

Year 1

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	Freestanding Structures To design and build a range of playground equipment for a lego or playmobil character. Designing, making and evaluating a strong chair for Baby Bear <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">THOUGHT</th> <th style="text-align: left;">ACTION</th> </tr> </thead> <tbody> <tr> <td>What sort of chair shall I make? 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Designing, making and evaluating a moving storyboard to retell a fairy tale to the class <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">THOUGHT</th> <th style="text-align: left;">ACTION</th> </tr> </thead> <tbody> <tr> <td>Who is the storyboard for? How will we use it? What will make it successful?</td> <td>Using talk to generate initial ideas, developing simple design criteria</td> </tr> <tr> <td>What will be in each scene? What could move? What captions will we use?</td> <td>Developing and communicating ideas through talk</td> </tr> <tr> <td>Should we use a lever or a slider for each scene? How will I draw and finish the pictures?</td> <td>Trying out and evaluating ideas for mechanisms and pictures using inexpensive card and paper</td> </tr> <tr> <td>Am I working on my own or with others? What is the first thing I/we need to do?</td> <td>Creating moving pictures for each scene of the fairy tale</td> </tr> <tr> <td>How well am I doing? Are the mechanisms working in the storyboard?</td> <td>Modifying, adapting and improving</td> </tr> <tr> <td>Evaluating, reflecting, questioning</td> <td>More actions...</td> </tr> <tr> <td>More thoughts...</td> <td>Evaluating the final product against design criteria, when retelling the fairy tale</td> </tr> </tbody> </table>	THOUGHT	ACTION	Who is the storyboard for? How will we use it? What will make it successful?	Using talk to generate initial ideas, developing simple design criteria	What will be in each scene? What could move? What captions will we use?	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Prior learning	<ul style="list-style-type: none"> • Experience of using construction kits to build walls, towers and frameworks. • Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card. • Experience of different methods of joining card and paper. 	<ul style="list-style-type: none"> • Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell. • Experience of cutting soft fruit and vegetables using appropriate utensils. 	<ul style="list-style-type: none"> • Early experiences of working with paper and card to make simple flaps and hinges. • Experience of simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape. 																																																
Designing	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Know how to make freestanding structures stronger, stiffer and more stable. • Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> • 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 Guide. • Know and use technical and sensory vocabulary relevant to the project. 	<ul style="list-style-type: none"> • Explore and use sliders and levers. • Understand that different mechanisms produce different types of movement. • Know and use technical vocabulary relevant to the project. 																																																

Year 2

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	<p style="text-align: center;">Textiles – Templates and joining techniques</p> <p style="text-align: center;">Designing, making and evaluating a puppet to perform a play</p> <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: left;">THOUGHT</th> <th style="width: 50%; text-align: left;">ACTION</th> </tr> </thead> <tbody> <tr> <td>What sort of puppet shall I make? 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Prior learning	<ul style="list-style-type: none"> Explored and used different fabrics. Cut and joined fabrics with simple techniques. Thought about the user and purpose of products. 	<ul style="list-style-type: none"> Assembled vehicles with moving wheels using construction kits. Explored moving vehicles through play. Gained some experience of designing, making and evaluating products for a specified user and purpose. Developed some cutting, joining and finishing skills with card. 	<ul style="list-style-type: none"> Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell. Experience of cutting soft fruit and vegetables using appropriate utensils. 																																																				
Designing	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Generate initial ideas and simple design criteria through talking and using own experiences. Develop and communicate ideas through drawings and mock-ups. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Explore and evaluate a range of products with wheels and axles. Evaluate their ideas throughout and their products against original criteria. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Explore and use wheels, axles and axle holders. Distinguish between fixed and freely moving axles. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> 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 Guide. Know and use technical and sensory vocabulary relevant to the project. 																																																				

Year 3

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	Mechanisms – Levers and Linkages Designing, making and evaluating a greetings card with moving parts for family or friends <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: left;">THOUGHT</th> <th style="width: 50%; text-align: left;">ACTION</th> </tr> </thead> <tbody> <tr> <td>What sort of greetings card shall I make and who will it be for? What part will move? 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Food – Healthy and varied diet – Sandwich snacks Designing, making and evaluating a bread-based product with a filling for lunch, such as a wrap, a sandwich, a roll, a blini or a toastie <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: left;">THOUGHT</th> <th style="width: 50%; text-align: left;">ACTION</th> </tr> </thead> <tbody> <tr> <td>Who am I making the food product for? How can I make it appealing for the range of users?</td> <td>Discussing and communicating ideas, researching existing products, drawing annotated sketches, generating design criteria.</td> </tr> <tr> <td>What kind of food product shall I make that can be carried easily? 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Prior learning	<ul style="list-style-type: none"> Explored and used mechanisms such as flaps, sliders and levers. Gained experience of basic cutting, joining and finishing techniques with paper and card. 	<ul style="list-style-type: none"> Experience of using different joining, cutting and finishing techniques with paper and card. A basic understanding of 2D and 3D shapes in mathematics and the physical properties and everyday uses of materials in science. 	<ul style="list-style-type: none"> Know some ways to prepare ingredients safely and hygienically. Have some basic knowledge and understanding about healthy eating and The Eatwell Guide. Have used some equipment and utensils and prepared and combined ingredients to make a product. 																																																
Designing	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Understand and use lever and linkage mechanisms. Distinguish between fixed and loose pivots. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 																																																

Year 4

	Autumn Term	Spring Term	Summer Term																																													
	<p style="text-align: center;">Mechanisms - Pneumatics</p> <p>Designing, making and evaluating a moving 'creature in a box' toy for small children</p> <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">THOUGHT</th> <th style="text-align: left;">ACTION</th> </tr> </thead> <tbody> <tr> <td>What sort of moving toy shall I make and who will it be for?</td> <td rowspan="3">Discussing ideas, drawing annotated sketches, generating design criteria.</td> </tr> <tr> <td>How will it fit into the box? How will it move? Which parts will move?</td> </tr> <tr> <td>Which pneumatic system will work best?</td> </tr> <tr> <td>What materials will I need?</td> <td>Modelling possible systems. 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How will it fasten?</td> </tr> <tr> <td>What fabric should I use?</td> </tr> <tr> <td>Which joining techniques would be the best for the fabric and pattern?</td> <td>Discuss and explore different fabrics suitable for purpose Possibly test fabrics for strength/waterproofness Discuss and test out different joining techniques on mock ups Evaluate these against the design criteria</td> </tr> <tr> <td>How can I make my holder aesthetically pleasing for the user?</td> <td>Test out a range of decorative techniques and decide on the one/s which are appropriate Create the holder following the design</td> </tr> <tr> <td>How long will it take to make? What tools will I need? What order should I do it in?</td> <td>Make suitable adjustment during the making process Develop the plan during the making</td> </tr> <tr> <td>Reflection and refining What isn't working very well? What could I improve on? Will my holder/purse/wallet fulfill its function? 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Prior learning	<ul style="list-style-type: none"> Explored simple mechanisms, such as sliders and levers, and simple structures. Learnt how materials can be joined to allow movement. Joined and combined materials using simple tools and techniques. 	<ul style="list-style-type: none"> Constructed a simple series electrical circuit in science, using bulbs, switches and buzzers. Cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue 	<ul style="list-style-type: none"> Have joined fabric in simple ways by gluing and stitching. Have used simple patterns and templates for marking out. Have evaluated a range of textile products. 																																													
Designing	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Understand and use pneumatic mechanisms. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 																																													

Year 5

	Autumn Term	Spring Term	Summer Term																																														
	Frame Structures Designing and making a small-scale bird hide for children to use in the school wildlife area <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 50%;">THOUGHT</th> <th style="text-align: left; width: 50%;">ACTION</th> </tr> </thead> <tbody> <tr> <td>What type of structure shall I make? What will be its purpose? Who will use it?</td> <td>Discussing ideas, drawing annotated sketches. Generating a simple design specification.</td> </tr> <tr> <td>Which will be the best shape for my bird hide? What features will it have?</td> <td>Discussing, modelling and evaluating different options.</td> </tr> <tr> <td>Which materials will I use to make it? 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Mechanisms – Cams Designing, making and evaluating a moving toy for children in a particular age range <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 50%;">THOUGHT</th> <th style="text-align: left; width: 50%;">ACTION</th> </tr> </thead> <tbody> <tr> <td>What type of moving toy shall I make? What will be its purpose? Who will use it?</td> <td>Discussing ideas, drawing annotated sketches or exploded diagrams Generating a simple design specification</td> </tr> <tr> <td>What type of movement will it have? 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Prior learning	<ul style="list-style-type: none"> • Experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials. • Basic understanding of what structures are and how they can be made stronger, stiffer and more stable. 	<ul style="list-style-type: none"> • Experience of axles, axle holders and wheels that are fixed or free moving. • Basic understanding of different types of movement. • Experience of cutting and joining techniques with a range of materials including card, plastic and wood. • An understanding of how to strengthen and stiffen structures. 	<ul style="list-style-type: none"> • Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. • Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients. 																																														
Designing	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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 are accurately assembled and well finished. Work within the constraints of time, resources and cost. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Understand how to strengthen, stiffen and reinforce 3D frameworks. • Know and use technical vocabulary 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 																																														

Year 6

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	<p style="text-align: center;">Electrical – Monitoring and Control Designing, making and evaluating an electronic toy moneybox for a child</p> <p>An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left; width: 50%;">THOUGHT</th> <th style="text-align: left; width: 50%;">ACTION</th> </tr> </thead> <tbody> <tr> <td>Who will my moneybox be for? How will it motivate the user to save money? How might it be programmed? What components will it need?</td> <td>Developing innovative ideas through discussion and annotated sketches, generating a design specification.</td> </tr> <tr> <td>Which switches or sensors should I use? What output devices should I use?</td> <td>Discussing ideas, modelling possible electrical circuits Recording design ideas pictorially or using circuit diagrams.</td> </tr> <tr> <td>What tools and components will I need? What sequence of steps will I use?</td> <td>Developing a step-by-step plan.</td> </tr> <tr> <td>How will computer control improve my moneybox?</td> <td>Writing and testing programs and connecting to a microcontroller.</td> </tr> <tr> <td>More thoughts... appraising, reflecting, refining.</td> <td>More actions... assembling, testing, modifying.</td> </tr> <tr> <td>Will the electronic moneybox achieve its purpose?</td> <td>Evaluating the alarm against the original design specification.</td> </tr> </tbody> </table>	THOUGHT	ACTION	Who will my moneybox be for? How will it motivate the user to save money? How might it be programmed? What components will it need?	Developing innovative ideas through discussion and annotated sketches, generating a design specification.	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Practising finishing techniques and, if possible, learning to use a sewing machine.</td> </tr> <tr> <td>How do I make a paper pattern for the product I want to produce?</td> <td>Creating a 2-D paper pattern with a seam allowance.</td> </tr> <tr> <td>What design decisions do I need to make? How can I communicate my ideas for my product in an effective way?</td> <td>Developing ideas through research, working drawings, computer-aided design, discussion, paper mock-ups and modelling.</td> </tr> <tr> <td>How will I show innovation? Who will be the user of my product and what are their needs, wants and values? What will be the purpose of my product?</td> <td>Thinking about the user and purpose and developing specifications for products. 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Prior learning	<ul style="list-style-type: none"> Initial experience of using computer control software and an interface box, a standalone box or microcontroller, e.g. Crumble. Some experience of writing and modifying a program to make a light turn on or flash on and off. Understanding of the essential characteristics of a series circuit and experience of creating a battery-powered, functional, electrical product. 	<ul style="list-style-type: none"> Experience of basic stitching, joining textiles and finishing techniques. Experience of making and using simple pattern pieces. 	<ul style="list-style-type: none"> Experience of axles, axle holders and wheels that are fixed or free moving. Basic understanding of electrical circuits, simple switches and components. Experience of cutting and joining techniques with a range of materials including card, plastic and wood. An understanding of how to strengthen and stiffen structures. 																																														
Designing	<ul style="list-style-type: none"> Develop a design specification for a functional product that responds automatically to changes in the environment. Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of electrical circuits or circuit diagrams. 	<ul style="list-style-type: none"> Generate innovative ideas by carrying out research including surveys, interviews and questionnaires. Develop, model and communicate ideas through talking, drawing, templates, mockups 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 their electrical product to respond to changes in the environment. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Understand and use electrical systems in their products. Understand the use of computer control systems in products. Apply their understanding of computing to program, monitor and control their products. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 																																														

This scheme of work is based around guidance from the Design & Technology Association. It stems from their 'Projects on a Page' documents and has been designed to build upon skills and knowledge developed in previous projects. Where possible the design brief is linked to other subject areas or events to bring the subject to life, making learning purposeful.

