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. |