Knowledge

Structures

	3	4	5	6
Unit	**n/a**	**Pavilions (taught in Year 4/5)**	**Bridges**	**n/a**
Key Vocabulary		3D shapes Cladding Design criteria Innovative Natural Reinforce Structure	beam bridge arch bridge truss bridge strength technique corrugation lamination stiffness rigid factors stability visual appeal aesthetics joints	
Technical Knowledge		• To understand what a frame structure is. • To know that a 'free-standing' structure is one which can stand on its own.	• To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood.	
Links to KS3 Aims & Technical Knowledge	• To understand and use the properties of materials and the performance of structural elements to achieve functioning solutions • To develop the creative, technical and practical expertise needed to perform everyday tasks confidently • 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			

KS2 Progression of Skills and Knowledge in Design Technology

Skills

National Curriculum Subject Content	Design		• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight.	• Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.	
	Make		• Creating a range of different shaped frame structures. • Making a variety of free standing frame structures of different shapes and sizes. • Selecting appropriate materials to build a strong structure and cladding. • Reinforcing corners to strengthen a structure. • Creating a design in accordance with a plan. • Learning to create different textural effects with materials.	• Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties.	
	Evaluate		• Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs.	• Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others.	

Knowledge

Mechanisms / mechanical system				
	3	**4**	**5**	**6**
Unit	**n/a**	**Slingshot car (taught in Year 4/5)**	**Popup book**	**n/a**
Key Vocabulary		design structure graphics research model template chassis energy kinetic mechanism air resistance	design input motion mechanism criteria research reinforce model	

KS2 Progression of Skills and Knowledge in Design Technology

Technical Knowledge		• To understand that all moving things have kinetic energy. • To understand that kinetic energy is the energy that something (object/person) has by being in motion. • 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	• To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms.	
Links to KS3 Aims & Technical Knowledge	• To understand and use the properties of materials and the performance of structural elements to achieve functioning solutions • To understand how more advanced mechanical systems used in their products enable changes in movement and force • 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			

Skills

National Curriculum Subject Content	**Design**		• 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.	• 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.	

	Make		• Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design.	• Following a design brief to make a popup 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.	
	Evaluate		• Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	• Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement.	

Knowledge

Cooking and nutrition

	3	4	5	6
Unit	**Eating seasonally**	**Adapting a recipe**	**n/a**	**Come dine with me**
Key Vocabulary	complementary country cut design evaluate export fruit grate import ingredients Mediterranean mock-up mountain peel polar seasonal seasons snip taste temperate texture tropical vegetable weather	adapt addition appearance budget buttery combine comment compare construct cream crunchy cuboid cut design evaluate fold hygiene ingredients layout market research modify multiplication opinion pounds sieve sift target audience taste texture unique		balance bitter bridge method complement cookbook cross-contamination enhance equipment farm to fork flavours ingredients method research pairing recipe preparation salty sour storyboard sweet umami

KS2 Progression of Skills and Knowledge in Design Technology

Technical Knowledge	• To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons. • To know that cooking instructions are known as a 'recipe'. • To know that imported food is food which has been brought into the country. • To know that exported food is food which has been sent to another country. • To know that eating seasonal foods can have a positive impact on the environment. • To know that similar coloured fruits and vegetables often have similar nutritional benefits. • To know that the appearance of food is as important as taste.	• To know that the amount of an ingredient in a recipe is known as the 'quantity.' • To know that safety and hygiene are important when cooking. • To know the following cooking techniques: sieving, measuring, stirring, cutting out and shaping. • To understand the importance of budgeting while planning ingredients for biscuits. • To know that products often have a target audience		• 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)
Links to KS3 Aims & Technical Knowledge	• To develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world • To 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 • To critique, evaluate and test their ideas and products and the work of others • To understand and apply the principles of nutrition and learn how to cook.			

Skills

National Curriculum	**Design**	Designing a recipe for a savoury tart.	• Designing a biscuit within a given budget, drawing upon previous taste testing judgements.		• Writing a recipe, explaining the key steps, method and ingredients. • Including facts and drawings from research undertaken.

KS2 Progression of Skills and Knowledge in Design Technology

	Make	• Following the instructions within a recipe. • Tasting seasonal ingredients. • Selecting seasonal ingredients. • Peeling ingredients safely. • Cutting safely with a vegetable knife.	• Following a baking recipe, including the preparation of ingredients. • Cooking safely, following basic hygiene rules. • Adapting a recipe to meet the requirements of a target audience.		• 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	• 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.	• Evaluating a recipe, considering: taste, smell, texture and appearance. • Describing the impact of the budget on the selection of ingredients. • Evaluating and comparing a range of food products. • Suggesting modifications to a recipe (e.g. This biscuit has too many raisins, and it is falling apart, so next time I will use less raisins)		• To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons. • To know that cooking instructions are known as a 'recipe'. • To know that imported food is food which has been brought into the country. • To know that exported food is food which has been sent to another country. • To know that eating seasonal foods can have a positive impact on the environment. • To know that similar coloured fruits and vegetables often have similar nutritional benefits. • To know that the appearance of food is as important as taste.
Links to KS3	• To understand and apply the principles of nutrition and health • To cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet • To become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes] • To understand the source, seasonality and characteristics of a broad range of ingredients.				

Knowledge

Electrical systems

	3	4	5	6
Unit	**n/a**	**Torches**	**n/a**	**Steady hand game**
Key Vocabulary		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		assemble battery battery pack benefit bulb bulb holder buzzer circuit user insulator LED component conductor copper design design criteria evaluation fine motor skills fit for purpose form function gross motor skills
Technical Knowledge		• To know that batteries contain acid, which can be dangerous if they leak. • To know the names of the components in a basic series circuit, including a buzzer.		• To know 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.
Links to KS3 Aims & Technical Knowledge	• To understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs] • To apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components. • 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			

Skills

National Curriculum Subject Content	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. • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.		• Designing a steady hand game - identifying and naming the components required. • Drawing a design from three different perspectives. • Generating ideas through sketching and discussion. • Modelling ideas through prototypes. • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.
	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		• 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. • Gathering images and information about existing children's toys. • Analysing a selection of existing children's toys.		• Testing own and others finished games, identifying what went well and making suggestions for improvement. • Gathering images and information about existing children's toys. • Analysing a selection of existing children's toys

KS2 Progression of Skills and Knowledge in Design Technology

Knowledge

Textiles

	3	4	5	6
Unit	**Cross-stitch and appliqué**	**Fastenings**	**Stuffed Animals**	**n/a**
Key Vocabulary	appliqué cross-stitch fabric running stitch patch thread embellish template cotton silk polyester wrinkle tear water-resistant breathable matt shiny biodegrade pinking	Criteria Fabric Fastening Fix Mock-up Stitch Template	accurate annotate appendage blanket-stitch design criteria detail evaluation fabric sew shape stuffed toy stuffing template	
Technical 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.	• To know that batteries contain acid, which can be dangerous if they leak. • To know the names of the components in a basic series circuit, including a buzzer.	• To know 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.	
Links to KS3 Aims & Technical Knowledge	• To develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world • To 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 • To critique, evaluate and test their ideas and products and the work of others			

KS2 Progression of Skills and Knowledge in Design Technology

Skills

National Curriculum Subject Content	**Design**	• Designing and making a template from an existing cushion and applying individual design criteria.	• Writing design criteria for a product, articulating decisions made. • Designing a personalised book sleeve.	• Designing a stuffed toy, considering the main component shapes required and creating an appropriate template. • Considering the proportions of individual components.	
	Make	• Following design criteria to create an Egyptian collar. • Selecting and cutting fabrics with ease using fabric scissors. • Threading needles with greater independence. • Tying knots with greater independence. • Sewing cross stitch to join fabric. • Decorating fabric using appliqué. • Completing design ideas with embellishing the collars based on design ideas (Egyptian collars).	• Making and testing a paper template with accuracy and in keeping with the design criteria. • Measuring, marking and cutting fabric using a paper template. • Selecting a stitch style to join fabric. • Working neatly by sewing small, straight stitches. • Incorporating a fastening to a design.	• 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 appliqué to attach pieces of fabric decoration. • Sewing blanket stitch to join fabric. • Applying blanket stitch so the spaces between the stitches are even and regular.	
	Evaluate	• Evaluating an end product and thinking of other ways in which to create similar items.	• Testing and evaluating an end product against the original design criteria. • Deciding how many of the criteria should be met for the product to be considered successful. • Suggesting modifications for improvement. • Articulating the advantages and disadvantages of different fastening types	• Testing and evaluating an end product and giving point for further improvements	

KS2 Progression of Skills and Knowledge in Design Technology

Knowledge

Digital World

	3	4	5	6
Unit	**Wearable technology**	**n/a**	**Monitoring devices – taught in Year 4/5**	**Navigating the world as a trekker**
Key Vocabulary	analogue analyse annotate badge computer-aided design (CAD) control design criteria develop digital digital revolution digital world display electronic electronic products fastening feature feedback form function layers monitor net opinion point of sale product product design program sense simulator smart technology test user		monitoring device electronic sensor thermoscope thermometer design brief design criteria inventor programming loop programming comment alert ambient boolean duplicate value variable model sustainability microplastics decompose plastic pollution man-made synthetic moulded transparent opaque versatile lightweight water-resistant durable 3D models consumables CAD Tinkercad workplane	smart smartphone equipment navigation cardinal compass application (apps) pedometer GPS tracker design brief design criteria client function program duplicate replica loop variable value if statement corrode lightweight sustainable design environmentally friendly biodegradable recyclable product lifecycle product lifespan

KS2 Progression of Skills and Knowledge in Design Technology

Technical Knowledge	• 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 know that a simulator is able to replicate the functions of an existing piece of technology • To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result. • To understand what is meant by 'point of sale display.' • To know that CAD stands for 'Computer-aided design'		• 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 the 6Rs of sustainability. • To understand what a virtual model is and the pros and cons of traditional vs CAD modelling.	• To know that accelerometers can detect movement. • To understand that sensors can be useful in products as they mean the product can function without human input. • To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. • To know that 'multifunctional' means an object or product has more than one function. • To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.
Links to KS3 Aims & Technical Knowledge	• To apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers]. • To develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world. • To 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 • To critique, evaluate and test their ideas and products and the work of others			

KS2 Progression of Skills and Knowledge in Design Technology

Skills

National Curriculum Subject Content	**Design**	• Problem solving by suggesting which features on a Micro:bit might be useful and justifying my ideas. • Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge. • Developing design ideas through annotated sketches to create a product concept. • Developing design criteria to respond to a design brief.		• 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	• Following a list of design requirements. • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.		• 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	• Analysing and evaluating wearable technology. • Using feedback from peers to improve design.		• 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. • 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 and features of my navigation tool to the client as part of a product concept pitch.

KS2 Progression of Skills and Knowledge in Design Technology

KS3 Skills

Design
• use research and exploration, such as the study of different cultures, to identify and understand user needs • identify and solve their own design problems and understand how to reformulate problems given to them • develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations • use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools
Make
• select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • select from and use a wider, more complex rang
Evaluate
• analyse the work of past and present professionals and others to develop and broaden their understanding • investigate new and emerging technologies (KS2 Digital World) • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists