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|  | **EYFS** | |
| ***Communication and language***   * *Listen attentively and respond to what they hear with relevant questions, comments and actions* * *Make comments about what they heard and ask questions to clarify their understanding* * *Hold conversation when engaged in back-and-forth exchanges with their teachers and peers* * *Offer explanations for why things might happen*   ***Personal, Social, Emotional Development***   * *Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate* * *Give focused attention to what the teacher says, responding appropriately even when engaged in activity, and show an ability to follow instructions involving several ideas or actions* * *Work and play co-operatively and take turns with others* * *Be confident to try new activities and show independence, resilience and perseverance in the face of challenges*   ***Physical Development***   * *Demonstrate strength, balance and coordination* * *Using a range of small tools, including scissors, paintbrushes*   ***Mathematics***   * *Compare quantities up to 10 in different contexts* * *Explore and represent patterns within numbers up to 10* | ***Understanding the world***   * *Know some similarities and differences between things in the past and now* * *Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter*   ***Expressive Arts and Design***   * *Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function* * *Share their creations, explaining the processes they have used*   ***Literacy***   * *Use recently introduced vocabulary* |

**Key Stage One**

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| **Year 1** | | | |
| **Substantive Knowledge** |  |  |  |
| **Sliders and Levers**  *Designing*   * Generate ideas based on simple design criteria and their own experiences, explaining what they could make. * Develop, model and communicate their ideas through drawings and mock-ups with card and paper.     *Making*   * Plan by suggesting what to do next. * Select and use tools, explaining their choices, to cut, shape and join paper and card. * Use simple finishing techniques suitable for the product they are creating.   *Evaluating*   * Explore a range of existing books and everyday products that use simple sliders and levers. * Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria.     *Technical knowledge and understanding*   * Explore and use sliders and levers. * Understand that different mechanisms produce different types of movement. * Know and use technical vocabulary relevant to the project. | **Wheels and Axels**  *Designing*   * Generate initial ideas and simple design criteria through talking and using own experiences. * Develop and communicate ideas through drawings and mock-ups.     *Making*   * Select from and use a range of tools and equipment to perform practical tasks such as cutting and joining to allow movement and finishing. * Select from and use a range of materials and components such as paper, card, plastic and wood according to their characteristics.     *Evaluating*   * Explore and evaluate a range of products with wheels and axels. * Evaluate their ideas throughout and their products against original criteria.     *Technical knowledge and understanding*   * Explore and use wheels, axels and axel holders. * Distinguish between fixed and freely moving axels. * Know and use technical vocabulary relevant to the project. | **Free Standing Structures**  *Designing*   * Generate ideas based on simple design criteria and their own experiences, explaining what they could make. * Develop, model and communicate their ideas through talking, mock-ups and drawings.     *Making*   * Plan by suggesting what to do next. * Select and use tools, skills and techniques, explaining their choices. * Select new and reclaimed materials and construction kits to build their structures. * Use simple finishing techniques suitable for the structure they are creating.     *Evaluating*   * Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings. * Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria.     *Technical knowledge and understanding*   * Know how to make freestanding structures stronger, stiffer and more stable. * Know and use technical vocabulary relevant to the project. |

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| **Year 2** | | | |
| **Substantive Knowledge** |  |  |  |
| **Textiles** 1 - templates and joining  *Designing*   * Design a functional and appealing product for a chosen user and purpose based on simple design criteria. * Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology.     *Making*   * Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing. * Select from and use textiles according to their characteristics.   *Evaluating*   * Explore and evaluate a range of existing textile products relevant to the project being undertaken. * Evaluate their ideas throughout and their final products against original design criteria.   *Technical knowledge and understanding*   * Understand how simple 3-D textile products are made, using a template to create two identical shapes. * Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. * Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons. * Know and use technical vocabulary relevant to the project. | **Textiles 2 -** freehand sewing and patterns  Embedding and building on skills from Textiles 1 | **Preparing Food**  *Designing*   * Design appealing products for a particular user based on simple design criteria. * Generate initial ideas and design criteria through investigating a variety of fruit and vegetables. * Communicate these ideas through talk and drawings.     *Making*   * Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. * Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product.     *Evaluating*   * Taste and evaluate a range of fruit and vegetables to determine the intended user’s preferences. * Evaluate ideas and finished products against design criteria, including intended user and purpose.     Technical knowledge and understanding   * Understand where a range of fruit and vegetables come from e.g. farmed or grown at home. * Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of *The eatwell plate*. * Know and use technical and sensory vocabulary relevant to the project. |

**Key Stage Two**

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| **Year 3** | | | |
| **Substantive Knowledge** |  |  |  |
| **Simple Circuits**  *Designing*   * Gather information about needs and wants and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. * Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams.     *Making*   * Order the main stages of making. * Select from and use tools and equipment to cut, shape, join and finish with some accuracy. * Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities.     *Evaluating*   * Investigate and analyse a range of existing battery-powered products. * Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.     *Technical knowledge and understanding*   * Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers. * Apply their understanding of computing to program and control their products. * Know and use technical vocabulary relevant to the project. | **Food**  *Designing*   * Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose. * Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas.     *Making*   * Plan the main stages of a recipe, listing ingredients, utensils and equipment. * Select and use appropriate utensils and equipment to prepare and combine ingredients. * Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.     *Evaluating*   * Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs. * Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.     *Technical knowledge and understanding*   * Know how to use appropriate equipment and utensils to prepare and combine food. * Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught. * Know and use relevant technical and sensory vocabulary appropriately. | **Levers and Linkages**  *Designing*   * Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user. * Use annotated sketches and prototypes to develop, model and communicate ideas.     *Making*   * Order the main stages of making. * Select from and use appropriate tools with some accuracy to cut, shape and join paper and card. * Select from and use finishing techniques suitable for the product they are creating.     *Evaluating*   * Investigate and analyse books and, where available, other products with lever and linkage mechanisms. * Evaluate their own products and ideas against criteria and user needs, as they design and make.     *Technical knowledge and understanding*   * Understand and use lever and linkage mechanisms. * Distinguish between fixed and loose pivots. * Know and use technical vocabulary relevant to the project. |

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| **Year 4** | | | |
| **Substantive Knowledge** |  |  |  |
| **Shell Structures**  *Designing*   * Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product. * Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas.     *Making*   * Order the main stages of making. * Select and use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy. * Explain their choice of materials according to functional properties and aesthetic qualities. * Use finishing techniques suitable for the product they are creating.     *Evaluating*   * Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. * Test and evaluate their own products against design criteria and the intended user and purpose.     *Technical knowledge and understanding*   * Develop and use knowledge of how to construct strong, stiff shell structures. * Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. * Know and use technical vocabulary relevant to the project. | **Pneumatics**  *Designing*   * Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user. * Use annotated sketches and prototypes to develop, model and communicate ideas.   *Making*   * Order the main stages of making. * Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons. * Select from and use finishing techniques suitable for the product they are creating.   *Evaluating*   * Investigate and analyse books, videos and products with pneumatic mechanisms. * Evaluate their own products and ideas against criteria and user needs, as they design and make.   *Technical knowledge and understanding*   * Understand and use pneumatic mechanisms. * Know and use technical vocabulary relevant to the project. | **2D/3D Shape Project**  *Designing*   * Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s. * Produce annotated sketches, prototypes, final product sketches and pattern pieces.     *Making*   * Plan the main stages of making. * Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing. * Select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern.     *Evaluating*   * Investigate a range of 3-D textile products relevant to the project. * Test their product against the original design criteria and with the intended user. * Take into account others’ views. * Understand how a key event/individual has influenced the development of the chosen product and/or fabric.     *Technical knowledge and understanding*   * Know how to strengthen, stiffen and reinforce existing fabrics. * Understand how to securely join two pieces of fabric together. * Understand the need for patterns and seam allowances. * Know and use technical vocabulary relevant to the project. |

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| **Year 5** | | | |
| **Substantive Knowledge** |  |  |  |
| **Textiles**  *Designing*   * Generate innovative ideas by carrying out research including surveys, interviews and questionnaires. * Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes and, where appropriate, computer-aided design. * Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification.     *Making*   * Produce detailed lists of equipment and fabrics relevant to their tasks. * Formulate step-by-step plans and, if appropriate, allocate tasks within a team. * Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost.     *Evaluating*   * Investigate and analyse textile products linked to their final product. * Compare the final product to the original design specification. * Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. * Consider the views of others to improve their work.     *Technical knowledge and understanding*   * A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. * Fabrics can be strengthened, stiffened and reinforced where appropriate. | **Mechanical Systems**  *Designing*   * Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. * Develop a simple design specification to guide their thinking. * Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.     *Making*   * Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. * Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost.     *Evaluating*   * Compare the final product to the original design specification. * Test products with the intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. * Consider the views of others to improve their work. * Investigate famous manufacturing and engineering companies relevant to the project.     *Technical knowledge and understanding*   * Understand that mechanical systems have an input, process and an output. * Understand how cams can be used to produce different types of movement and change the direction of movement. * Know and use technical vocabulary relevant to the project. | **Frame Structures**  *Designing*   * Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. * Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. * Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches.     *Making*   * Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used. * Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks. * Use finishing and decorative techniques suitable for the product they are designing and making.     *Evaluating*   * Investigate and evaluate a range of existing frame structures. * Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests. * Research key events and individuals relevant to frame structures.     *Technical knowledge and understanding*   * Understand how to strengthen, stiffen and reinforce 3-D frameworks. * Know and use technical vocabulary relevant to the project. |

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| **Year 6** | | | |
| **Substantive Knowledge** |  |  |  |
| **Pulleys or Gears**  *Designing*   * Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. * Develop a simple design specification to guide their thinking. * Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.     *Making*   * Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. * Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost.     *Evaluating*   * Compare the final product to the original design specification. * Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. * Consider the views of others to improve their work. * Investigate famous manufacturing and engineering companies relevant to the project.     *Technical knowledge and understanding*   * Understand that mechanical and electrical systems have an input, process and an output. * Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement. * Know and use technical vocabulary relevant to the project. | **Food**  *Designing*   * Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification. * Explore a range of initial ideas and make design decisions to develop a final product linked to user and purpose. * Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas.     *Making*   * Write a step-by-step recipe, including a list of ingredients, equipment and utensils * Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients. * Make, decorate and present the food product appropriately for the intended user and purpose.     *Evaluating*   * Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams. * Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements. * Understand how key chefs have influenced eating habits to promote varied and healthy diets.     *Technical knowledge and understanding*   * Know how to use utensils and equipment including heat sources to prepare and cook food. * Understand about seasonality in relation to food products and the source of different food products. * Know and use relevant technical and sensory vocabulary | **Circuits and Switches**  *Designing*   * Use research to develop a design specification for a functional product that responds automatically to changes in the environment. Take account of constraints including time, resources and cost. * Generate and develop innovative ideas and share and clarify these through discussion. * Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams.     *Making*   * Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. * Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. * Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment.     *Evaluating*   * Continually evaluate and modify the working features of the product to match the initial design specification. * Test the system to demonstrate its effectiveness for the intended user and purpose. * Investigate famous inventors who developed ground-breaking electrical systems and components.     *Technical knowledge and understanding*   * Understand and use electrical systems in their products. * Apply their understanding of computing to program, monitor and control their products. * Know and use technical vocabulary relevant to the project. |