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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*
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**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 patternsEmbedding 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.
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**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.
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