Design and Technology Skills Progression Map

	By the end of Early Years:	Year 1- **Structures- Constructing a Windmill** **Mechanisms- Moving Storybook** **Food- Fruit and Vegetables** *Year 1/2-* *Food- Fruit and Vegetables* *Mechanisms- Moving Storybook* *Textiles- Puppets* **Year 2-** **Textiles- Pouches** **Structures- Baby Bear's Chair** **Food- Balanced Diet** By the end of Key Stage 1, pupils will have had the opportunity to:	**Year 3-** **Mechanical Systems: Pneumatic Toys** **Food: Eating Seasonally** **Digital World: Electronic Charms** **Year 4-** **Electrical Systems: Torches** **Structure: Pavilions** **Textiles- Fastenings** By the end of Lower Key Stage 2, pupils will have had the opportunity to:	**Year 5-** **Electrical Systems- Greetings Cards** **Mechanical Systems- Pop up Books** **Digital World- Monitoring Devices** **Year 6-** **Art Project- Replaces Textiles this year** **Food- Come Dine with Me** **Structure- Playgrounds** By the end of Upper Key Stage 2, pupils will have had the opportunity to:
Structures	**Physical Development** • Progress towards a more fluent style of moving, with developing control and grace. • Develop their small motor skills so that they can use a range of tools competently, safely and confidently. • Choose the right resources to carry out their own plan	• Generating and communicating ideas using sketching and modelling • Learning about different types of structures, found in the natural world and in everyday objects • Making a structure according to design criteria • Creating joints and structures from paper/card and tape • Exploring the features of structures • Comparing the stability of different shapes • Testing the strength of own structures • Identifying the weakest part of a structure	• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect • Building frame structures designed to support weight • Creating a range of different shaped frame structures • Making a variety of free standing frame structures of different shapes and sizes • Selecting appropriate materials to build a strong structure and for the cladding • Reinforcing corners to strengthen a structure • Creating a design in accordance with a plan	• 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 • Improving a design plan based on peer evaluation • Testing and adapting a design to improve it as it is developed

	Personal, Social and Emotional Development • Select and use activities and resources, with help when needed. This helps them to achieve a goal they have chosen or one which is suggested to them	• Evaluating the strength, stiffness and stability of own structure •identifying natural and man-made structures • Identifying when a structure is more or less stable than another • Knowing that shapes and structures with wide, flat bases or legs are the most stable • Understanding that the shape of a structure affects its strength • Using the vocabulary: strength, stiffness and stability • Knowing that materials can be manipulated to improve strength and stiffness • Building a strong and stiff structure by folding paper	• Learning to create different textural effects with materials • Evaluating structures made by the class • Describing what characteristics of a design and construction made it the most effective • Considering effective and ineffective designs •Learning what pavilions are and their purpose • Building on prior knowledge of net structures and broadening knowledge of frame structures • Learning that architects consider light, shadow and patterns when designing • Implementing frame and shell structure knowledge • Considering effective and ineffective designs	• Identifying what makes a successful structure Knowing that structures can be strengthened by manipulating materials and shapes • Identifying the shell structure in everyday life (cars, aeroplanes, tins, cans) • Understanding man made and natural structures
Mechanisms/ Mechanical systems	**Expressive Arts and Design** • Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning,	• Creating a class design criteria • Design for a specific audience in accordance with a design criteria • Selecting a suitable linkage system to produce the desired motions • Designing a wheel Selecting appropriate materials based on their properties	• 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 • Measuring, marking, cutting and assembling with increasing accuracy	• Designing a pop-up book which uses a mixture of structures and mechanisms • Naming each mechanism, input and output accurately • Storyboarding ideas for a book • Following a design brief to make a pop up book, neatly and with focus on accuracy

	refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills. **Understanding the World** • Explore how things work	• Making linkages using card for levers and split pins for pivots • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used • Cutting and assembling components neatly • Selecting materials according to their characteristics • Following a design brief • Evaluating own designs against design criteria • Using peer feedback to modify a final design • Evaluating different designs • Testing and adapting a design • Learning that mechanisms are a collection of moving parts that work together in a machine • Learning that there is an input and output in a mechanism • Identifying mechanisms in everyday objects • Learning that a lever is something that turns on a pivot	• Making a model based on a chosen design • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance •Learning that products change and evolve over time • Learning that all moving things have kinetic energy • Understanding that kinetic energy is the energy that something (object person) has by being in motion	• Making mechanisms and/or structures using sliders, pivots and folds to produce movement • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result • Evaluating the work of others and receiving feedback on own work • Suggesting points for improvement • Knowing that an input is the motion used to start a mechanism • Knowing that output is the motion that happens as a result of starting the input • Knowing that mechanisms control movement • Describing mechanisms that can be used to change one kind of motion into another

		• Learning that a linkage is a system of levers that are connected by pivots • Exploring wheel mechanisms • Learning how axels help wheels to move a vehicle		
Electrical systems (KS2 only)		N/A	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas • Making a torch with a working electrical circuit and switch • Using appropriate equipment to cut and attach materials • Assembling a torch according to the design and success criteria • Evaluating electrical products • Testing and evaluating the success of a final product and taking inspiration from the work of peers •Learning how electrical items work • Identifying electrical products • Learning what electrical conductors and insulators are • Understanding that a battery contains stored electricity and can be used to power products • Identifying the features of a torch	• Designing an electronic greetings card with a copper track circuit and components • Creating a labelled circuit diagram showing positive and negative parts in relation to the LED and the battery • Writing design criteria for an electronic greeting card • Compiling a moodboard relevant to my chosen theme, purpose and recipient • Making a functional series circuit • Creating an electronics greeting card, referring to a design criteria • Mapping out where different components of the circuit will go • Evaluating a peer's product against design criteria and suggesting modifications that could be made to improve the reliability or aesthetics of it or to incorporate another type of circuit component

			• Understanding how a torch works • Articulating the positives and negatives about different torches	• Stating what Sir Rowland Hill invented and why it was important for greeting cards • Analysing and evaluating a range of existing greeting cards • Learning the key components used to create a functioning circuit • Learning that copper is a conductor and can be used as part of a circuit • Understanding that breaks in a circuit will stop it from working • Explaining how a series circuit will work in my card • Identifying the negative and positive leg of an LED • Drawing a series circuit diagram and symbols

Cooking and nutrition		• Designing a healthy wrap based on a food combination which work well together • Slicing food safely using the bridge or claw grip • Constructing a wrap that meets a design brief • Describing the taste, texture and smell of fruit and vegetables • Taste testing food combinations and final products • Describing the information that should be included on a label • Evaluating which grip was most effective • Understanding what makes a balanced diet • Knowing where to find the nutritional information on packaging • Knowing the five food groups	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish •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 • 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 • Learning that climate affects food growth • Working with cooking equipment safely and hygienically • Learning that imported foods travel from far away and this can negatively impact the environment • Learning that vegetables and fruit grow in certain seasons • Learning that each fruit and vegetable gives us nutritional benefits • Learning to use, store and clean a knife safely	• Writing a recipe, explaining the key steps, method and ingredients • Including facts and drawings from research undertaken • Following a recipe, including using the correct quantities of each ingredient • Adapting a recipe based on research • Working to a given timescale • Working safely and hygienically with independence • Evaluating a recipe, considering: taste, smell, texture and origin of the food group • Taste testing and scoring final products • Suggesting and writing up points of improvements in productions • Evaluating health and safety in production to minimise cross contamination Learning how to research a recipe by ingredient • Recording the relevant ingredients and equipment needed for a recipe • Understanding the combinations of food that will complement one another

				• Understanding where food comes from, describing the process of 'Farm to Fork' for a given ingredient
Textiles		• Designing a pouch • Selecting and cutting fabrics for sewing • Decorating a pouch using fabric glue or running stitch • Troubleshooting scenarios posed by teacher • Evaluating the quality of the stitching on others' work • Discussing as a class, the success of their stitching against the success criteria • Identifying aspects of their peers' work that they particularly like and why • Joining items using fabric glue or stitching Identifying benefits of these techniques • Threading a needle	• Writing design criteria for a product, articulating decisions made • Designing a personalised Book sleeve 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 sewing small, neat stitches • Incorporating fastening to a design • 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	• Designing a product in accordance to specification linked to set of design criteria to fit a specific theme • Annotating designs • Using a template when pinning panels onto fabric • Marking and cutting fabric accurately, in accordance with a design • Sewing a strong running stitch, making small, neat stitches and following the edge • Tying strong knots • Decorating a product -attaching objects using thread and adding a secure fastening • Evaluating work continually as it is created

		• Sewing running stitch, with evenly spaced, neat, even stitches to join fabric • Neatly pinning and cutting fabric using a template	• Suggesting modifications for improvement • Understanding that there are different types of fastenings and what they are • Articulating the benefits and disadvantages of different fastening types	• Learning different decorative stitches • Application and outcome of the individual technique • Sewing accurately with even regularity of stitches
Digital World (KS2 only)	**Fine Motor Skills** • Use a range of small tools, including scissors, paintbrushes and cutlery **Creating with Materials** • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • Share their creations, explaining the process they have used	N/A	• 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 • 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 • Analysing and evaluating an existing product • Identifying the key features of a pouch	• 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 maneuvering 3D objects, using CAD • Changing the properties of, or combine one or more 3D objects, using CAD • Understanding the functional and aesthetic properties of plastics • 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

			• Identifying key product developments that occurred as a result of the digital revolution • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm • Understanding what a loop is in programming • Explaining the basic functionality of my eCharm program • Understanding what is meant by 'point of sale display'	• Describing key developments in thermometer history • Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range • Explaining key functions in my program (audible alert, visuals) • Explaining how my product would be useful for an animal carer including programmed features