

Design and Technology

National Curriculum

Key stage 1

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an interactive process of designing and making. They should work in a range of relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment].

When designing and making, pupils should be taught to:

Design

- design purposeful, functional, appealing products for themselves and other users based on design criteria
- generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

Make

- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics

Evaluate

- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria

Technical knowledge

- build structures, exploring how they can be made stronger, stiffer and more stable
- explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.

Key stage 2

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].

When designing and making, pupils should be taught to:

Design

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluate

- investigate and analyse a range of existing products
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- understand how key events and individuals in design and technology have helped shape the world

Technical knowledge

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures

- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- apply their understanding of computing to program, monitor and control their products.

Design and technology – key stages 1 and 2 Cooking and nutrition

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:

Key stage 1

- use the basic principles of a healthy and varied diet to prepare dishes
- understand where food comes from.

Key stage 2

- understand and apply the principles of a healthy and varied diet
- prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques
- understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

Our School Aims

- Significant levels of originality and the willingness to take creative risks to produce innovative ideas and prototypes.
- An excellent attitude to learning and independent working.
- The ability to use time efficiently and work constructively and productively with others.
- The ability to carry out thorough research, show initiative and ask questions to develop an exceptionally detailed knowledge of users' needs.
- The ability to act as responsible designers and makers, working ethically, using finite materials carefully and working safely.
- A thorough knowledge of which tools, equipment and materials to use to make their products.
- The ability to apply mathematical knowledge.
- The ability to manage risks exceptionally well to manufacture products safely and hygienically.
- A passion for the subject and knowledge of, up-to-date technological innovations in materials, products and systems.

Opportunities

Key Stage 1	Key Stage 2
<p>Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, such as the home and school, gardens and playgrounds, the local community, industry and the wider environment.</p> <p>When designing and making, pupils should be taught to:</p> <p>Design</p> <ul style="list-style-type: none"> • design purposeful, functional, appealing products for themselves and other users based on design criteria. • generate develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. <p>Make</p> <ul style="list-style-type: none"> • select from and use a range of tools and equipment to perform practical tasks such as cutting, shaping, joining and finishing. • select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. <p>Evaluate</p> <ul style="list-style-type: none"> • explore and evaluate a range of existing products. • evaluate their ideas and products against design criteria. <p>Technical knowledge</p> <ul style="list-style-type: none"> • build structures, exploring how they can be made stronger, stiffer and more stable. • explore and use mechanisms, such as levers, sliders, wheels and axles, in their products. <p>Cooking and nutrition</p> <ul style="list-style-type: none"> • use the basic principles of a healthy and varied diet to prepare dishes. • understand where food comes from. 	<p>Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment.</p> <p>When designing and making, pupils should be taught to:</p> <p>Design</p> <ul style="list-style-type: none"> • use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups. • generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design. <p>Make</p> <ul style="list-style-type: none"> • select from and use a wider range of tools and equipment to perform practical tasks, such as cutting, shaping, joining and finishing, accurately. • select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities. <p>Evaluate</p> <ul style="list-style-type: none"> • investigate and analyse a range of existing products. • evaluate their ideas and products against their own design criteria and consider the views of others to improve their work. • understand how key events and individuals in design and technology have helped shape the world <p>Technical knowledge</p> <ul style="list-style-type: none"> • apply their understanding of how to strengthen, stiffen and reinforce more complex structures. • understand and use mechanical systems in their products, such as gears, pulleys, cams, levers and linkages. • understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs, buzzers and motors. • apply their understanding of computing to programme, monitor and control their products. <p>Cooking and nutrition</p> <ul style="list-style-type: none"> • understand and apply the principles of a healthy and varied diet. • prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. • understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.

Design and Technology Curriculum Objectives

Key Stage 1

Year	Achievement	Knowledge and Independent Application		
		To master practical skills	To design, make, evaluate and improve	To take inspiration from design throughout history
1	Emerging	Food: <ul style="list-style-type: none"> Handle equipment and tools effectively, including knives for cutting fruit or vegetables. Follow simple hygiene rules such as washing hands, putting on an apron. Materials: <ul style="list-style-type: none"> Handle tools, objects, construction and malleable materials safely and with increasing control. Cut materials safely (with adult support) Textiles: <ul style="list-style-type: none"> Explore how different media and materials can be combined to create different effects. 	<ul style="list-style-type: none"> Discuss own thoughts and ideas verbally. Use pictures and words to describe what they want to do. Select appropriate resources and adapt work as necessary. 	<ul style="list-style-type: none"> Use everyday language to talk about own or others work. Explore the meaning and sound of new words related to objects or designs.
	Expected	Food • Cut, peel or grate ingredients safely and hygienically. • Measure or weigh using measuring cups or electronic scales. Materials • Cut materials safely using tools provided. • Measure and mark out to the nearest centimetre. • Demonstrate a range of cutting and shaping techniques (such as tearing, cutting, folding and curling). Textiles • Shape textiles using templates. • Colour and decorate textiles using a number of techniques (such as dyeing, adding sequins or printing).	<ul style="list-style-type: none"> Design products that have a clear purpose. Identify features that could be improved. 	<ul style="list-style-type: none"> Explore objects and designs to identify likes and dislikes of the designs.
	Exceeding	Food • Decide on the best method of preparing ingredients safely and hygienically. Materials • Choose appropriate tools to cut materials safely. • Apply measuring and marking techniques to the nearest cm. • Choose the most appropriate technique for cutting and shaping materials (such as tearing, cutting, folding and curling). Textiles • Shape textiles based on your own idea. • Decide how to colour and decorate textiles using a number of techniques (such as dyeing, adding sequins, printing or sewing).	<ul style="list-style-type: none"> Design products that have a clear purpose and an intended use. Begin to evaluate their products. 	<ul style="list-style-type: none"> Begin to suggest improvements to existing designs.
2	Emerging	With support: Electricals and electronics • Diagnose faults in battery operated devices (such as low battery, water damage or battery terminal damage). Computing • Model designs using software. Construction • Use materials to practise drilling, screwing, gluing and nailing materials to make and strengthen products. Mechanics • Create products using levers, wheels and winding mechanisms.	<ul style="list-style-type: none"> Design products that have a clear purpose and an intended use. Begin to evaluate their products. 	<ul style="list-style-type: none"> Begin to suggest improvements to existing designs.
	Expected	Electricals and electronics • Diagnose faults in battery operated devices (such as low battery, water damage or battery terminal damage). Computing • Model designs using software. Construction • Use materials to practise drilling, screwing, gluing and nailing materials to make and strengthen products. Mechanics • Create products using levers, wheels and winding mechanisms.	<ul style="list-style-type: none"> Design products that have a clear purpose and an intended user. Identify features that need refining. Use software to design. 	<ul style="list-style-type: none"> Explore a range of objects and designs to identify likes and dislikes of the designs and suggest improvements to existing designs. Explore how products have been created.
	Exceeding	Electricals and Electronics - Begin to create a simple circuit. Computing - Model designs using software independently. Construction - Begin to choose suitable techniques to construct products or to repair items. Mechanics - Use scientific knowledge of forces to develop products using levers,	<ul style="list-style-type: none"> Design products that have a clear purpose for more than one intended user. When making products show some 	<ul style="list-style-type: none"> Improve upon existing designs, giving a reason for your choice using your knowledge of how the product was made.

		winding mechanisms and pulleys.	awareness of which order would be more efficient. • Begin to refine design during the making process using software.	
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Lower Key Stage 2

Year	Achievement	Knowledge and Independent Application		
		To master practical skills	To design, make, evaluate and improve	To take inspiration from design throughout history
3	Emerging	<p>Food • Prepare ingredients hygienically using appropriate utensils. • Measure ingredients with support • Follow a recipe with adult support.</p> <p>Materials • Cut materials safely. • Measure and mark out to the nearest centimetre with some accuracy. • Apply cutting and shaping techniques. • With support, select appropriate simple joining techniques.</p> <p>Electricals and Electronics - Begin to create a simple circuit.</p>	<ul style="list-style-type: none"> • Design products that have a clear purpose for more than one intended user. • When making products show some awareness of which order would be more efficient. • Begin to refine design during the making process using software. 	<ul style="list-style-type: none"> • Improve upon existing designs, giving a reason for your choice using your knowledge of how the product was made.
	Expected	<p>Food • Prepare ingredients hygienically using appropriate utensils. • Measure ingredients to the nearest gram. • Follow a recipe with adult support.</p> <p>Materials • Cut materials safely by selecting appropriate tools. • Measure and mark out to the nearest centimetre with some accuracy. • Apply cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs). • Select appropriate simple joining techniques.</p> <p>Electricals and electronics • Create series circuits</p>	<ul style="list-style-type: none"> • Make products by working efficiently (such as by carefully selecting materials). • Refine work and techniques. • Evaluate the product design at the end of production and make necessary changes/adaptions. • Use software to design and represent product designs. 	<ul style="list-style-type: none"> • Improve upon existing designs, giving more than one reason for your choices. • Investigate products to understand how they work.
	Exceeding	<p>Food • Prepare ingredients hygienically using correct utensils. • Measure ingredients to the nearest gram accurately. •Begin to follow a recipe independently. • Assemble ingredients in logical order.</p> <p>Materials • Cut materials safely with increasing accuracy by selecting appropriate tools. • Measure and mark out to the nearest centimetre accurately. • Apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs). • Select appropriate joining techniques suitable for a range of materials.</p> <p>Electricals and electronics • Understand the difference between series and parallel circuits</p>	<ul style="list-style-type: none"> • Make products with a purpose by working efficiently (such as by carefully selecting materials) deciding which order could be more successful. • Refine work and techniques as work progresses, continually evaluating the product design. • Use software to design and represent product designs. 	<ul style="list-style-type: none"> • Improve upon existing designs, explaining your reasons. • Disassemble products to understand how they work.
4	Emerging	<p>Food • Prepare ingredients hygienically using correct utensils. • Measure ingredients to the nearest gram accurately. •Begin to follow a recipe independently. • Assemble ingredients in logical order.</p>	<ul style="list-style-type: none"> • Make products with a purpose by working efficiently (such as by carefully selecting materials) 	<ul style="list-style-type: none"> • Improve upon existing designs, explaining your reasons. • Disassemble products to

	<p>Materials • Cut materials safely with increasing accuracy by selecting appropriate tools. • Measure and mark out to the nearest centimetre accurately. • Apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs). • Select appropriate joining techniques suitable for a range of materials.</p> <p>Textiles • make a seam with support. • With support join textiles with appropriate stitching. • With support select the most appropriate techniques to decorate textiles.</p> <p>Electricals and electronics • Understand the difference between series and parallel circuits</p> <p>Computing • Control models using software designed for this purpose.</p> <p>Construction • With support choose suitable techniques to construct products or to repair items. • Strengthen materials using suitable techniques.</p> <p>Mechanics • With support use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as levers, winding mechanisms, pulleys and gears).</p>	<p>deciding which order could be more successful.</p> <p>• Refine work and techniques as work progresses, continually evaluating the product design.</p> <p>• Use software to design and represent product designs.</p>	<p>understand how they work.</p>
Expected	<p>Food • Prepare relevant ingredients hygienically using correct utensils. • Measure ingredients to the nearest gram accurately using the most appropriate resources. • Follow a recipe. • Assemble or cook ingredients (controlling the temperature of the oven or hob, if cooking).</p> <p>Materials • Cut materials accurately and safely by selecting appropriate tools. • Measure and mark out to the nearest millimetre. • Consistently apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs). • Select appropriate joining techniques.</p> <p>Textiles • Understand the need for a seam allowance. • Join textiles with appropriate stitching. • Select the most appropriate techniques to decorate textiles.</p> <p>Electricals and electronics • Create series and parallel circuits</p> <p>Computing • Control and monitor models using software designed for this purpose.</p> <p>Construction • Choose suitable techniques to construct products or to repair items. • Strengthen materials using suitable techniques.</p> <p>Mechanics • Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as levers, winding mechanisms, pulleys and gears).</p>	<p>• Design with purpose by identifying opportunities to design.</p> <p>• Create products with a purpose by working efficiently (such as by carefully selecting materials) knowing which order would be more successful.</p> <p>• Refine work and techniques as work progresses, continually evaluating the product design showing an ability to suggest other ideas to solve product faults.</p> <p>• Use software to design and represent product designs with more than one angle or dimension.</p>	<p>• Identify some of the great designers in all of the areas of study (including pioneers in horticultural techniques) to generate ideas for designs.</p> <p>• Improve upon existing designs, giving one explanation for your reasoning.</p> <p>• Disassemble products to understand how they work.</p>
Exceeding	<p>Food • Prepare ingredients hygienically and independently select appropriate utensils. • Measure ingredients to the nearest gram/millilitre accurately. • Follow a recipe and make own adaptations to improve it. • Cook ingredients controlling the temperature and cooking time.</p> <p>Materials • Cut materials accurately and safely by independently selecting appropriate tools to achieve the best possible finish or make the best possible cut. • Select appropriate joining techniques from a range of techniques that have been tried and tested.</p> <p>Textiles • Create a product where there is the need for a seam allowance. • Join textiles with appropriate stitching that has been tried and tested. • Select the most appropriate techniques to decorate textiles from a range of media.</p> <p>Electricals and electronics • Create series and parallel circuits and use this in a product</p> <p>Computing • Control and monitor models using the most suitable software designed for this purpose.</p> <p>Construction • Strengthen materials using suitable techniques that have been tested against</p>	<p>• Design for a specific purpose or audience and take their needs into account.</p> <p>• Create products by testing out prototypes before deciding on the final design</p> <p>• Refine work and techniques as work progresses, continually evaluating the product design having a clear idea of what could be done to improve the product.</p> <p>• Use software to design and produce diagrams of the final</p>	<p>• Identify and use ideas from some of the great designers in all of the areas of study (including pioneers in horticultural techniques).</p> <p>• Improve upon existing designs, and explain the reasons for your choices in detail.</p> <p>• Disassemble products to understand how they work and recreate the techniques used.</p>

	<p>damage or weight.</p> <p>Mechanics • Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product they have designed (such as levers, winding mechanisms, pulleys and gears).</p>	<p>design (considering different angles).</p>	
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Upper Key Stage 2

Year	Achievement	Knowledge and Independent Application		
		To master practical skills	To design, make, evaluate and improve	To take inspiration from design throughout history
5	Emerging	<p>Food • Prepare ingredients hygienically and independently select appropriate utensils. • Measure ingredients to the nearest gram/millilitre accurately. • Follow a recipe and make own adaptations to improve it. • Cook ingredients controlling the temperature and cooking time.</p> <p>Materials • Cut materials accurately and safely by independently selecting appropriate tools to achieve the best possible finish or make the best possible cut. • Select appropriate joining techniques from a range of techniques that have been tried and tested.</p> <p>Textiles • Create a product where there is the need for a seam allowance. • Join textiles with appropriate stitching that has been tried and tested. • Select the most appropriate techniques to decorate textiles from a range of media.</p> <p>Construction • Strengthen materials using suitable techniques that have been tested against damage or weight.</p> <p>Mechanics with support look at movement using cams</p>	<ul style="list-style-type: none"> • Design for a specific purpose or audience and take their needs into account. • Create products by testing out prototypes before deciding on the final design • Refine work and techniques as work progresses, continually evaluating the product design having a clear idea of what could be done to improve the product. • Use software to design and produce diagrams of the final design (considering different angles). 	<ul style="list-style-type: none"> • Identify and use ideas from some of the great designers in all of the areas of study (including pioneers in horticultural techniques). • Improve upon existing designs, and explain the reasons for your choices in detail. • Disassemble products to understand how they work and recreate the techniques used.
	Expected	<p>Food • Demonstrate a range of baking and cooking techniques. • Create and refine recipes, including ingredients, methods, cooking times and temperatures.</p> <p>Materials • Cut materials and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape). • Show an understanding of the qualities of materials to choose appropriate tools to cut and shape (such as the nature of fabric may require sharper scissors than would be used to cut paper).</p> <p>Textiles • Create objects (such as a cushion). • Join textiles with simple stitching techniques (such as running stitch to attach decoration). • Use materials to create different visual and tactile effects in the decoration of textiles (such as a soft decoration for comfort on a cushion).</p> <p>Construction • Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filling and sanding).</p> <p>Mechanics • Look at movement using cams</p>	<ul style="list-style-type: none"> • Design with the user in mind, a suitable product. • Make products through stages of prototypes adapting where necessary to improve the final product. • Ensure products have a high quality finish, using art skills where appropriate. • Use prototypes, cross-sectional diagrams and computer aided designs to represent designs. 	<ul style="list-style-type: none"> • Identify elements of design from one particular designer throughout history. • Create designs that improve upon existing products • Evaluate the design of products so as to suggest improvements to the user experience.
	Exceeding	<p>Food • Demonstrate a range of baking and cooking techniques. • Create and refine their own recipes, considering a balanced diet and the seven food groups.</p> <p>Materials • Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape). • Select appropriate materials and tools to cut and shape (such as the nature of fabric may require sharper scissors than would be used to cut paper).</p> <p>Textiles • Create objects (such as a cushion) that employ a seam allowance. • Join textiles with a combination of stitching techniques (such as back stitch for seams and running stitch to attach decoration). • Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles (such as a soft decoration for comfort on a cushion).</p>	<ul style="list-style-type: none"> • Design with the user in mind, a product which will offer a service (rather than simply for profit). • Make products through stages of prototypes, making continual refinements and evaluating their effectiveness. • Ensure products have a high quality finish, using art skills where appropriate choosing 	<ul style="list-style-type: none"> • Begin to use elements of design from a range of inspirational designers throughout history, giving reasons for choices. • Create innovative designs that improve upon existing products. • Evaluate the design of products so as to suggest improvements to a particular user's experience.

		<p>Construction • Apply a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filling and sanding).</p> <p>Mechanics • Convert rotary motion to linear using cams</p>	<ul style="list-style-type: none"> • Use prototypes, cross-sectional diagrams and computer aided designs to represent designs with developing accuracy. 	
6	Emerging	<p>Food • Demonstrate a range of baking and cooking techniques. • Create and refine their own recipes, considering a balanced diet and the seven food groups.</p> <p>Electricals and electronics With support: • Create circuits using electronics kits that employ a number of components (such as LEDs, resistors, transistors and chips).</p> <p>Computing • With support write code to control and monitor models or products.</p> <p>Mechanics • With support use innovative combinations of electronics (or computing) and mechanics in product designs.</p>	<ul style="list-style-type: none"> • Design with the user in mind, a product which will offer a service (rather than simply for profit). • Make products through stages of prototypes, making continual refinements and evaluating their effectiveness. • Ensure products have a high quality finish, using art skills where appropriate choosing • Use prototypes, cross-sectional diagrams and computer aided designs to represent designs with developing accuracy. 	<ul style="list-style-type: none"> • Begin to use elements of design from a range of inspirational designers throughout history, giving reasons for choices. • Create innovative designs that improve upon existing products. • Evaluate the design of products so as to suggest improvements to a particular user's experience.
	Expected	<p>Food • Understand the importance of correct storage and handling of ingredients (using knowledge of micro-organisms). • Measure accurately and calculate ratios of ingredients to scale up or down from a recipe.</p> <p>Electricals and electronics • Create circuits using electronics kits that employ a number of components (such as LEDs, resistors, transistors and chips).</p> <p>Computing • Write code to control and monitor models or products.</p> <p>Mechanics • Use innovative combinations of electronics (or computing) and mechanics in product designs.</p>	<ul style="list-style-type: none"> • Design with the user in mind, motivated by the service a product will offer (rather than simply for profit). • Use prototypes, cross-sectional diagrams and computer aided designs to represent designs accurately with more precise measurements. 	<ul style="list-style-type: none"> • Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices. • Create innovative designs that improve upon existing products with a specific area given to enhance. • Evaluate the design of products so as to suggest improvements to be made for two specific contrasting users.
	Exceeding	<ul style="list-style-type: none"> • Increase skills, knowledge and competence in using materials, machinery, technique and processes. • Complete common practical, diagnostic, repair and maintenance tasks and multi-stage processes. • Develop well-conceived and well-executed practical solutions. • Select and use complex tools, equipment, machinery and techniques skillfully. • Develop sophisticated practical skills and carry out diagnostic, repair and maintenance tasks in a range of contexts. • Explore materials and technological developments, and experiment with using them. • Understand the importance of nutrition, a balanced diet and about the characteristics of a broad range of ingredients in choosing and preparing food. • Cook a repertoire of savoury meals and become confident in a range of cooking techniques. 	<ul style="list-style-type: none"> • Plan, design, make and evaluate a range of quality products, in a variety of materials that are fit for purpose. • Communicate ideas and designs skillfully and accurately in 2D and 3D, using a variety of techniques, including computing. 	<ul style="list-style-type: none"> • Analyse the work of others, including iconic designs, to inform work. • Use historical and contextual references to influence and improve work. • Understand developments in design and technology and the responsibilities of designers, including environmental responsibilities.

Phase Outcomes

		End of Year 2	End of Year 4	End of Year 6
To master practical skills	Food	<ul style="list-style-type: none"> • Cut, peel or grate ingredients safely and hygienically. • Measure or weigh using measuring cups or electronic scales. • Assemble or cook ingredients. 	<ul style="list-style-type: none"> • Prepare ingredients hygienically using appropriate utensils. • Measure ingredients to the nearest gram accurately. • Follow a recipe. • Assemble or cook ingredients (controlling the temperature of the oven or hob, if cooking). 	<ul style="list-style-type: none"> • Understand the importance of correct storage and handling of ingredients (using knowledge of micro-organisms). • Measure accurately and calculate ratios of ingredients to scale up or down from a recipe. • Demonstrate a range of baking and cooking techniques. • Create and refine recipes, including ingredients, methods, cooking times and temperatures.
	Materials	<ul style="list-style-type: none"> • Cut materials safely using tools provided. • Measure and mark out to the nearest centimetre. • Demonstrate a range of cutting and shaping techniques (such as tearing, cutting, folding and curling). • Demonstrate a range of joining techniques (such as gluing, hinges or combining materials to strengthen). 	<ul style="list-style-type: none"> • Cut materials accurately and safely by selecting appropriate tools. • Measure and mark out to the nearest millimetre. • Apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs). • Select appropriate joining techniques. 	<ul style="list-style-type: none"> • Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape). • Show an understanding of the qualities of materials to choose appropriate tools to cut and shape (such as the nature of fabric may require sharper scissors than would be used to cut paper).
	Textiles	<ul style="list-style-type: none"> • Shape textiles using templates. • Join textiles using running stitch. • Colour and decorate textiles using a number of techniques (such as dyeing, adding sequins or printing). 	<ul style="list-style-type: none"> • Understand the need for a seam allowance. • Join textiles with appropriate stitching. • Select the most appropriate techniques to decorate textiles. 	<ul style="list-style-type: none"> • Create objects (such as a cushion) that employ a seam allowance. • Join textiles with a combination of stitching techniques (such as back stitch for seams and running stitch to attach decoration). • Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles (such as a soft decoration for comfort on a cushion).
	Electricals and electronics	<ul style="list-style-type: none"> • Diagnose faults in battery operated devices (such as low battery, water damage or battery terminal damage). 	<ul style="list-style-type: none"> • Create series and parallel circuits 	<ul style="list-style-type: none"> • Create circuits using electronics kits that employ a number of components (such as LEDs, resistors, transistors and chips).
	Computing	<ul style="list-style-type: none"> • Model designs using software. 	<ul style="list-style-type: none"> • Control and monitor models using software designed for this purpose. 	<ul style="list-style-type: none"> • Write code to control and monitor models or products.
	Construction	<ul style="list-style-type: none"> • Use materials to practise drilling, screwing, gluing and nailing materials to make and strengthen products. 	<ul style="list-style-type: none"> • Choose suitable techniques to construct products or to repair items. • Strengthen materials using suitable techniques. 	<ul style="list-style-type: none"> • Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filling and sanding).
	Mechanics	<ul style="list-style-type: none"> • Create products using levers, wheels and winding mechanisms. 	<ul style="list-style-type: none"> • Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as levers, winding mechanisms, pulleys and gears). 	<ul style="list-style-type: none"> • Convert rotary motion to linear using cams. • Use innovative combinations of electronics (or computing) and mechanics in product designs.
To design, make, evaluate and improve		<ul style="list-style-type: none"> • Design products that have a clear purpose and an intended user. • Make products, refining the design as work progresses. • Use software to design. 	<ul style="list-style-type: none"> • Design with purpose by identifying opportunities to design. • Make products by working efficiently (such as by carefully selecting materials). • Refine work and techniques as work progresses, continually evaluating the product design. • Use software to design and represent product designs. 	<ul style="list-style-type: none"> • Design with the user in mind, motivated by the service a product will offer (rather than simply for profit). • Make products through stages of prototypes, making continual refinements. • Ensure products have a high quality finish, using art skills where appropriate. • Use prototypes, cross-sectional diagrams and computer aided designs to represent designs.
To take inspiration from design throughout history		<ul style="list-style-type: none"> • Explore objects and designs to identify likes and dislikes of the designs. • Suggest improvements to existing designs. • Explore how products have been created. 	<ul style="list-style-type: none"> • Identify some of the great designers in all of the areas of study (including pioneers in horticultural techniques) to generate ideas for designs. • Improve upon existing designs, giving reasons for choices. • Disassemble products to understand how they work. 	<ul style="list-style-type: none"> • Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices. • Create innovative designs that improve upon existing products. • Evaluate the design of products so as to suggest improvements to the user experience.

P-Scales

<p>P4</p> <ul style="list-style-type: none"> • With help, begin to assemble components provided for an activity. • Contribute to activities by coactively grasping and moving simple tools. • Explore options within a limited range of materials. 	<p>P5</p> <ul style="list-style-type: none"> • Use a basic tool, with support. • Demonstrate preferences for products, materials and ingredients. 	<p>P6</p> <ul style="list-style-type: none"> • Recognise familiar products and explore the different parts they are made from. • Watch others using a basic tool and copy the actions. • Begin to offer responses to making activities. 	<p>P7</p> <ul style="list-style-type: none"> • Operate familiar products, with support, and explore how they work. • Use basic tools or equipment in simple processes, chosen in negotiation with the teacher. • Begin to communicate preferences in designing and making. 	<p>P8</p> <ul style="list-style-type: none"> • Explore familiar products and communicate views about them when prompted. • With help, manipulate a range of basic tools in making activities. • Begin to contribute to decisions about what to do and how. 	<p>Early Years</p> <ul style="list-style-type: none"> • Manipulate materials to achieve a planned effect. • Construct with purpose in mind, using a variety of resources. • Select appropriate resources and adapt work where necessary. • Select tools and techniques needed to shape, assemble and join materials. • Create simple representations of events, people and objects.
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Challenge – KS3

<p>Design and technology opportunities</p> <ul style="list-style-type: none"> • Work in a number of fields including: <ul style="list-style-type: none"> • materials (including textiles) • horticulture • electricals and electronics • construction • mechanics • cooking • emerging areas of design and technology (such as food design, design for disability, and age-related design). 	<p>Mastering practical skills</p> <ul style="list-style-type: none"> • Increase skills, knowledge and competence in using materials, machinery, technique and processes. • Complete common practical, diagnostic, repair and maintenance tasks and multi-stage processes. • Develop well-conceived and well-executed practical solutions. • Select and use complex tools, equipment, machinery and techniques skillfully. • Develop sophisticated practical skills and carry out diagnostic, repair and maintenance tasks in a range of contexts. • Explore materials and technological developments, and experiment with using them. • Understand the importance of nutrition, a balanced diet and about the characteristics of a broad range of ingredients in choosing and preparing food. • Cook a repertoire of savoury meals and become confident in a range of cooking techniques. 	<p>Designing, making, evaluating and improving</p> <ul style="list-style-type: none"> • Plan, design, make and evaluate a range of quality products, in a variety of materials, that are fit for purpose. • Communicate ideas and designs skilfully and accurately in 2D and 3D, using a variety of techniques, including computing. 	<p>Taking inspiration from design throughout history</p> <ul style="list-style-type: none"> • Analyse the work of others, including iconic designs, to inform work. • Use historical and contextual references to influence and improve work. • Understand developments in design and technology and the responsibilities of designers, including environmental responsibilities.
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