hygienically with independence
	Evaluate	• 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
Knowledge	Cooking and nutrition	• 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 and vegetables before eating to remove any dirt and insecticides • To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork)

Progression of Knowledge and Skills

Textiles

		Year 1 & 2
		Puppets
Skills	Design	• Using a template to create a design for a puppet
	Make	• Cutting fabric neatly with scissors • Using joining methods to decorate a puppet • Sequencing steps for construction
	Evaluate	• Reflecting on a finished product, explaining likes and dislikes
Knowledge		• To know that 'joining technique' means connecting two pieces of material together • To know that there are various temporary methods of joining fabric by using staples, glue or pins • To understand that different techniques for joining materials can be used for different purposes • To understand that a template (or fabric pattern) is used to cut out the same shape multiple times • To know that drawing a design idea is useful to see how an idea will look

Progression of Knowledge and Skills

Textiles

		Year 3 & 4
		Cross-stitch and appliqué Egyptian collars
Skills	Design	• Designing and making a template from an existing cushion and applying individual design criteria
	Make	• Following design criteria to create a cushion or Egyptian collar • Selecting and cutting fabrics with ease using fabric scissors • Threading needles with greater independence • Tying knots with greater independence • Sewing cross stitch to join fabric • Decorating fabric using appliqué • Completing design ideas with stuffing and sewing the edges (Cushions) ***or*** embellishing the collars based on design ideas (Egyptian collars)
	Evaluate	• Evaluating an end product and thinking of other ways in which to create similar items
Knowledge		• To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces • To know that when two edges of fabric have been joined together it is called a seam • To know that it is important to leave space on the fabric for the seam • To understand that some products are turned inside out after sewing so the stitching is hidden

Progression of Knowledge and Skills

Progression of skills and knowledge

Textiles

		Year 5
		Stuffed toys
Skills	Design	• Designing a stuffed toy considering the main component shapes required and creating an appropriate template • Considering the proportions of individual components
	Make	• Creating a 3D stuffed toy from a 2D design • Measuring, marking and cutting fabric accurately and independently • Creating strong and secure blanket stitches when joining fabric • Threading needles independently • Using applique to attach pieces of fabric decoration • Sewing blanket stitch to join fabric • Applying blanket stitch so the space between the stitches are even and regular
	Evaluate	• Testing and evaluating an end product and giving point for further improvements
Knowledge		• To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric • To understand that it is easier to finish simpler designs to a high standard • To know that soft toys are often made by creating appendages separately and then attaching them to the main body • To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely

Progression of Knowledge and Skills

Progression of skills and knowledge

Digital world (KS2 only)

Year 3/4

		Cycle A: Electronic charm	Cycle B: Mindful moments timer
Skills	Design	• Problem solving by suggesting potential features on a Micro: bit and justifying my ideas. • Developing design ideas for a technology pouch. • Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge.	• Writing design criteria for a programmed timer (Micro:bit). • Exploring different mindfulness strategies. • Applying the results of my research to further inform my design criteria. • Developing a prototype case for my mindful moment timer. • Using and manipulating shapes and clipart by using computer-aided design (CAD), to produce a logo. • Following a list of design requirements.
	Make	• Using a template when cutting and assembling the pouch. • Following a list of design requirements. • Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch. • Applying functional features such as using foam to create soft buttons. • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.	• Developing a prototype case for my mindful moment timer. • Creating a 3D structure using a net. • Programming a micro:bit in the Microsoft micro:bit editor, to time a set number of seconds/minutes upon button press.
	Evaluate	• Analysing and evaluating an existing product. • Identifying the key features of a pouch.	• Investigating and analysing a range of timers by identifying and 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 a logo is 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.
Knowledge	Technical	• To understand that, in programming, a 'loop' is code that repeats something again and again until stopped. • To know that a Micro:bit is a pocket-sized, codeable computer.	• To 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 your code works before installing it onto an electronic device.
	Additional	•To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result. •To know that in Design and technology the term 'smart' means a programmed product. •To know the difference between analogue and digital technologies. • To understand what is meant by 'point of sale display.' • To know that CAD stands for 'Computer-aided design'.	•To understand the terms 'ergonomic' and 'aesthetic'. •To know that a prototype is a 3D model made out of cheap materials, that allows us to test design ideas and make better decisions about size, shape and materials.

Progression of Knowledge and Skills

Progression of skills and knowledge

Digital world (KS2 only)

Year 5/6

		Cycle A: Monitoring devices	Cycle B: Navigating the world
Skills	Design	• Researching (books, internet) for a particular (user's) animal's needs. • Developing design criteria based on research. • Generating multiple housing ideas using building bricks. • Understanding what a virtual model is and the pros and cons of traditional and CAD modelling. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combining one or more 3D objects, using CAD.	• Writing a design brief from information submitted by a client. • Developing design criteria to fulfil the client's request. • Considering and suggesting additional functions for my navigation tool. • Developing a product idea through annotated sketches. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combining one or more 3D objects, using CAD.
	Make	• Understanding 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.	• 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. • Programming an N,E, S, W cardinal compass.
	Evaluate	• Stating an event or fact from the last 100 years of plastic history. • Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices. • Explaining key functions in my program (audible alert, visuals). • Explaining how my product would be useful for an animal carer including programmed features.	• 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. • Identifying key industries that utilise 3D CAD modelling and explaining why. • Describing how the product concept fits the client's request and how it will benefit the customers. • Explaining the key functions in my program, including any additions. • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • 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 pitch.
Knowledge	Technical	• To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record. • To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose. • To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met.	• 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.
	Additional	• To understand key developments in thermometer history. • To know events or facts that took place over the last 100 years in the history of plastic, and how this is changing our outlook on the future. • To know the 6Rs of sustainability. • To understand what a virtual model is and the pros and cons of traditional vs CAD modelling.	• To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. • To know that 'multifunctional' means an object or product has more than one function. • To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.

Vocabulary

Design and technology vocabulary

KS1 Year 1

Food: Fruit and vegetables

- Blender
- Carton
- Fruit
- Healthy
- Ingredients
- Peel
- Peeler
- Recipe
- Slice
- Smoothie
- Stencil
- Template
- Vegetable

Mechanisms: Making a moving story book

- Assemble
- Design
- Evaluation
- Mechanism
- Model
- Sliders
- Stencil
- Target audience
- Template
- Test

Structures: Constructing a windmill

- Client
- Design
- Evaluation
- Net
- Stable
- Strong
- Test
- Weak
- Windmill

Vocabulary

Design and technology vocabulary

KS1 | Year 1

Textiles: Puppets

- Decorate
- Design
- Fabric
- Glue
- Model
- Hand puppet
- Safety pin
- Staple
- Stencil
- Template

Mechanisms: Wheels and axles

- Axle
- Axle holder
- Chassis
- Design
- Evaluation
- Fix
- Mechanic
- Mechanism
- Model
- Test
- Wheel

Vocabulary

Design and technology vocabulary

KS1 | Year 2

Food: A balanced diet

- Alternative
- Diet
- Balanced diet
- Evaluation
- Expensive
- Healthy
- Ingredients
- Nutrients
- Packaging
- Refrigerator
- Sugar
- Substitute

Mechanisms: Making a moving monster

- Evaluation
- Input
- Lever
- Linear motion
- Linkage
- Mechanical
- Mechanism
- Motion
- Oscillating motion
- Output
- Pivot
- Reciprocating motion
- Rotary motion
- Survey

Structures: Baby bear's chair

- Function
- Man-made
- Mould
- Natural
- Stable
- Stiff
- Strong
- Structure
- Test
- Weak

Vocabulary

Design and technology vocabulary

KS1 | Year 2

Textiles: Pouches

- Accurate
- Fabric
- Knot
- Pouch
- Running-stitch
- Sew
- Shape
- Stencil
- Template
- Thimble

Mechanisms: Fairground wheel

- Axle
- Decorate
- Evaluation
- Ferris wheel
- Mechanism
- Stable
- Strong
- Test
- Waterproof
- Weak

Vocabulary

Design and technology vocabulary

KS2 | Year 3

Food: Eating seasonally

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

Structures: Constructing a castle

- 2D shapes
- 3D shapes
- Castle
- Design criteria
- Evaluate
- Facade
- Feature
- Flag
- Net
- Recyclable
- Scoring
- Stable
- Strong
- Structure
- Tab
- Weak

Textiles: Cushions / Egyptian collars

- Accurate
- Applique
- Cross-stitch
- Cushion
- Decorate
- Detail
- Fabric
- Patch
- Running-stitch
- Seam
- Stencil
- Stuffing
- Target audience
- Target customer
- Template

Vocabulary

Design and technology vocabulary

KS2 | Year 3

Electrical systems: Electric poster

- Battery
- Bulb
- Circuit
- Circuit component
- Crocodile wires
- Electrical product
- Electrical system
- Final design
- Information design
- Initial ideas
- Peer assessment
- Research
- Self assessment
- Sketch

Mechanical systems: Pneumatic toys

- Exploded-diagram
- Function
- Input
- Lever
- Linkage
- Mechanism
- Motion
- Net
- Output
- Pivot
- Pneumatic system
- Thumbnail sketch

Digital world: Electronic charms

- Analogue
- Badge
- CAD
- Control
- Design requirements
- Develop
- Digital
- Digital revolution
- Digital world
- Display
- Electronic
- Electronic products
- Fasten
- Feature
- Function
- Initiate
- Key features
- Layers
- Loops
- Micro: bit
- Monitor
- Net
- Point of sale
- Product
- Product design
- Program
- Sense
- Simulator
- Smart wearables
- Stand
- Technology
- Template
- Test
- User

Vocabulary

Design and technology vocabulary

KS2 Year 4

Structures: Pavilions

- Aesthetic
- Cladding
- Design criteria
- Evaluation
- Frame structure
- Function
- Inspiration
- Pavilion
- Reinforce
- Stable
- Structure
- Target audience
- Target customer
- Texture
- Theme

Food: Adapting a recipe

- Adapt
- Budget
- Cooling rack
- Creaming
- Equipment
- Evaluation
- Flavour
- Ingredients
- Method
- Net
- Packaging
- Prototype
- Quantity
- Recipe
- Rubbing
- Sieving
- Target audience
- Unit of measurement
- Utilities

Textiles: Fastenings

- Aesthetic
- Assemble
- Book sleeve
- Design criteria
- Evaluation
- Fabric
- Fastening
- Mock-up
- Net
- Running-stitch
- Stencil
- Target audience
- Target customer
- Template

Vocabulary

Design and technology vocabulary

KS2 | Year 4

Electrical systems: Torches

- Battery
- Bulb
- Buzzer
- Cell
- Component
- Conductor
- Copper
- Design criteria
- Electrical item
- Electricity
- Electronic item
- Function
- Insulator
- Series circuit
- Switch
- Test
- Torch
- Wire

Mechanical systems: Making a slingshot car

- Aesthetic
- Air resistance
- Chassis
- Design
- Design criteria
- Function
- Graphics
- Kinetic energy
- Mechanism
- Net
- Structure

Digital world: Mindful moments timer

- 2D
- Advantage
- Assemble
- Block
- Brand identity
- Branding
- Bug
- CAD
- Cheap
- Clipart
- Coding
- Criteria
- Debug
- Design
- Develop
- Disadvantage
- Ergonomic
- Evaluate
- Form
- Function
- Instructions
- Join
- Logo
- Loop
- Mindfulness
- Model
- Net
- Pause
- Process
- Program
- Prototype
- Research
- Sketchpad
- Template
- Test
- Timer
- User
- Variable

Vocabulary

Design and technology vocabulary

KS2 | Year 5

Food: What could be healthier?

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

Mechanical systems: Making a pop-up book

- Aesthetic
- Computer-aided design (CAD)
- Caption
- Design
- Design brief
- Design criteria
- Exploded-diagram
- Function
- Input
- Linkage
- Mechanism
- Motion
- Output
- Pivot
- Prototype
- Slider
- Structure
- Template

Textiles: Stuffed toys

- Accurate
- Annotate
- Appendage
- Blanket-stitch
- Design criteria
- Detail
- Evaluation
- Fabric
- Sew
- Shape
- Stuffed toy
- Stuffing
- Template

Vocabulary

Design and technology vocabulary

KS2 Year 5

Electrical systems: Doodlers

- Circuit component
- Configuration
- Current
- Develop
- DIY
- Investigate
- Motor
- Motorised
- Problem solve
- Product analysis
- Series circuit
- Stable
- Target user

Structures: Bridges

- Abutment
- Accurate
- Arched bridge
- Beam bridge
- Coping saw
- Evaluation
- File
- Mark out
- Material properties
- Measure
- Predict
- Reinforce
- Research
- Sandpaper
- Set square
- Suspension bridge
- Tenon saw
- Test
- Truss bridge
- Wood

Digital world: Monitoring devices

- Alert
- Ambient
- Boolean
- Consumables
- Decompose
- Development
- Device
- Duplicate
- Durable
- Electronic
- Inventor
- Lightweight
- Man-made
- Manipulate
- Manoeuvre
- Microplastics
- Model
- Monitor
- Monitoring device
- Moulded
- Plastic
- Plastic pollution
- Programming comment
- Programming loop
- Reformed
- Replica
- Research
- Sensor
- Strong
- Sustainability
- Synthetic
- Thermometer
- Thermoscope
- Value
- Variable
- Versatile
- Water-resistant
- Workplane

Vocabulary

Design and technology vocabulary

KS2 | Year 6

Food:
Come dine with me

- Accompaniment
- Collaboration
- Cookbook
- Cross-contamination
- Equipment
- Farm
- Flavour
- Illustration
- Imperative-verb
- Ingredients
- Method
- Nationality
- Preparation
- Processed
- Reared
- Recipe
- Research
- Storyboard
- Target audience
- Top tips
- Unit of measurement

Mechanical systems:
Automata toys

- Accurate
- Assembly-diagram
- Automata
- Axle
- Bench hook
- Cam
- Clamp
- Component
- Cutting list
- Diagram
- Dowel
- Drill bits
- Exploded-diagram
- Finish
- Follower
- Frame
- Function
- Hand drill
- Jelutong
- Linkage
- Mark out
- Measure
- Mechanism
- Model
- Research
- Right-angle
- Set square
- Tenon saw

Vocabulary

Design and technology vocabulary

KS2 | Year 6

Textiles: Waistcoats

- Accurate
- Adapt
- Annotate
- Design
- Design criteria
- Detail
- Fabric
- Fastening
- Knot
- Properties
- Running-stitch
- Seam
- Sew
- Shape
- Target audience
- Target customer
- Template
- Thread
- Unique
- Waistcoat
- Waterproof

Electrical systems: Steady hand game

- Assemble
- Battery
- Battery pack
- Benefit
- Bulb
- Bulb holder
- Buzzer
- Circuit
- Circuit symbol
- Component
- Conductor
- Copper
- Design
- Design criteria
- Evaluation
- Fine motor skills
- Fit for purpose
- Form
- Function
- Gross motor skills
- Insulator
- LED
- User

Vocabulary

Design and technology vocabulary

KS2 | Year 6

Structures: Playgrounds

- Adapt
- Apparatus
- Bench hook
- Cladding
- Coping saw
- Design
- Dowel
- Evaluation
- Feedback
- Idea
- Jelutong
- Landscape
- Mark out
- Measure
- Modify
- Natural materials
- Plan view
- Playground
- Prototype
- Reinforce
- Sketch
- Strong
- Structure
- Tenon saw
- Texture
- User
- Vice
- Weak

Digital world: Navigating the world

- 3D CAD
- Application (apps)
- Biodegradable
- Boolean
- Cardinal compass
- Client
- Compass
- Concept
- Convince
- Corrode
- Duplicate
- Environmentally friendly
- Equipment
- Feature
- Finite
- Function
- Functional
- GPS tracker
- If statement
- Infinite
- Investment
- Lightweight
- Loop
- Manufacture
- Materials (wood, metal, plastic etc.)
- Mouldable
- Navigation
- Non-recyclable
- Product lifecycle
- Product lifespan
- Program
- Recyclable
- Smart
- Sustainable
- Sustainable design
- Unsustainable design
- Variable
- Workplane