Knowledge and Skills Progression for Design & Technology

	Design **Conceptual Knowledge** "The interrelationships among the basic elements within a larger structure that enable them to function together"	**Make** **Procedural Knowledge** "How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods"	**Evaluate** **Metacognitive Knowledge** "The knowledge of thinking processes"	**Technical Knowledge** **Factual Knowledge** *"The basic elements students must know to be acquainted with a discipline or solve problems in it"*
EY FS	I can recognise that a range of technology is used in places such as homes and schools	I can select and use technology for particular purposes		
Year 1	Learning the importance of a clear design criteria Including individual preferences and requirements in a design Designing smoothie carton packaging by-hand or on ICT software Using a template to create a design for a puppet	Making stable structures from card, tape and glue 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 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 Cutting fabric neatly with scissors Using joining methods to decorate a puppet Sequencing steps for construction	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 Tasting and evaluating different food combinations Describing appearance, smell and taste Suggesting information to be included on packaging Reflecting on a finished product, explaining likes and dislikes	Understanding the difference between fruits and vegetables Describing and grouping fruits by texture and taste Describing the purpose of structures, including windmills Learning how to turn 2D nets into 3D structures Learning that the shape of materials can be changed to improve the strength and stiffness of structures Understanding that cylinders are a strong type of structure that are often used for windmills and lighthouses Understanding that windmill turbines use wind to turn and make the machines inside work Understanding that axles are used in structures and mechanisms to make parts turn in a circle Developing awareness of different structures for different purposes Learning different ways in which to join fabrics together: pinning, stapling, gluing
Year 2	Creating a class design criteria for a moving monster Designing a moving monster 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 pouch	Making a structure according to design criteria Creating joints and structures from paper/card and tape 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 Selecting and cutting fabrics for sewing Decorating a pouch using fabric glue or running stitch	Evaluating own designs against design criteria Using peer feedback to modify a final design Evaluating different designs Testing and adapting a design 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	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 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 Joining items using fabric glue or stitching Identifying benefits of these techniques Threading a needle Sewing running stitch, with evenly spaced, neat, even stitches to join fabric Neatly pinning and cutting fabric using a template

Year 3	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 need and colours Designing and/or decorating a castle tower on CAD software Creating a healthy and nutritious recipe for a savoury tart Using seasonal ingredients, considering the taste, texture, smell and appearance of the dish	Constructing a range of 3D geometric shapes using nets Creating special features for individual designs Making facades from a range of recycled materials 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	Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design Suggesting points for modification of the individual designs 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 Identifying features of a castle Identifying suitable materials to be selected and used for a castle, considering weight, compression, tension Extending the knowledge of wide and flat based objects are more stable Understanding the terminology of strut, tie, span, beam Understanding the difference between frame and shell structure
Year 4	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 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 Writing design criteria for a product, articulating decisions made Designing a personalised Book sleeve	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 Measuring, marking, cutting and assembling with increasing accuracy Making a model based on a chosen design 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	Evaluating structures made by the class Describing what characteristics of a design and construction made it the most effective Considering effective and ineffective designs Evaluating the speed of a final product based on the effect of shape on speed and the accuracy of workmanship on performance Testing and evaluating the success of a final product and taking inspiration from the work of peers 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	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 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 Understanding that there are different types of fastenings and what they are Articulating the benefits and disadvantages of different fastening types

Year 5	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 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 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 combine one or more 3D objects, using CAD	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 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	Identifying the nutritional differences between different products and recipes Identifying and describing healthy benefits of food groups 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 Stating what Sir Rowland Hill invented and why it was important for greeting cards 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	Understanding where food comes from - learning that beef is from cattle and how beef is reared and processed Understanding what constitutes a balanced diet Learning to adapt a recipe to make it healthier Comparing two adapted recipes using a nutritional calculator and then identifying the healthier option Exploring how to create a strong beam Identifying arch and beam bridges and understanding the terms: compression and tension Identifying stronger and weaker structures Finding different ways to reinforce structures Understanding how triangles can be used to reinforce bridges Articulating the difference between beam, arch, truss and suspension bridges 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 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

Year 6	Designing a playground featuring a variety of different structures, giving careful onsideration to how the structures will be used, considering effective and ineffective designs 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' 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 combine one or more 3D objects, using CAD	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 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	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 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 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 explain why Describing how the product concept fits the client's request and how it will benefit the customers	Learning that batteries contain acid, which can be dangerous if they leak Identifying and naming the circuit components in a steady hand game Programming an N,E, S,W cardinal compass 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