| Year Group: 4 | Unit: Simple electrical circuits |
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| **National Curriculum Aims**<br>The national curriculum for design and technology aims to ensure that all pupils:<br>➢ develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world<br>➢ build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users<br>➢ critique, evaluate and test their ideas and products and the work of others | **Technical knowledge**<br>➢ understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]<br>➢ apply their understanding of computing to program, monitor and control their products.<br><br>**Product Outcome**<br>To create an electrical buggy. |

**Prior Learning:** 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.

| Curriculum | Learning Intention/possible activities | Knowledge and Key Vocabulary |
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| **Evaluate**<br>➢ Investigate and analyse a range of existing battery-powered products | **Which toys are powered by batteries?**<br>Recap previous learning from the science unit on circuits and discuss key components.<br>Investigate and analyse a range of existing battery powered toys and how these use the electrical energy.<br><br>**What are the key features of vehicle?**<br>Investigate and analyse a range of cars to identify their key features including. | **Knowledge:**<br>- A circuit is a path through which electricity passes. A conductor is a material which allows an electric current to pass through it.<br>- Insulator is a material which does not easily allow electric current to pass through it.<br>- Prototype is a model made to test whether a design will work.<br>- System is a set of related parts or components that together achieve a desired outcome.<br>- Output devices are components that produce an outcome e.g. bulbs and buzzers.<br>- Input devices are components that are used to control an electrical circuit e.g. switches. |
| **Design**<br>➢ 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.<br>➢ Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated | **How do designers know what will appeal to their audience?**<br>Research what would appeal to my audience through a questionnaire (KS2 children).<br><br>**How can my research help me?**<br>Create a set of design criteria based on the results of my survey. | **Vocabulary:**<br>series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip control, purpose, function, prototype, design criteria, innovative, appealing, design brief |

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| sketches, cross-sectional and exploded diagrams. | Design a battery-operated toy. | |
| **Make**<br>➢ Order the main stages of making.<br>➢ Select from and use tools and equipment to cut, shape, join and finish with some accuracy.<br>➢ Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities. | **How can I make a battery powered vehicle?**<br>Make a battery-operated toy with a switch out of a range of materials. | |
| **Evaluate**<br>➢ Investigate and analyse a range of existing battery-powered products.<br>➢ Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work. | **Does my product meet my design criteria?**<br>Evaluate my final product against my design criteria. | |

**Thinking Deeper:** What type of toy might a designer aim to create next? Consider gaps in the market and current/upcoming trends.

## Links to other subjects:

- Subject Specific links- Science – discuss the properties and suitability of materials for particular purposes. Mathematics – compare and sort common 2-D and 3-D shapes in everyday objects. Recognise 3-D shapes in different orientations and describe them. Spoken language – ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.
- Personal Development – resilience when problem solving
- SMSC – social – working with younger children during the design process
- Cultural Capital – gaining an understanding into how everyday products are designed and produced.
- Careers – market research, designers
- British Values – mutual respect when evaluating products created
- Equality – considering marketing to an inclusive audience