Progression in Design and Technology

	Skills and Knowledge		Structures	Mechanical Systems	Textiles	Cooking and nutrition
YEAR 1	Skills	Design	**Constructing a Windmill** • Learning the importance of a clear design criteria • Including individual preferences and requirements in a design	**Making a Moving Story Book** • Explaining how to adapt mechanisms, using bridges or guides to control the movement • Designing a moving story book for a given audience	**Puppets** • Using a template to create a design for a puppet	
		Make	• Making stable structures from card, tape and glue • Learning how to turn 2D nets into 3D structures • 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	• Following a design to create moving models that use levers and sliders	• Cutting fabric neatly with scissors • Using joining methods to decorate a puppet • Sequencing steps for construction	
		Evaluate	N/A	• Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed • Reviewing the success of a product by testing it with its intended audience	• Reflecting on a finished product, explaining likes and dislikes	
	Knowledge	Technical	• To understand that the shape of materials can be changed to improve the strength and stiffness of structures • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses) • To understand that axles are used in structures and mechanisms to make parts turn in a circle • To begin to understand that different structures are used for different purposes • To know that a structure is something that has been made and put together	• 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 the slider	• To know that ‘joining technique’ means connecting two pieces of material together • To know that there are various temporary methods of joining fabric by using staples. glue or pins • To understand that different techniques for joining materials can be used for different purposes • To understand that a template (or fabric pattern) is used to cut out the same shape multiple times • To know that drawing a design idea is useful to see how an idea will look	
		Additional	• To know that a client is the person I am designing for • To know that design criteria is a list of points to ensure the product meets the client’s needs and wants • To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity • To know that windmill turbines use wind to turn and make the machines inside work • To know that a windmill is a structure with sails that are moved by the wind • To know the three main parts of a windmill are the turbine, axle and structure	• To know that in Design and technology we call a plan a ‘design’		

Progression in Design and Technology

	Skills and Knowledge		Structures	Mechanical Systems	Textiles	Cooking and nutrition	
YEAR 2	Skills	Design	**Baby Bear's Chair** • Generating and communicating ideas using sketching and modelling • Learning about different types of structures, found in the natural world and in everyday objects	**Fairground Wheel** • Selecting a suitable linkage system to produce the desired motions • Designing a wheel Selecting appropriate materials based on their properties		**A Balanced Diet** • Designing a healthy wrap based on a food combination which work well together	
		Make	• Making a structure according to design criteria • Creating joints and structures from paper/card and tape • Building a strong and stiff structure by folding paper	• Selecting materials according to their characteristics • Following a design brief		• Slicing food safely using the bridge or claw grip • Constructing a wrap that meets a design brief	
		Evaluate	• Exploring the features of structures • Comparing the stability of different shapes • Testing the strength of own structures • Identifying the weakest part of a structure • Evaluating the strength, stiffness and stability of own structure	• Evaluating different designs • Testing and adapting a design		• 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	
	Knowledge	Technical	• To know that shapes and structures with wide, flat bases or legs are the most stable • To understand that 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 know that different materials have different properties and are therefore suitable for different uses		Cooking and Nutrition	• 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 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'
		Additional	• To know that natural structures are those found in nature • To know that man-made structures are those made by people	• To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder • To know that it is important to test my design as I go along so that I can solve any problems that may occur			

Progression in Design and Technology

	Skills and Knowledge		Structures	Mechanical Systems	Textiles	Cooking and nutrition
YEAR 3	Skills	Design	**Constructing a Castle** • 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	**Pneumatic Toys** • Designing a toy which uses a pneumatic system • Developing design criteria from a design brief • Generating ideas using thumbnail sketches and exploded diagrams • Learning that different types of drawings are used in design to explain ideas clearly	**Cushions** • Designing and making a template from an existing cushion and applying individual design criteria	
		Make	• Constructing a range of 3D geometric shapes using nets • Creating special features for individual designs • Making facades from a range of recycled materials	• Creating a pneumatic system to create a desired motion • Building secure housing for a pneumatic system • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy • Selecting materials due to their functional and aesthetic characteristics • Manipulating materials to create different effects by cutting, creasing, folding, weaving	• Following design criteria to create a cushion • 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	
		Evaluate	• 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	• Using the views of others to improve designs • Testing and modifying the outcome, suggesting improvements • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client	• Evaluating an end product and thinking of other ways in which to create similar items	
	Knowledge	Technical	• To understand that wide and flat based objects are more stable • To understand the importance of strength and stiffness in structures	• 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 applique is a way of mending or decorating a textile by applying smaller pieces of fabric •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	
		Additional	• To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose • 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 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		

Progression in Design and Technology

	Skills and Knowledge		Structures	Mechanical Systems	Textiles	Cooking and nutrition
YEAR 4	Skills	Design	**Pavilions** • Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect • Building frame structures designed to support weight	**Making a Slingshot Car** • 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		**Adapting a Recipe** • Designing a biscuit within a given budget, drawing upon previous taste testing
		Make	• 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		• Following a baking recipe • Cooking safely, following basic hygiene rules • Adapting a recipe
		Evaluate	• 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		• Evaluating a recipe, considering: taste, smell, texture and appearance • Describing the impact of the budget on the selection of ingredients • Evaluating and comparing a range of products • Suggesting modifications
	Knowledge	Technical	• To understand what a frame structure is • To know that a 'free-standing' structure is one which can stand on its own	• 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.		Cooking and Nutrition 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 understand the importance of budgeting while planning ingredients for biscuits
		Additional	• To know that a pavilions ia 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 understand 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 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.		

Progression in Design and Technology

	Skills and Knowledge		Structures	Mechanical Systems	Textiles	Cooking and nutrition
YEAR 5	Skills	Design	**Bridges** • Designing a stable structure that is able to support weight • Creating frame structure with focus on triangulation	**Making a Pop-up Book** • 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	**Stuffed Toys** • Designing a stuffed toy considering the main component shapes required and creating an appropriate template • Considering the proportions of individual components	
		Make	• Making a range of different shaped beam bridges • Using triangles to create truss bridges that span a given distance and supports a load • Building a wooden bridge structure • Independently measuring and marking wood accurately • Selecting appropriate tools and equipment for particular tasks • Using the correct techniques to saws safely • Identifying where a structure needs reinforcement and using card corners for support • Explaining why selecting appropriating materials is an important part of the design process • Understanding basic wood functional properties	• 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	• 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 applique to attach pieces of fabric decoration • Sewing blanket stitch to join fabric • Applying blanket stitch so the space between the stitches are even and regular	
		Evaluate	• Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary • Suggesting points for improvements for own bridges and those designed by others	• Evaluating the work of others and receiving feedback on own work • Suggesting points for improvement	• Testing and evaluating an end product and giving point for further improvements	
	Knowledge	Technical	• To understand some different ways to reinforce structures • To understand how triangles can be used to reinforce bridges • To know that properties are words that describe the form and function of materials • To understand why material selection is important based on their properties • To understand the material (functional and aesthetic) properties of wood	• To know that mechanisms control movement • To understand that mechanisms that 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 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	
		Additional	• To understand the difference between arch, beam, truss and suspension bridges • To understand how to carry and use a saw safely	• 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		

Progression in Design and Technology

	Skills and Knowledge		Structures	Mechanical Systems	Textiles	Cooking and nutrition	
YEAR 6	Skills	Design	**Playgrounds** • Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs	**Automata Toys** •Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement • Understanding how linkages change the direction of a force • Making things move at the same time • Understanding and drawing cross-sectional diagrams to show the inner-working		**Come Dine with Me** • Writing a recipe, explaining the key steps, method and ingredients • Including facts and drawings from research undertaken	
		Make	• 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	• Measuring, marking and checking the accuracy of the jelutong and dowel pieces required • Measuring, marking and cutting components accurately using a ruler and scissors • Assembling components accurately to make a stable frame • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set		• 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	
		Evaluate	• 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	• Evaluating the work of others and receiving feedback on own work • Applying points of improvements • Describing changes they would make/do if they were to do the project again		• 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	
	Knowledge	Technical	• To know that structures can be strengthened by manipulating materials and shapes	• 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		Cooking and Nutrition	• 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 understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides • To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork)
		Additional	• 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	• 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 and saw safely • To know that a set square can be used to help mark 90° angles			