



Coleshill Church Of England Primary School

Progression of Skills in Design & Technology – Electrical Systems

Our curriculum is about bringing engagement, fun and enthusiasm to learning. We aspire to provide outstanding educational experiences which will inspire children to develop into lifelong independent learners. Our high expectations develop character and pride in our identity as Coleshill Church of England Primary school, preparing every child for their future.

National Curriculum

KS1	KS2
<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 [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 <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 	<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 [for example, cutting, shaping, joining and finishing], accurately • select from and use a wide 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

<ul style="list-style-type: none"> • explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. 	Technical Knowledge <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 [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.
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Progression of Skills

Year	Overview	Design	Make	Evaluate / Tech Knowledge
Year 4	<p>Torches: Pupils are introduced to electricity and electrical safety before making a simple electric circuit to create a functioning torch.</p> <p><i>*Note*</i> using electrostatic energy is a Year 3 skill which you could link in to year 4</p>	<p>Identifying a design criteria and a target audience</p> <p>Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas</p>	<p>Refer to the design criteria</p> <p>Using a wider range of materials and equipment safely</p> <p>Making a torch with a working electrical circuit and switch</p> <p>Using appropriate equipment to cut and attach materials</p> <p>Assembling a torch according to the design and success criteria</p>	<p>Learning to give constructive criticism on own work and the work of others</p> <p>Testing the success of a product against the original design criteria and justifying opinions</p> <p>Evaluating electrical products</p> <p>Testing and evaluating the success of a final product and taking inspiration from the work of peers</p> <p>Understanding what static electricity is and how it moves objects through attraction or repulsion</p> <p>Generating static electricity independently</p> <p>Using static electricity to make objects move in a desired way</p> <p>Learning how electrical items work</p> <p>Identifying electrical products</p> <p>Learning what electrical conductors and insulators are</p> <p>Understanding that a battery contains stored electricity and can be used to power products</p> <p>Identifying the features of a torch</p> <p>Understanding how a torch works</p>

				Articulating the positives and negatives about different torches
Year 6	Steady Hand Games: Pupils create electromagnetic toys and more complex electronic circuits to create a steady hand game	Designing something with a simple electrical control circuit Creating a labelled design showing positive and negative parts in relation to the LED and the battery Designing a steady hand game – identifying and naming the components required Drawing a design from three different perspectives Generating ideas through sketching and discussion Modelling ideas through prototypes	Making a working circuit Refer to a design criteria Mapping out where different components of the circuit will go Making electromagnetic motors and tweaking the motor to improve its function Constructing a stable base for an electromagnetic game Accurately cutting, folding and assembling a net Decorating the base of the game to a high quality finish Making and testing a circuit Incorporating a circuit into a base	Evaluating a completed product against the original design sheet and looking at modifications that could be made to improve the reliability or aesthetics of it or to incorporate another type of electronic device, eg; buzzer Testing own and others finished games, identifying what went well and making suggestions for improvement Learning the key components used to create a functioning circuit Learning that graphite is a conductor and can be used as part of a circuit Learning the difference between series and parallel circuits Understanding that breaks in a circuit will stop it from working Understanding how electromagnetic motors work Learning that batteries contain acid, which can be dangerous if they leak Learning that when electricity enters a magnetic field it can make a motor