Design Technology

Toton Bispham Drive Junior School
Ad esse optimum

	KS1	Year 3	Year 4	Year 5	Year 6	KS3
	CONCEPTUAL					
STRUCTURES	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 know what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own. To know that a pavilion is a decorative building or structure for leisure activities. To know that cladding can be applied to structures for different effects. To know that aesthetics are how a product looks. To know that a product's function means its purpose. To know that the target audience means the person or group of people a product is designed for. To know that architects consider light, shadow and patterns when designing		To know that structures can be strengthened by manipulating materials and shapes. To know what a 'footprint plan' is. To know 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.	To understand and use the properties of materials and the performance of structural elements to achieve functioning solutions
	PROCEDURAL					
	To be able to generate and communicate ideas using sketching and modelling.		To be able to design a stable structure that is aesthetically pleasing and selecting materials to create a desired effect. To be able to describe what characteristics of a design and		To be able to draw upon new and prior knowledge to build a range of structures	

	To be able to make a structure according to design criteria. To be able to create joints and structures from paper/card and tape. To be able to build a strong and stiff structure by folding paper. To be able to test the strength of own structure, identifying the weakest part of a structure. To be able to evaluate the strength, stiffness and stability of own structure		construction made it the most effective. To be able to consider effective and ineffective designs To be able to reinforce corners to strengthen a structure. To be able to build frame structures designed to support weight. To be able to create a range of different shaped frame structures. To be able to make a variety of free standing frame structures of different shapes and sizes. To be able to create a design in accordance with a plan. To be able to create different textural effects with materials To be able to evaluate structures made by the class.		To be able to evaluate effective and ineffective designs. To be able to consider the purpose of different structures To be able to design a cityscape with a variety of To be able to use CAD to design a footprint (Sketch Up) To be able to measure, mark and cut wood to create a range of structures. To be able to use a range of materials to reinforce and add decoration to structures. To be able to improve a design plan based on peer evaluation. To be able to test and adapt a design to improve it as it is developed. To be able to identify what makes a successful structure	
			Activity Ideas Greek Pavilion		**Activity Ideas** Mayan city Variety of different temple types to create a cityscape Accurate replica of a Mayan Temples - links to History Air raid shelters - WW2 Design Bletchley Park - WW2	

MECHANISMS	CONCEPTUAL					
	To know that different materials have different properties and are therefore suitable for different uses. To know that it is important to test my design as I go along so that I can solve any problems that may occur. To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. To know that there is always an input and output in a mechanism. To know that an input is the energy that is used to start something working. To know that an output is the movement that happens as a result of the input. To know that a lever is something that turns on a pivot. To know that a linkage mechanism is made up of a series of levers. To know some real-life objects that contain mechanisms.	To know 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 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 how linkages change the direction of a force. To know that cross-sectional diagrams can show the inner-workings of a design. To know that the mechanism in an automata uses a system of cams, axles and followers. To know that different shaped cams produce different outputs. To know that an automata is a hand-powered mechanical toy. To know that a triangular structure strengthens and reinforces		To know and understand how more advanced mechanical systems used in their products enable changes in movement and force

	PROCEDURAL					
	To be able to select a suitable linkage system to produce the desired motion. To be able to design a wheel, selecting materials according to their characteristics. To be able to follow a design brief evaluating different designs. To be able to test and adapt a design To be able to create a class design criteria for a moving monster. To be able to design a moving monster for a specific audience in accordance with a design criteria. To be able to make linkages using card for levers and split pins for pivots. To be able to experiment with linkages adjusting the widths, lengths and thicknesses of card used. To be able to cut and assemble components neatly To be able to evaluate designs against design criteria using peer feedback to modify a final design	To be able to create a design which uses a pneumatic system. To be able to develop design criteria from a design brief. To be able to generate ideas using thumbnail sketches and exploded diagrams. To be able to create a pneumatic system encased in a structure To be able to select materials due to their functional and aesthetic characteristics. To be able to manipulate materials to create different effects by cutting, creasing, folding and weaving. To be able to use the views of others to improve designs, including testing and modifying outcomes	.	To be able to experiment with a range of cams, considering the design and desired movement To be able to measure, mark and cut components (including wood) accurately To be able to assemble components accurately to make a stable frame. To be able to use a glue gun safely. To be able to build a wooden box structure. To be able to select appropriate tools and equipment for particular tasks. To be able to use the correct techniques to saw safely. To be able to create exploded-diagrams to detail their design. To be able to select appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set. To be able to evaluate the work of others and receiving feedback on own work. To be able to apply points of improvement to their product		

				To be able to explain what they would do if they were to do the project again.		
		Activity Ideas Diorama - recycled materials Water scene - moving fish or fish with moving mouth		**Activity Ideas** Space scene - astronauts and rocket Moving planets		

ELECTRICAL SYSTEMS						
	CONCEPTUAL					
	N/A	N/A	To know that an electrical circuit must be complete for electricity to flow. To know that a switch can be used to complete and break an electrical circuit. To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.		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 the diagram perspectives 'top view', 'side view' and 'back'	To know and 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]
	PROCEDURAL					
	N/A	N/A	To be able to design a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. To be able to make a torch with a working electrical circuit and switch To be able to use appropriate equipment to cut and attach materials. To be able to assemble a torch according to the design and success criteria. To be able to evaluate electrical products. To be able to test and evaluate the success of a final product.		To be able to design a steady hand game - identifying and naming the components required. To be able to draw a design from three different perspectives. To be able to generate ideas through sketching and discussion. To be able to model ideas through prototypes. To be able to construct a stable base for a game. To be able to accurately cut, fold and assemble a net. To be able to decorate the base of the game to a high quality finish.	

					To be able to make and test a circuit. To be able to incorporate a circuit into a base To be able to test own and others finished games. To be able to identify what went well and make suggestions for improvement.	

COOKING & NUTRITION	CONCEPTUAL					
	To know that 'diet' means the food and drink that a person or animal usually eats. To know 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 know I 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 I should only have a maximum of five teaspoons of sugar a day to stay healthy. • To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'.		To know that the amount of an ingredient in a recipe is known as the 'quantity.' To know that it is important to use oven gloves when removing hot food from an oven. To know the following cooking techniques: sieving, creaming, rubbing method, cooling. To know and understand the importance of budgeting while planning ingredients for a recipe (biscuits)		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 know that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. To know what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).	To know and understand and apply the principles of nutrition and health To understand the source, seasonality and characteristics of a broad range of ingredients.

	PROCEDURAL					
	To be able to design a healthy wrap based on a food combination which works well together. To be able to slice food safely using the bridge or claw grip., constructing a wrap that meets a design brief. To be able to describe the taste, texture and smell of fruit and vegetables. To be able to taste test food combinations and final products. To be able to describe the information that should be included on a label. To be able to evaluate which grip was most effective.		To be able to design a dish (biscuits) within a given budget, drawing upon previous taste testing judgements. To be able to follow a baking recipe, from start to finish, including the preparation of ingredients. To be able to cook safely, following basic hygiene rules. To be able to adapt a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet). To be able to evaluate a recipe, considering: taste, smell, texture and appearance. To be able to describe the impact of the budget on the selection of ingredients. To be able to evaluate and compare a range of food products. To be able to suggest 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 be able to write a recipe, explaining the key steps, method and ingredients, including facts and drawings from research undertaken. To be able to follow a recipe, including using the correct quantities of each ingredient. To be able to adapt a recipe based on research. To be able to work to a given timescale and work safely and hygienically with independence To be able to evaluate a recipe, considering: taste, smell, texture and origin of the food group. To be able to taste test and score final products. To be able to suggest and write up points of improvements when scoring others' dishes, and when evaluating own throughout the planning, preparation and cooking process. To be able to evaluate health and safety in production to minimise cross contamination	To be able 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]

TEXTILES						
	CONCEPTUAL					
	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 used to protect my fingers when sewing.	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 the proportions of individual components. To know that a blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. To know that textile products are often made by creating different parts and then attaching them together to create a product To know that small, neat stitches which are pulled taut are important to ensure that the seams are strong and hold securely. To know that it is easier to finish simpler designs to a high standard.	N/A	
	PROCEDURAL					
	To be able to select and cut fabrics for sewing. To be able to decorate a pouch using fabric glue or running stitch. To be able to thread a needle. To be able to sew running stitch, with evenly spaced,	To be able to design and make a template from an existing cushion and applying individual design criteria. To be able to follow design criteria to create a cushion or Egyptian collar. To be able to select and cut fabrics with ease using fabric scissors.		To be able to design the main component shapes required and creating an appropriate template. To be able to create a textile product e.g a stocking with decoration and embellishments (sequins, buttons etc) from a 2D design.		

	neat, even stitches to join fabric. To be able to neatly pin and cut fabric using a template. To be able to troubleshoot scenarios posed by teacher. To be able to evaluate the quality of the stitching on others' work. To be able to discuss as a class, the success of their stitching against the success criteria. To be able to identify aspects of peers' work that they particularly like and why.	To be able to thread needles with greater independence. To be able to tie knots with greater independence. To be able to sew cross stitch to join fabric. To be able to decorate fabric using appliqué. To be able to complete design ideas with stuffing and sewing the edges (Cushions) or embellishing the collars based on design ideas (Egyptian collars). To be able to evaluate an end product and think of other ways in which to create similar items		To be able to measure, mark and cut fabric accurately and independently. To be able to create strong and secure blanket stitches when joining fabric. To be able to thread needles independently. To be able to use appliqué to attach pieces of fabric decoration. To be able to sew a range of stitches, including some for decoration. To be able to apply blanket stitch so the spaces between the stitches are even and regular. To be able to test and evaluate product and give points for further improvements.		
		Activity Ideas Egyptian collar Cross stitch		**Activity Ideas** Christmas stocking - with applique, decorations - sequins, buttons, beads, bells etc... with hanging		

DIGITAL WORLD						
	CONCEPTUAL					
		To know 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 know that CAD stands for 'Computer-aided design'. To know what a focus group is by taking part in one.		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 know that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met. To know what a virtual model is and the pros and cons of traditional vs CAD modelling.		To know how 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].
	PROCEDURAL					
		To be able to understand what is meant by 'point of sale display.' To be able to problem solve by suggesting potential features on a micro:bit and justifying my ideas. To be able to analyse and evaluate an existing product. To be able to draw and manipulate 2D shapes, using		To be able to develop design criteria based on research. To be able to understand what a virtual model is and the pros and cons of traditional and CAD modelling. To be able to place and manoeuvre 3D objects, using CAD. To be able to change the properties of, or combining one or more 3D objects, using CAD		

		computer-aided design to produce a point of sale badge. To be able to write a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm. To be able to develop design ideas through annotated sketches to create a product concept. To be able to develop a design criteria to respond to a design brief. To be able to follow a list of design requirements. To be able to use feedback from peers to improve a design.		To be able to explain key functions in my program (audible alert, visuals).		
		Activity Ideas Pedometer Heart monitor Fitbit style		**Activity Ideas** Rocket count down Tick-tack-toe game Animal tracker		

Key:

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