DT Progression of Skills and Knowledge

Mechanisms		**Year 1**		**Year 3/4 Cycle A**	**Year 5/6 Cycle A**	**Year 5/6 Cycle B**
		Sliders and Levers	Wheels and Axles	Pneumatics	Pop-Up Books	Cams
Skills	Design	• To explain how to adapt mechanisms using bridges or guides to control the movement. • To design a moving product for a given audience.	• To design a vehicle that includes wheels, axles and axle holders that when combined will allow the wheels to move. • To create clearly labelled drawings that illustrate movement.	• To design a toy which uses a pneumatic system. • To develop design criteria from a design brief. • To generate ideas using thumbnail sketches and exploded diagrams. • To learn that different types of drawings are used in design to explain ideas clearly.	• To design a pop up book which uses a mixture of structures and mechanisms. • To name each mechanism, input and output accurately. • To storyboard ideas for a book.	• To experiment with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement. • To understand how linkages change the direction of a force. • To make things move at the same time. • To understand and draw cross-sectional diagrams to show the inner workings of my design.
	Make	• To follow a design to create a moving model that uses sliders and levers.	• To adapt mechanisms when: - they do not work as they should - to fit their vehicle design - to improve how they work after testing their vehicle	• To create a pneumatic system with a desired motion. • To build secure housing for a pneumatic system. • To use syringes and balloons to create different types of pneumatic systems to make a functional and appalling pneumatic toy. • To select materials due to their functional and aesthetic characteristics. • To manipulate materials to create different effects by cutting, creasing, folding and weaving.	• To follow a design brief to make pop up books, neatly and with a focus on accuracy. • To make mechanisms and/or structures using sliders, pivots and folds to produce movement. • To use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.	• To measure, mark and check the accuracy of the jelutong and dowel pieces required. • To measure, mark and cut components accurately using a ruler and scissors. • To assemble components accurately to make a stable frame. • To understand that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles. • To select appropriate materials based on the materials being joined and the speed at which the glue needs to dry.

	Evaluate	• To test a finished product, seeing whether it moves as planned and if not explaining why and how it can be fixed. • To review the success of a product by testing it with its intended audience.	• To test wheel and axle mechanisms, identifying what stops the wheels from turning and recognising that a wheel needs an axle in order to move.	• To use the views of others to improve designs. • To test and modify the outcome, suggesting improvements. • To understand the purpose of exploded-diagrams through the eyes of a designer and their client.	• To evaluate the work of others and receive feedback on their own work. • To suggest points for improvement.	• To evaluate the work of others and receive feedback on their own work. • To apply points of improvement to their toys. • To describe changes they would make if they were to do the project again.
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 a 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 needs to be balanced.	• 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 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 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 in Design and Technology we call a plan a ‘design’.	• To know some real life items that use wheels.	• 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 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 a saw safely. • To know that a set square can be used to help mark 90 degree angles.

Textiles		Year 2	Year 3/4 Cycle A	Year 3/4 Cycle B	Year 5/6 Cycle B
		Pouches	Cushions	Fastenings	Stuffed Toys
Skills	Design	• To design a textile product.	• To design and make a template from an existing product and apply to individual design criteria.	• To write a design criteria for a product, articulating decisions made. • To design a personalised book sleeve.	• To design a stuffed toy considering the main component shapes required and create an appropriate template. • To consider the proportions of individual components.
	Make	• To select and cut fabrics for sewing. • To decorate a product using a running-stitch. • To thread a needle. • To sew a running-stitch with evenly spaced neat stitches to join fabric. • To neatly pin and cut fabric using a template.	• To follow design criteria to create a product. • To select cutting fabrics with ease using fabric scissors. • To thread needles with greater independence. • To tie knots with greater independence. • To sew cross-stitch to join fabric. • To decorate fabric using applique. • To complete design ideas with stuffing and sewing edges or embellishments based on design ideas.	• To make and test a paper template with accuracy and in keeping with the design criteria. • To measure, mark and cut fabric using a paper template. • To select a stitch style to join fabric. • To work neatly by sewing small, straight stitches. • To incorporate a fastening to a design.	• To create a 3D stuffed toy from a 2D design. • To measure, mark and cut fabrics accurately and independently. • To create strong and secure blanket stitches when joining fabric. • To thread needles independently. • To use applique to attach pieces of fabric decoration. • To sew blanket stitch to join fabric. • To apply blanket stitch so the spaces between the stitches are even and regular.
	Evaluate	• To troubleshoot scenarios posed by the teacher. • To evaluate the quality of the stitching on others' work. • To discuss as a class the success of their stitching against the success criteria. • To identify aspects of their peers' work that they particularly like and explain why.	• To evaluate an end product and think of other ways in which to create similar items.	• To test and evaluate an end product against the original design criteria. • To decide how many of the criteria should be met for the product to be considered successful. • To suggest modifications for improvement. • To articulate the advantages and disadvantages of different fastening types.	• To test and evaluate an end product and give points for further improvements.
Knowledge	Technical	• To know that sewing is a method of joining fabric. • To know that different stitches can be used when sewing. • To understand the importance of tying a knot after sewing the final stitch. • To know that a thimble can be	• 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 fabrics have been joined together it is called a seam. • To know that it is important to	• To know that a fastening is something which holds two pieces of material together. • To know that different fastening types are useful for different purposes. • To know that creating a mock up of their design is useful for	• To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. • To understand that is it easier to finish simpler designs to a high standard. • To know that soft toys are often

		used to protect my finger when sewing.	leave space on the fabric for the seam. • To understand that some products are turned inside out after sewing so the stitching is hidden.	checking ideas and proportions.	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.

Structures		**Reception**		**Year 2**	**Year 3/4 Cycle B**	**Year 5/6 Cycle A**
		Junk Modelling	Boats	Free-Standing	Shell	Frame
Skills	Design	• To explore and investigate the tools and materials in the junk modelling area. • To develop scissor skills. • To investigate cutting different materials. • To learn how to plan and select the correct resources to make a model. • To verbally plan and create a junk model. • To share a finished model and talk about the process in its creation. • To explore different ways to temporarily join materials together.	• To understand what waterproof means and to test whether materials are waterproof. • To test and make predictions for which materials float or sink. • To compare the use of boats. • To investigate how the shape and structure of boats affects the way they move. • To design a boat. • To create a boat based on their own design.	• To generate and communicate ideas using sketching and modelling. • To learn about different types of structures found in the natural world and in everyday objects.	• To design a structure with key features to appeal to a specific person/purpose. • To draw and label a design for a structure using 2D shapes, to label the 3D shapes that will create the features as well as label materials needed and colours. • To design and decorate a structure on CAD software.	• To design a model featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs.
	Make			• To make a structure according to design criteria. • To create joints and structures from paper/card. • To build strong and stiff structures by folding paper.	• To construct a range of 3D geometric shapes using nets. • To create special features for individual designs. • To make facades from a range of recycled materials.	• To build a range of apparatus structures drawing upon new and prior knowledge of structures. • To measure, mark and cut wood to create a range of structures. • To use a range of materials to reinforce and add decoration to structures.

	Evaluate			• To explore the features of structures. • To compare the stability of different shapes. • To test the strength of own structures. • To identify the weakest part of a structure. • To evaluate the strength, stiffness and stability of own structure.	• To evaluate own work and the work of others based on the aesthetic of the finished product and in comparison to the original design. • To suggest points for modification of the individual designs.	• To improve a design plan based on peer evaluation. • To test and adapt a design to improve it as it is developed. • To identify what makes a successful structure.
Knowledge	Technical			• To know that shapes and structures with wide, flat bases or legs are the most stable. • To understand the shape of a structure affects its strength. • 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.	• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.	• To know that structures can be strengthened by manipulating materials and shapes.
	Additional			• To know that natural structures are those found in nature. • To know that man made structures are those made by people.	• To know features of their structure such as a castle, to include flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse as well as their purpose. • To know that facade is the front of a structure. • To understand that a	• 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.

					structure such as 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.	

Cooking and Nutrition		**Reception**	**Year 1**	**Year 2**	**Year 3/4 Cycle B**	**Year 5/6 Cycle B**
		Fruit and Vegetables	Fruit and Vegetables	A Balanced Diet	Eating Seasonally	What could be healthier?
Skills	Design	• To explore fruits and vegetables and the differences between them. • To explore a pumpkin and describe it using the five senses. • To design a fruit and vegetable soup recipe. • To learn how to use a knife safely. • To safely use tools to prepare ingredients. • To design food packaging.	• To design a smoothie carton packaging by hand or on ICT software.	• To design a healthy wrap based on food combinations which work well together.	• To create a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering taste , texture, smell and appearance of the dish.	• To adapt a traditional recipe understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • To write an amended method for a recipe to incorporate the relevant changes to ingredients. • To design appealing packaging to reflect a recipe.
	Make		• To chop fruits and vegetables safely to make a smoothie. • To identify if a food is a fruit or a vegetable. • To know where and how fruits and vegetables grow.	• To slice food safely using the bridge or claw grip. • To construct a wrap that meets a design brief.	• To know how to prepare themselves and a workspace to cook safely in, learning the basic rules to avoid food contamination.	• To cut and prepare vegetables safely. • To use equipment safely, including knives, hot pans and hobs. • To know how to avoid cross-contamination. • To follow a step by step method carefully to make a recipe.
	Evaluate		• To taste and evaluate different food combinations.	• To describe the taste, texture, and smell of fruit and vegetables. • To taste test food	• To establish and use design criteria to help test and review dishes.	• To identify the nutritional differences between different products and recipes.

			• To describe appearance, smell and taste. • To suggest information to be included on packaging.	combinations and final products. • To describe the information that should be included on a label. • To evaluate which grip was most effective.	• To describe the benefits of seasonal fruits and vegetables and the impact on the environment. • To suggest points for improvement when making a seasonal tart.	• To identify and describe healthy benefits of food groups.
Knowledge	Technical		• To understand the difference between fruits and vegetables. • To understand that some foods typically known as vegetables are actually fruits. • 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 a plant.	• To know that diet means the food and drink that a person or animal usually eats. • To understand what makes a balanced diet. • To know where to find the nutritional information on packaging. • To know that the five main food groups are: carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To understand that a person should eat a range of different foods from each food group, and roughly how much of each food group. • To know that nutrients are substances in food that all living things need to make energy, grow and develop. • To know that ingredients means the items in a mixture or recipe. • To know that a person should only have a maximum of five teaspoons of sugar a day to stay healthy. • To know that many foods and drinks we do not expect to contain sugar do, we call these hidden sugars.	• 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.	• 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 calendar to see how healthy a food option is. • To understand 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.

Electrical Systems		**Year 3/4 Cycle A**	**Year 5/6 Cycle A**
		Torches	Doodlers
Skills	Design	• To design a product giving consideration to the target audience and create both design and success criteria focusing on features of individual design ideas.	• To identify factors that could be changed on existing products and explain how these would alter the form and function of the product. • To develop design criteria based on findings from investigating existing products. • To develop design criteria that clarifies the target user.
	Make	• To make a product with a working electrical circuit and switch. • To use appropriate equipment to cut and attach materials. • To assemble a torch according to the design and success criteria.	• To alter a procuts form and function by tinkering with its configuration. • To make a functional series circuit incorporating a motor. • To construct a product with consideration for the design criteria. • To break down the construction process into steps so that others can make the product.
	Evaluate	• To evaluate electrical products. • To test and evaluate the success of a final product.	• To carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. • To determine which parts of a product affect its function and which parts affect its form. • To analyse whether changes in configurations positively or negatively affect an existing product. • To peer evaluate a set of instructions to build a product.
Knowledge	Technical	• To understand that electrical conductors are materials which electricity can pass through. • To understand that electrical insulators are materials which electricity cannot pass through. • To know that a battery contains stored electricity that can be used to power products. • To know that an electrical circuit must be complete for electricity flow. • To know that a switch can be used to complete and break an electrical circuit.	• To know that series circuits only have one direction for the electricity to flow. • To know when there is a break in a series circuit, all components turn off. • To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. • To know a motorised product is one which uses a motor to function.
	Additional	• To know the features of an electrical product e.g. torch. • To know facts from the history and invention of the electric light bulb.	• To know that product analysis is critiquing the strengths and weaknesses of a product. • To know that 'configuration' means how the parts of a product are arranged.