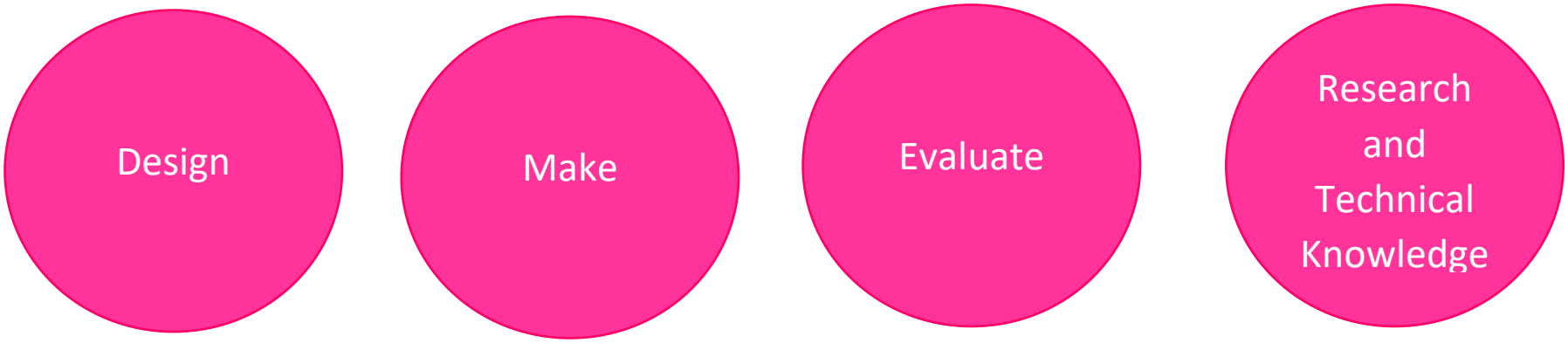
Beechwood Primary School

Explore, Discover, Achieve

Design and Technology

Key Concepts and Breadth of Study



Children will be expected to follow the four-step process of research, design, create and evaluate.

	Design	Make	Evaluate	Research and Technical knowledge
EYFS Autumn 1 'We are Unique' Autumn 2 'We are Inquisitive' Spring 1 'We are Explorers' Spring 2 'We can be Heroes' Summer 1 'We are investigators' Summer 2	Children construct with a purpose in mind to achieve a planned effect. The creative and construction areas provide materials and equipment in order to access the objectives in the continuous provision. There are design sheets in available in the construction area for children to use if they wish. Adults work with children to help facilitate the creation of large scale models by questioning and encouraging them to think through e.g. *a fire engine, Evil Pea trap.*	Chn use various construction materials (mobilo, lego, duplo, blocks are available in CP) To begin to construct, stacking blocks vertically and horizontally, making enclosures and creating spaces (model making in CP e.g. building their dream house, building the 3 little pigs house, making bear dens making rockets and spaceships) To joins construction pieces together to build and balance. To discover that tools can be used for a purpose. Children manipulate materials, using different tools and techniques, to achieve a planned effect. Make use of props and materials when role playing characters in narratives and stories. - Using tools to create clay hedgehogs - Chopping vegetables to make pumpkin soup - Rolling dough and grating cheese to make pizzas - Making a fire engine / emergency service vehicles.	Share their creations, explaining the process they have used	

Year 1/2 Cycle A Autumn - **Cooking –** Bread (Great Fire of London)	To design a recipe to make bread based on ingredients available in 1666. Research different types of bread.	Make a traditional simple white loaf. Explore how to mix ingredients to make a dough. Knead bread dough.	Taste the loaf and evaluate it based off taste, texture and smell.	Knows where food comes from Knows which food group bread fits into and how it is made. Measure and add ingredients Mixing ingredients carefully How to knead dough Knows that bread needs to prove before it bakes.
Spring – **Structures –** Animals	Learn the importance of design criteria. Plan and design an animal structure to be built out of art straws. Learn about different types of structures in the natural world and everyday objects.	Make structure according to design criteria. Create joints using paper/tape/card/glue. Make a strong structure.	Exploring the features of structures. Compare stability of different shapes and lengths. Evaluate their own structure by testing strength and suitability.	To know that structures with wide, flat bases are the most strong and stable. To understand the shape of structure affects his strength. To know materials can be manipulated to improve strength. To understand a structure is something that is formed from parts. To understand a stable structure is one that is firm and unlikely to change or move.
Summer – **Mechanisms –** Catapults.	To recap that a plan in design technology is called a design. Explore types of moving mechanisms and how they are made.	Follow their design to make a catapult. Select materials in order to make a moving mechanism.	Evaluate catapult against the design. Test the efficacy of their moving mechanism.	To know that mechanism are a collection of moving parts that work together to make a machine.

	Design a catapult with a moving mechanism.			To know there is an input and an output in a mechanism. To know the input is the energy that is used to start something working. To know that the output is what happens as a result of the input. To know a lever is something that turns on a pivot.
Year 3 Autumn 1 – **Structures** Stonehenge Spring 2 **Digital World** Scratch Story Summer 2	• Designing a structure with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours.	• Designing a castle with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours. • Designing and/or decorating a castle tower on CAD software. • Using a template when cutting and assembling the pouch.	• Designing a castle with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours. • Designing and/or decorating a castle tower on CAD software.	• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures. • To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose.

Cooking and Nutrition Ciabattas	• Designing and/or decorating a castle tower on CAD software. • 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. • Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.	• 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. • 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.	• Analysing and evaluating an existing product. • Identifying the key features of a pouch. • 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.	• To know that a façade is the front of a structure. • To understand that a castle needed to be strong and stable to withstand enemy attack. • To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product. • 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 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 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.

Year 4 Autumn 1 – **Textiles** Cross-stitch Spring 2 **Mechanisms / Mechanical systems** Sling-shots Summer 2 **Electrical systems** Electric poster	• Designing and making a template from an existing cushion and applying individual design criteria. • 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. • 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.	• 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). • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. • Create a final design for the electric poster. • Mount the poster onto corrugated card to improve its strength and allow it to 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).	• Evaluating an end product and thinking of other ways in which to create similar items. • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance. • 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.	•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 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 understand that products change and evolve over time. • 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 or advertise something. •To know that it is important to assess and evaluate design ideas and models against a list of design criteria. • 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. • 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).
Year 5 Autumn 2 **Mechanisms / Mechanical Systems** Pop-up Books Spring 2 **Cooking and Nutrition** Healthy Eating Summer 2 **Textiles** Stuffed Animals	• 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. • Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • Writing an amended method for a recipe to incorporate the relevant changes to ingredients. • Designing appealing packaging to reflect a recipe.	• 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. • Cutting and preparing vegetables safely. • Using equipment safely, including knives, hot pans and hobs. • Knowing how to avoid cross-contamination. • Following a step by step method carefully to make a recipe. • 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	• Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement. To evaluate their completed models against their own design criteria and consider the views of others to improve their work. • Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups. • Testing and evaluating an end product and giving point for further improvements.	• To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms. • To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing. • To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. • To know that I can adapt a recipe to make it healthier by substituting ingredients. • To know that I can use a nutritional calculator to see how healthy a food option is.

	• Designing a stuffed toy, considering the main component shapes required and creating an appropriate template. • Considering the proportions of individual components.	regular.		• To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. • 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.
Year 6 Autumn 2 **Structures** Anderson Shelters	• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs	• Building a range of play apparatus structures drawing upon new and prior knowledge of structures. • Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures. • Understanding the functional and aesthetic properties of plastics.	• 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. • Stating an event or fact from the last 100 years of plastic history.	• To know that structures can be strengthened by manipulating materials and shapes. • 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.

Spring 2 **Digital World** Monitoring devices Summer 2 **Textiles** Stuffed Animals	• 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. • 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	• Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range. • 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.	• 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. • 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.	• 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 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 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 'form' means the shape and appearance of an object. •To know the difference between 'form' and 'function'.

	purpose’ and ‘form over function’.			•To understand that 'fit for purpose' means that a product works how it should and is easy to use. • To know that form over purpose means that a product looks good but does not work very well. • To know the importance of ‘form follows function’ when designing: the product must be designed primarily with the function in mind. • To understand the diagram perspectives 'top view', 'side view' and 'back'.