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|  | **DESIGN TECHNOLOGY - PROGRESSION OF SKILLS & KNOWLEDGE** |  |
| **Introduction**An overview of the skills and knowledge covered in each year group and strand and how these are developed through ourDesign Technology scheme of work. |
| **Design Concepts:**

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| **Cooking & Nutrition** | **Mechanisms & Mechanical Systems** | **Electrical Systems** | **Textiles** | **Structures** |
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| Where food comes from,balanced diet, preparationand cooking skills. Kitchenhygiene and safety. Followingrecipes | Mimic natural movementsusing mechanisms such ascams, followers, levers andsliders | Operational series circuits,circuit components, circuitdiagrams and symbols,combined to create variouselectrical products. | Fastening, sewing, decorativeand functional fabrictechniques includingcross stitch, blanketstitch and appliqué | Material functional andaesthetic properties,strength and stability,stiffen and reinforcestructures. |

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|  | **Cooking & Nutrition** |
| **Year 1/2** **Smoothies** | **Year3/4** **Seasonal Food** | **Year 5/6****Developing a Recipe** |
| **Skills** | **Design** | • Designing smoothie carton packaging by-hand. | • Designing a recipe for a savoury tart. | • Adapting a traditional recipe, understanding that the nutritional value of arecipe alters if you remove, substitute or add additional ingredients.• Writing an amended method for a recipe to incorporate the relevantchanges to ingredients.• Designing appealing packaging to reflect a recipe.• Researching existing recipes to inform ingredient choices. |
| **Make** | • Chopping fruit and vegetables safely to make asmoothie.• Juicing fruits safely to make a smoothie. | Following the instructions within a recipe.• Tasting seasonal ingredients.• Selecting seasonal ingredients.• Peeling ingredients safely.• Cutting safely with a vegetable knife | • 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 |
| **Evaluate** | • Tasting and evaluating different food combinations.• Describing appearance, smell and taste.• Suggesting information to be included on packaging.• Comparing their own smoothie with someone else’s. | • Establishing and using design criteria to help test and review dishes.• Describing the benefits of seasonal fruits and vegetables and the impact onthe environment.• Suggesting points for improvement when making a seasonal tart | • Identifying the nutritional differences between different products andrecipes.• Identifying and describing healthy benefits of food groups. |
| **Knowledge** | **Technical**  | • To know that a blender is a machine which mixesingredients together into a smooth liquid.• To know that a fruit has seeds.• To know that fruits grow on trees or vines.• To know that vegetables can grow either above orbelow ground.• To know that vegetables is any edible part of a plant(e.g. roots: potatoes, leaves: lettuce, fruit: cucumber). | 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 know that eating seasonal foods can have a positive impact on theenvironment.• To know that similar coloured fruits and vegetables often have similarnutritional benefits.• To know that the appearance of food is as important as taste. | • To understand where meat comes from - learning that beef is from cattle andhow beef is reared and processed.• To know that recipes can be adapted to suit nutritional needs and dietaryrequirements.• To know that I can use a nutritional calculator to see how healthy a foodoption is.• To understand that ‘cross-contamination’ means bacteria and germs havebeen passed onto ready-to-eat foods and it happens when these foods mixwith raw meat or unclean objects.• To know that coloured chopping boards can prevent cross-contamination.• To know that nutritional information is found on food packaging.• To know that food packaging serves many purposes. |
| **Additional** |  |  |  |

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|  | **Mechanisms & Mechanical Systems** |
| **Year 1/2**  **Making a Moving Picture Book** | **Year 1/2****Wheels & Axles** |
| **Skills** | **Design** | • Explaining how to adapt mechanisms, using bridges or guides to control themovement.• Designing a moving story book for a given audience. | • Designing a vehicle that includes wheels, axles and axle holders, that when combined, willallow the wheels to move.• Creating clearly labelled drawings that illustrate movement. |
| **Make** | Following a design to create moving models that use levers and sliders. | • Adapting mechanisms, when:● they do not work as they should.● to fit their vehicle design.● to improve how they work after testing their vehicle.  |
| **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. | • Testing wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move.  |
| **Knowledge** | **Technical**  | • 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 themovement of the slider. | • To know that wheels need to be round to rotate and move.• To understand that for a wheel to move it must be attached to a rotating axle.• To know that an axle moves within an axle holder which is fixed to the vehicle or toy.• To know that the frame of a vehicle (chassis) needs to be balanced. |
| **Additional** | • To know that in Design and technology we call a plan a ‘design’. | • To know some real-life items that use wheels such as wheelbarrows, hamster wheels andvehicles. |
|  | **Mechanisms & Mechanical Systems** |
| **Year 3/4** **Pneumatic Toy** | **Year 5/6****Gears & Pulleys** |
| **Skills** | **Design** | • 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. | ● Noticing wider-reaching problems or needs in the community.● Identifying a wide range of needs and potential barriers through market research.● Writing more complex problem statements that consider multiple factors and constraints.● Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost.● Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality.● Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.● Using a series of prototypes to refine and improve their designs. |
| **Make** | • 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. | ● Consistently apply safety instructions.● Select appropriate scissors to handle delicate cutting tasks and challenging materials.● Cutting patterns and drawings accurately.● In supervised groups, using hot glue guns safely.● Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly.● Choosing PVA glue over hot glue for its safety when joining materials in less intensive projects. |
| **Evaluate** | • 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. | ● Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects.● Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost.● Considering alternative materials, tools or techniques that could enhance the product.● Providing feedback that is helpful, specific, and encouraging.● Incorporating feedback from peers or users improve their product further, explaining the changes they made and the impact they had. |
| **Knowledge** | **Technical**  | • 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. | ● That mechanical systems that use gears in everyday objects (eg bicycle, clock).● That gears and pulleys allow us to transfer movement and force from one part of a mechanical system to another.● That gears allow us to increase the output of a mechanism. |
| **Additional** | • To understand how sketches, drawings and diagrams can be used to communicate design ideas.• To know that exploded-diagrams are used to show how different parts of a product fit together.• To know that thumbnail sketches are small drawings to get ideas down on paper quickly | ● That market research is a way of collecting information about problems or needs.● That constraints are things that might stop our ideas being successful.● That original and innovative ideas are different from what has been made before.● That annotations are detailed labels and comments on diagrams.● That risks are things that might happen.● That hot glue creates a strong bond quickly.● That is often better to choose safer equipment.● That sustainability means thinking about the materials that were used to make a product and how the product was made.● That their final product can still be improved by different materials or techniques.● That evaluating their designs in detail will help them understand its successful and less successful parts.● That feedback should be positive, helpful and specific.● That explaining how they used feedback to improve their design can help them create better products in the future |

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|  | **Electrical Systems** |
| **Year 3/4****Torch** | **Year3/4** **Electric Poster** | **Year 5/6****Steady Hand Game** |
| **Skills** | **Design** | • Designing a torch, giving consideration to the target audience and creating bothdesign and success criteria focusing on features of individual design ideas. | • Carry out research based on a given topic (e.g. The Romans) to develop arange of initial ideas.• Generate a final design for the electric poster with consideration to theclient’s needs and design criteria.• Design an electric poster that fits the requirements of a given brief.• Plan the positioning of the bulb (circuit component) and its purpose | • 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.• Understanding the purpose of products (toys), including what is meant by ‘fit for purpose’ and ‘form over function’. |
| **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. | • Create a final design for the electric poster.• Mount the poster onto corrugated card to improve its strength and allow itto withstand the weight of the circuit on the rear.• Measure and mark materials out using a template or ruler.• Fit an electrical component (bulb).• Learn ways to give the final product a higher quality finish (e.g. framing toconceal a roughly cut edge). | • 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. | • 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 justifyingopinions.• Revisiting the requirements of the client to review developing design ideasand check that they fulfil their needs. | • Testing own and others finished games, identifying what went well and makingsuggestions for improvement.• Gathering images and information about existing children’s toys.• Analysing a selection of existing children’s toys. |
| **Knowledge** | **Technical**  | • 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 understand that an electrical system is a group of parts (components) thatwork together to transport electricity around a circuit.• To understand common features of an electric product (switch, battery orplug, 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 andcrocodile wire to build simple circuits. | • 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 |
| **Additional** | • To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens.• To know facts from the history and invention of the electric light bulb(s) - by SirJoseph Swan and Thomas Ediso | • To understand the importance and purpose of information design.• To understand how material choices (such as mounting paper to corrugatedcard) can improve a product to serve its purpose (remain rigid without bendingwhen the electrical circuit is attached).  | •To know that ‘form’ means the shape and appearance of an object.•To know the difference between 'form' and 'function'.•To understand that 'fit for purpose' means that a product works how it should and is easy to use.• To know that form over purpose means that a product looks good but does not work very well.• To know the importance of ‘form follows function’ when designing: the product must be designed primarily with the function in mind.• To understand the diagram perspectives 'top view', 'side view' and 'back'. |

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|  | **Textiles** |
| **Year 1/2**  **Puppets** | **Year 3/4****Cross Stitch & Applique** |
| **Skills** | **Design** | • Using a template to create a design for a puppet | • Designing and making a template from an existing cushion and applyingindividual design criteria. |
| **Make** | • Cutting fabric neatly with scissors.• Using joining methods to decorate a puppet.• Sequencing steps for construction.  | • 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) orembellishing the collars based on design ideas (Egyptian collars). |
| **Evaluate** | • Reflecting on a finished product, explaining likes and dislike | • Evaluating an end product and thinking of other ways in which to createsimilar items. |
| **Knowledge** | **Technical**  | • 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 applique is a way of mending or decorating a textile by applyingsmaller pieces of fabric to larger pieces.•To know that when two edges of fabric have been joined together it is called aseam.•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 thestitching is hidden. |
| **Additional** |  |  |
|  | **Textiles** |
| **Year 5/6** **Waistcoats** | **Year 5/6****Toys** |
| **Skills** | **Design** | • Designing a waistcoat in accordance to a specification linked to set of design criteria.• Annotating designs, to explain their decisions. | • Designing a stuffed toy, considering the main component shapes requiredand creating an appropriate template.• Considering the proportions of individual components. |
| **Make** | • Using a template when cutting fabric to ensure they achieve the correct shape.• Using pins effectively to secure a template to fabric without creases or bulges.• Marking and cutting fabric accurately, in accordance with their design.• Sewing a strong running stitch, making small, neat stitches and following the edge.• Tying strong knots.• Decorating a waistcoat, attaching features (such as appliqué) using thread.• Finishing the waistcoat with a secure fastening (such as buttons).• Learning different decorative stitches.• Sewing accurately with evenly spaced, neat stitches. | • Creating a 3D stuffed toy from a 2D design.• Measuring, marking and cutting fabric accurately and independently .• Creating strong and secure blanket stitches when joining fabric.• Threading needles independently.• Using appliqué to attach pieces of fabric decoration.• Sewing blanket stitch to join fabric.• Applying blanket stitch so the spaces between the stitches are even andregular |
| **Evaluate** | • Reflecting on their work continually throughout the design, make and evaluate process. | • Testing and evaluating an end product and giving point for furtherimprovements. |
| **Knowledge** | **Technical**  | • To understand that it is important to design clothing with the client/ target customer in mind.• To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric.• To understand the importance of consistently sized stitches. | • To know that blanket stitch is useful to reinforce the edges of a fabricmaterial 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 separatelyand then attaching them to the main body.• To know that small, neat stitches which are pulled taut are important toensure that the soft toy is strong and holds the stuffing securely. |
| **Additional** |  |  |

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|  | **Structures** |
| **Year 1/2**  **Constructing a Windmill** | **Year 1/2****Baby Bear’s Chair** |
| **Skills** | **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.• Learning about different types of structures, found in the natural worldand in everyday objects. |
| **Make** | • Making stable structures from card.• 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.• Finding the middle of an object.• Puncturing holes.• Adding weight to structures.• Creating supporting structures.• Cutting evenly and carefully | • 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. |
| **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.  | • Exploring the features of structures.• Comparing the stability of different shapes.• Testing the strength of own structures.• Identifying the weakest part of a structure.• Evaluating the strength, stiffness and stability of own structure. |
| **Knowledge** | **Technical**  | • 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 the sails or blades of a windmill are moved by the wind.• To know that a structure is something built for a reason.• To know that stable structures do not topple.• To know that adding weight to the base of a structure can make it more stable | • To know that shapes and structures with wide, flat bases or legs are themost stable.• To understand that the shape of a structure affects its strength.• To know that materials can be manipulated to improve strength andstiffness.• To know that a structure is something which has been formed or madefrom parts.• To know that a ‘stable’ structure is one which is firmly fixed and unlikelyto 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 bendeasily |
| **Additional** | • To know that design criteria is a list of points to ensure the product meets the clients needs and wants.• To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity.• To know that windmill turbines use wind to turn and make the machines inside work.• To know that a windmill is a structure with sails that are moved by the wind.• To know the three main parts of a windmill are the turbine, axle and structure.• To know that windmills are used to generate power and were used for grinding flour. | • To know that natural structures are those found in nature.• To know that man-made structures are those made by people. |
|  | **Structures** |
| **Year 3/4****Construction Castle**  | **Year 5/6****Playgrounds** |
| **Skills** | **Design** | • 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 playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs. |
| **Make** | • Constructing a range of 3D geometric shapes using nets.• Creating special features for individual designs.• Making facades from a range of recycled materials. | • Building a range of play apparatus structures drawing upon new and priorknowledge 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 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. | • 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. |
| **Knowledge** | **Technical**  | • To understand that wide and flat based objects are more stable.• To understand the importance of strength and stiffness in structures. | • To know that structures can be strengthened by manipulating materials andshapes. |
| **Additional** | • To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose.• To know that a façade is the front of a structure.• To understand that a castle needed to be strong and stable to withstand enemy attack.• To know that a paper net is a flat 2D shape that can become a 3D shape once assembled.• To know that a design specification is a list of success criteria for a product. | • To understand what a 'footprint plan' is.• To understand that in the real world, design , can impact users in positive andnegative ways.• To know that a prototype is a cheap model to test a design idea. |