Vine Tree Primary School Progression Document 

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| Progression in Design and Technology – *Structures* | | | | | | | |
|  | **Reception – ELG, Expressive Arts and Design / Physical Development** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
|  |  | **Constructing a windmill** | **Baby bear’s chair** | **Constructing a castle** | **Pavillions** | **Bridges** | **Playgrounds** |
| **Design** |  | • Learning the importance of a clear design criteria • Including individual preferences and requirements in a design | • Generating and communicating ideas using sketching and modelling | • 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 | • 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 stable structure that is able to support weight  • Creating frame structure with focus on triangulation | • Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs |
| **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 | • 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 | • 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 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 | • 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 | • 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 |
| **Evaluate** |  | • 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 | • Testing the strength of own structures  • Identifying the weakest part of a structure  • Evaluating the strength, stiffness and stability of own structure | • 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 | • Evaluating structures made by the class  • Describing what characteristics of a design and construction made it the most effective  • Considering effective and ineffective designs | • 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 | • 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 |
| **Technical Knowledge** |  | • 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 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 understand what a frame structure is  • To know that a ‘free-standing’ structure is one which can stand on its own | • 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 structures can be strengthened by manipulating materials and shapes |

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| Progression in Design and Technology – *Mechanisms* | | | | | | | |
|  | **Reception – ELG, Expressive Arts and Design / Physical Development** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
|  |  | **Moving storybook** | **Making a moving monster** | **Pneumatic toys** | **Making a slingshot car** | **Pop up book** | **Automata toys** |
| **Design** |  | • Explaining how to adapt mechanisms, using bridges or guides to control the movement.  • Designing a moving story book for a given audience | • Creating a class design criteria for a moving monster.  • Designing a moving monster for a specific audience in accordance with a design criteria. | • 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. | • 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. | • 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. | •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-workings of my design. |
| **Make** |  | • Following a design to create moving models that use levers and sliders. | • 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. | • 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 and weaving. | • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. | • 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. | • 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. |
| **Evaluate** |  | • 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. | • Evaluating own designs against design criteria.  • Using peer feedback to modify a final design. | • 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 the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance. |  | • Evaluating the work of others and receiving feedback on own work.  • Applying points of improvement to their toys.  • Describing changes they would make/do if they were to do the project again. |
| **Technical Knowledge** |  | • 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 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 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 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. | • 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. • Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria. |

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| Progression in Design and Technology – *Cooking and Nutrition* | | | | | | | |
|  | **Reception – ELG, Expressive Arts and Design / Physical Development** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
|  |  | **Fruit and Vegetables** | **A balanced diet** | **Eating Seasonally** | **Adapting a recipe** | **What could be healthier?** | **Come dine with me** |
| **Design** |  | • Designing smoothie carton packaging by-hand or on ICT software. | • Designing a healthy wrap based on a food combination which works well together. | • Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish. | • Designing a biscuit within a given budget, drawing upon previous taste testing judgements. | • 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. | • Writing a recipe, explaining the key steps, method and ingredients.  • Including facts and drawings from research undertaken. |
| **Make** |  | • 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. | • Slicing food safely using the bridge or claw grip.  • Constructing a wrap that meets a design brief. | • 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. | • Following a baking recipe, from start to finish, including the preparation of ingredients.  • Cooking safely, following basic hygiene rules.  • Adapting a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet). | • 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. | • 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** |  | • Tasting and evaluating different food combinations.  • Describing appearance, smell and taste.  • Suggesting information to be included on packaging | • 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. | • 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. | • 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 food products.  • Suggesting 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). | • Identifying the nutritional differences between different products and recipes.  • Identifying and describing healthy benefits of food groups. | • 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 when scoring others’ dishes, and when evaluating their own throughout the planning, preparation and cooking process.  • Evaluating health and safety in production to minimise cross contamination. |
| **Cooking and Nutrition** |  | • Understanding the difference between fruits and vegetables  • To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber).  • 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 the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber) | • 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’. | • 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 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. | • 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 calculator to see how healthy a food option is.  • To understand that ‘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. | • 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). |

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| Progression in Design and Technology – *Textiles* | | | | | | | |
|  | **Reception – ELG, Expressive Arts and Design / Physical Development** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
|  |  | **Puppets** | **Pouches** | Cross-stitch and appliqué  **Cushions or Egyptian collars** | **Fastenings** |  | |
| **Design** |  | • Using a template to create a design for a puppet. | • Designing a pouch. | • Designing and making a template from an existing cushion and applying individual design criteria. | • Writing design criteria for a product, articulating decisions made.  • Designing a personalised book sleeve. |
| **Make** |  | • Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet.  • Sequencing the steps taken during construction. | • Selecting and cutting fabrics for sewing.  • Decorating a pouch using fabric glue or running stitch.  • Threading a needle.  • Sewing running stitch, with evenly spaced, neat, even stitches to join fabric.  • Neatly pinning and cutting fabric using a template. | • Following design criteria to create a cushion or Egyptian collar.  • 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 (Cushions) or embellishing the collars based on design ideas (Egyptian collars). | • 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 by sewing small, straight stitches.  • Incorporating fastening to a design. |
| **Evaluate** |  | • Reflecting on a finished product, explaining likes and dislikes. | • Troubleshooting scenarios posed by teacher. | • Evaluating an end product and thinking of other ways in which to create similar items. | • 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.  • Articulating the advantages and disadvantages of different fastening types. |
| **Knowledge** |  | • 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. | • 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 that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro.  • To know that different fastening types are useful for different purposes. • To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions. |

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| Progression in Design and Technology – *Electrical systems* | | | | | | | |
|  | **Reception – ELG, Expressive Arts and Design / Physical Development** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
|  |  | | | | **Torches** | **Doodlers** | **Steady hand game** |
| **Design** | • Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. | • Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product.  • Developing design criteria based on findings from investigating existing products.  • Developing design criteria that clarifies the target user. | • 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. |
| **Make** | • 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. | • Altering a product’s form and function by tinkering with its configuration.  • Making a functional series circuit, incorporating a motor.  • Constructing a product with consideration for the design criteria. | • 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. |
| **Evaluate** | • Evaluating electrical products. • Testing and evaluating the success of a final product. | • Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses.  • Determining which parts of a product affect its function and which parts affect its form.  • Analysing whether changes in configuration positively or negatively affect an existing product. | • Testing own and others finished games, identifying what went well and making suggestions for improvement. |
| **Technical Knowledge** | • 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 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. | • 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. |

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| Progression in Design and Technology – | | | | | | | |
|  | **Reception – ELG, Expressive Arts and Design / Physical Development** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
|  |  | | | **Electronic Charm** |  | **Monitoring Devices** | **Navigating the world** |
| **Design** | • 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. | • 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 combining one or more 3D objects, using CAD | • 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 combining one or more 3D objects, using CAD |
| **Make** | • 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. | • Understanding the functional and aesthetic properties of plastics.  • Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range. | • Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo).  • Explaining material choices and why they were chosen as part of a product concept.  • Programming an N,E, S, W cardinal compass. |
| **Evaluate** | • Analysing and evaluating an existing product.  • Identifying the key features of a pouch. | • 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. • Explaining key functions in my program (audible alert, visuals).  • Explaining how my product would be useful for an animal carer including programmed features. | • 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 explaining why.  • Describing how the product concept fits the client’s request and how it will benefit the customers.  • 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 pitch. |
| **Technical Knowledge** | • To understand 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 ‘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 understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met. | • To know that accelerometers can detect movement.  • To understand that sensors can be useful in products as they mean the product can function without human input. |