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| Ringway Primary School  Progression Grid  Design Technology | | | | | | | |
| **Design**  **Make**  **Evaluate**   **Knowledge** | | | | | | | |
|  | Reception | Key Stage 1 | | Key Stage 2 | | | |
| NC Objectives | ELG  Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.  Share their creations, explaining the process they have used.  Use a range of small tools, including scissors, paintbrushes and cutlery. | Design purposeful, functional, appealing products for themselves and other users based on design criteria  Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and where appropriate, information and communication technology.  Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing)  Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.  Explore and evaluate a range of existing products  Evaluate their ideas and products against design criteria  Build structures, exploring how they can be made stronger, stiffer and more stable.  Explore and use mechanisms (for example, levers, sliders, wheels and axels) in their products. | | Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups  Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design  Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately  Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities  Investigate and analyse a range of existing products  Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work  Understand how key events and individuals in design and technology have helped shape the world.  Apply their understanding of how to strengthen, stiffen and reinforce more complex structures  Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]  Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]  Apply their understanding of computing to program, monitor and control their products | | | |
|  | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Structures | Making verbal plans and material choices.  Developing a junk model.  Improving fine motor/scissor skills with a variety of materials. Joining materials in a variety of ways (temporary and permanent). Joining different materials together. Describing their junk model, and how they intend to put it together.  Giving a verbal evaluation of their own and others’ junk models with adult support. Checking to see if their model matches their plan. Considering what they would do differently if they were to do it again. Describing their favourite and least favourite part of their model.  To know there are a range to different materials that can be used to make a model and that they are all slightly different. Making simple suggestions to fix their junk model. | Learning the importance of a clear design criteria.  Including individual preferences and requirements in a design  Making stable structures from card, tape and glue.  Learning how to turn 2D shapes into 3D structures.  Following instructions to cut and assemble supporting structures.  Making functioning parts which are assembled into the main supporting structure.  Testing the strength of their structure.  Identifying the weaknesses and strengths of their own structure.  To understand that the shape of materials can be changed to improve the strength and stiffness of structures.  To understand that axels are used in structures and mechanisms to make parts turn in a cycle.  To know that a structure is something that has been made and put together. | Generating and communicating ideas using sketching and modelling.  Learning about different types of structures, found in the natural world and in everyday objects.  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.  Exploring the features of structures.  Comparing the stability of different shapes.  Testing the strength of their structure.  Identifying the weaknesses and strengths of their own structure.  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. | Designing a product with key features to appeal to a specific person/purpose.  Drawing and labelling their design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours.  Constructing 3D geometric shapes.  Making facades.  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.  To understand that wide and flat based objects are more stable.  To understand the importance of strength and stiffness in structures.  To know that a façade is the front of a structure.  To know that a design specification is a list of success criteria for a product. | Designing a stable structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight.  Creating a range of different shaped frame structures. 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.  Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs.  To understand what a frame structure is.  To know that a ‘free-standing’ structure is one which can stand on its own.  To know that aesthetics is how a product looks.  To know that a product’s function means its purpose. | Designing a stable structure that is able to support weight.  Creating frame structure with focus on triangulation.  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 bridge structure using thick card.  Independently measuring and marking card accurately.  Selecting appropriate equipment for particular tasks.  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.  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.  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 understand the difference between arch, beam, truss and suspension bridges. | Designing a playground featuring a variety of different structures, considering how the structures will be used, considering effective and ineffective designs.  Building a range of play apparatus structures drawing upon new and prior knowledge of structures.  Measuring and marking to create a range of structures.  Using a range of materials to reinforce and add decoration to structures.  To select a design plan based on peer evaluation.  Identifying what makes a successful structure.  To know that structures can be strengthened by manipulating materials and shapes.  To understand what a 'footprint plan' is.  To know that a prototype is a cheap model to test a design idea. |
| Mechanisms/Mechanical systems |  | Exploring how to adapt mechanisms, using guides to control the movement.  Creating clearly labelled drawings which illustrate movement.  Following their own design to create moving models that use levers and sliders.  Adapting their mechanisms.  Testing their finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed.  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 wheels need to be round to rotate and move, and to understand that in order for the wheel to move it must be attached to a rotating axle. | Selecting a suitable linkage system to produce the desired motions.  Selecting appropriate materials based on their properties.  Designing their product for a specific audience in accordance with a design criteria.  Selecting materials according to their characteristics.  Following a design brief.  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.  Evaluating different designs.  Testing and adapting a design.  Evaluating own designs against design criteria.  Using peer feedback to modify a final design.  To know that different materials have different properties and are therefore suitable for different uses.  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. | Designing a product 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.  Creating a pneumatic system to create a desired motion.  Using balloons to create different types of pneumatic systems to make a functional and appealing pneumatic product.  Using materials due to their functional and aesthetic characteristics.  Manipulating materials to create different effects by cutting, creasing, folding, weaving.  Using the views of others to improve designs.  Testing and modifying the outcome, suggesting improvements.  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 understand how sketches, drawings and diagrams can be used to communicate design ideas. | 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.  Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design.  Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.  To understand that all moving things have kinetic energy and 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 and to understand that the shape of a moving object will affect how it moves due to air resistance. 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) | Designing a pop-up book which uses a mixture of structures and mechanisms.  Taming each mechanism, input and output accurately.  Storyboarding ideas for a book.  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.  Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement.  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. | Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement.  Making things move at the same time.  Understanding and drawing cross-sectional diagrams to show the inner-working.  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.  Evaluating the work of others and receiving feedback on own work.  Describing changes they would make/do if they were to do the project again.  To understand that the mechanism in an automata uses a system of cams, axles and followers.  To know that an automata is a hand powered mechanical toy. |
| Textiles | To explore a range of small tools, such as scissors and glue.  To explore a variety of materials and experimenting with design, colour, texture and function. | To use a template to create a design.  Cutting fabric neatly with scissors.  Using joining methods to decorate their product.  Sequencing steps for construction.  Reflecting on their finished product, explaining their likes and dislikes.  To know that ‘joining techniques’ are joining two pieces of materials together and that there are various temporary methods.  To understand that a template is used to cut out the same shape multiple times.  To know that drawing a design is useful to see how an idea will look. | To design a pouch.  Selecting and cutting fabrics for sewing.  Decorating a pouch using fabric glue.  Threading a needle.  Sewing running stitch, with evenly spaced, neat, even stitches to join fabric.  Neatly pinning and cutting fabric using a template.  Discussing as a class, the success of their stitching against the success criteria.  Identifying aspects of their peers’ work that they particularly like and why.  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. | Develop a sampler showing different stitches, such as running stitch and cross stitch.  Threading needles with greater independence.  Tying knots with greater independence.  Sewing cross stitch.  Decorating fabric.  Evaluating an end product and thinking of other ways in which to create similar items.  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 before beginning the stitch. | Writing design criteria for a product, articulating decisions made.  Designing a personalised bookmark.  Making and testing a paper template with accuracy and in keeping with the design criteria.  Selecting different forms of cross-stitch to embroider a bookmark.  Deciding how many of the criteria should be met for the product to be considered successful. Suggesting modifications for improvement.  To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions. | Designing a stuffed toy considering the main component shapes required and creating an appropriate template.  Considering the proportions of individual components.  Creating a 3D stuffed toy from a 2D design. Measuring, marking and cutting fabric accurately, with support if needed.  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.  Testing and evaluating an end product and giving point for further improvements.  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. | Designing a product in accordance to specification linked to set of design criteria to fit a specific theme.  Using a template when pinning panels onto fabric.  Marking and cutting fabric accurately, in accordance with a design.  Sewing a strong running stitch, making small, neat stitches and following the edge. Tying strong knots.  Decorating the product -attaching objects using thread and adding a secure fastening.  Sewing accurately with even regularity of stitches.  Evaluating work continually as it is created.  To know that using a template helps to accurately mark out a design on fabric. |
|  | ELG | Key Stage 1 | | Key Stage 2 | | | |
| Cooking and Nutrition  NC Objectives | Use cutlery safely.  Manage their own basic hygiene and personal needs, including the importance of healthy food choices. | Use the basic principles of a healthy and varied diet to prepare dishes  Understand where food comes from | | Understand and apply the principles of a healthy diet.  Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.  Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. | | | |
|  | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Cooking and Nutrition | Designing a soup recipe as a class. Designing soup packaging.  Chopping plasticine safely. Chopping vegetables with support.  Tasting the soup and giving opinions. Describing some of the following when tasting food: look, feel, smell and taste. Choosing their favourite packaging design and explaining why.  To know that soup is ingredients (usually vegetables and liquid) blended together.  To know that vegetables are grown.  To recognise and name some common vegetables.  To know that different vegetables taste different. To know that eating vegetables is good for us. To discuss why different packages might be used for different foods. | Designing a smoothie carton packaging by hand.  Identifying if a food is a fruit or a vegetable.  Learning where and how fruits and vegetables grow.  Tasting and evaluating different food combinations.  Suggesting information to be included on packaging.  Understanding the differences between fruits and vegetables.  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 design a healthy wrap based on a food combination which work well together.  Slicing food safely using the bridge or claw grip.  Constructing a wrap that meets a design brief.  To describe 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.  To know that ‘diet’ means the food and drink that a person usually eats and 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 you 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 you 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’. | Considering the taste, texture, smell and appearance of the dish.  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.  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.  To know that not all fruits and vegetables can be grown in the UK.  To know that imported food is food which has been brought into the country and that imported foods travel from far away and this can negatively impact the environment.  To know that exported food is food which has been sent to another country.  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 each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre and 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. | Designing a biscuit within a given budget, drawing upon previous taste testing.  Following a baking recipe.  Cooking safely, following basic hygiene rules. Adapting a recipe.  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.  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. | 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.  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.  Identifying the nutritional differences between different products and recipes. Identifying and describing healthy benefits of food groups.  To know that I can use a nutritional calculator to see how healthy a food option is. | writing a recipe, explaining the key steps, method and ingredients.  Following a recipe, including using the correct quantities of each ingredient.  Working safely and hygienically with independence.  Evaluating a recipe, considering: taste, smell, texture and origin of the food group.  Evaluating health and safety in production to minimise cross contamination.  To know that ‘flavour’ is how a food or drink tastes.  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. |
| Electrical Systems |  |  |  | Generate a final design for the electric poster.  Design an electric poster that fits the requirements of a given brief.  Plan the positioning of the bulb (circuit component) and its purpose.  Measure and mark materials out using a ruler.  Fit an electrical component (bulb).  Learn ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge).  Learning to give and accept constructive criticism on own work and the work of others.  Testing the success of initial ideas against the design criteria and justifying opinions.  To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit.  To understand common features of an electric product (switch, battery or plug, dials, buttons etc.).  To list examples of common electric products (kettle, remote control etc.).  To understand that an electric product uses an electrical system to work (function).  To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits **t**o understand how material choices (such as mounting paper to corrugated card) can improve a product to serve its purpose (remain rigid without bending when the electrical circuit is attached). | Designing a torch, considering the target audience and creating both design and success criteria focusing on features of individual design ideas.  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.  Evaluating electrical products.  Testing and evaluating the success of a final product.  To understand that electrical conductors are materials which electricity can pass through.  To understand that electrical insulators are materials which electricity cannot pass through.  To know that a battery contains stored electricity that can be used to power products.  To know that an electrical circuit must be complete for electricity to flow.  To know that a switch can be used to complete and break an electrical circuit. To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison. | Designing an electronic greetings card with a copper track circuit and components.  Creating a labelled circuit diagram showing positive and negative parts in relation to the LED and the battery.  Writing design criteria for an electronic greeting card.  Compiling a mood board relevant to my chosen theme, purpose and recipient.  Making a functional series circuit.  Creating an electronics greeting card, referring to a design criteria.  Mapping out where different components of the circuit will go.  Evaluating a peer’s product against design criteria and suggesting modifications that could be made to improve the reliability or aesthetics of it or to incorporate another type of circuit component.  Stating what Sir Rowland Hill invented and why it was important for greeting cards.  Analysing and evaluating a range of existing greeting cards.  To know the key components used to create a functioning circuit.  To know that copper is a conductor and can be used as part of a circuit.  To understand that breaks in a circuit will stop it from working.  To understand that a series circuit only has one path for the electrical current to flow from positive to negative.  To know that we use symbols to represent components in a circuit diagram.  To know the names of the components in a basic series circuit: crocodile wires, LED (light-emitting diode), battery holder, battery, cell.  To know that a mood board may include words, sketches, textures, colours, material samples etc. and can act as inspiration when designing. | Designing a steady hand game - identifying and naming the components required.  To draw their design.  Generating ideas through sketching and discussion.  Understanding the purpose of products (toys), including what is meant by ‘fit for purpose’ and ‘form over function’.  Having a stable base for a game.  Decorating the base of the game to a high-quality finish.  Making and testing a circuit Incorporating a circuit into a base.  Testing own and others finished games, identifying what went well and making suggestions for improvement.  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. |
| Digital World |  |  |  | Experimenting with and consolidating knowledge of different methods of Sphero programming.  Developing a programming sequence to tell a story.  Edit the programming sequence to improve accuracy.  To understand that algorithms can be used to affect the actions of a digital device. | Explore the functions of a Sphero.  Developing a prototype programme.  Evaluating my Sphero program against points on my design criteria and amending them to include any changes I made.  Documenting and evaluating my project.  Testing my program for bugs (errors in the code).  Finding and fixing the bugs (debug) in my code.  To understand what variables are in programming.  To know some of the features of a Sphero.  To know that an algorithm is a set of instructions to be followed by the computer. | Researching (books, internet) for a particular (user’s) animal’s needs.  Developing design criteria based on research.  Placing and maneuvering 3D objects.  Changing the properties of, or combine one or more 3D objects.  Explaining key functions in my program (audible alert, visuals) and explaining how my product would be useful for an animal carer including programmed features.  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 in programming are a set of rules which are followed if certain conditions are met.  To know the 6Rs of sustainability.  To understand what a virtual model is and the pros and cons of traditional vs CAD modelling. | Writing a design brief from information submitted by a client.  Developing design criteria to fulfil the client’s request.  Developing a product idea through annotated sketches.  Placing and maneuvering 3D objects, using CAD.  Changing the properties of, or combine one or more 3D objects, using CAD.  Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo).  Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.  Describing how the product concept fits the client’s request and how it will benefit the customers.  Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch.  To understand that sensors can be useful in products as they mean the product can function without human input. |
| Nursery | **Structures** – Make simple models which express their ideas, e.g. basic junk modelling.  Share their creations, explaining the process they have used.  **Textiles** –  Join different materials and explore different textures.  Safely use and explore a variety of materials and techniques, experimenting with textures, form and function.  **Skills -**  Use one handed tools and equipment, for example, making snips in paper with scissors.  Use a range of tools, including scissors, paintbrushes and cutlery. |  | Playgroup | **Structures**  To build independently with a range of appropriate resources.  Good manipulation skills.  Make simple models which express their ideas, e.g. junk modelling.  **Textiles**  To show increasing control in holding, using and manipulating a range of small tools. |  |  |  |