

Design and Technology – Year 6

Content- Electrical Systems- More complex circuits

Big Question: How does evaluation support functionality?

NC objectives - areas of study	End point of area of study	Vocabulary		
		Basic	Adventurous	Technical
<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.</p> <p>When designing and making, pupils should be taught to:</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. -Select from and use a wider range of tools and equipment to perform practical tasks accurately. -Select from and use a wider range of materials and components. Including construction materials and textiles. -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. 	<p><u>Electrical Systems-</u></p> <p>Children understand and use electrical systems in their products.</p> <p>Children can apply their understanding of their computing to program, monitor and control their products.</p> <p>Children know and use relevant technical vocabulary during the whole process of designing, making and evaluating their product.</p>	<p>Crocodile clips, buzzers, bulbs/bulb holders, light emitting diodes, wire</p>	<p>Function Innovate specification</p>	<p>Series circuit Parallel circuit Components Micro switches Reed switches Light dependent</p>

<p>-Understand how key events and individuals in design and technology have helped shape the world.</p> <p>-Understand and use electrical systems in their products.</p> <p>-They can apply their understanding of computing to programme, monitor and control their products.</p>				
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Knowledge

Substantive Knowledge

Electrical Systems - concepts- **Functionality** and **Authenticity**

Lesson 1:

LO: To understand how electrical systems can be used in existing products.

Children to know famous inventors who have developed ground-breaking electrical systems and components.

Investigate famous inventors who developed ground-breaking electrical systems and components.

Discuss examples of alarm systems – where and why they are used, for example to provide information, to warn of danger or disturbance, to prevent damage, to keep things safe. Focus on car alarms and the needs of the driver and purpose.

Lesson 2:

LO: To know and understand the differences between parallel and series circuits.

(Retrieval year 4 DT and Science learning – Electricity and simple circuits.)

Drawing on science understanding, ask the children to explore a range of electrical systems that could be used to control their products, including a simple series circuit where a single output device is controlled, a series circuit where two output devices are controlled by one switch and, where

Disciplinary Knowledge

Each lesson: Tell chn- Explain to the children that today we are going to be electricians. This includes evaluating electrical systems, products, components and applications, designing and conducting research programs. They will apply their knowledge of electricity and material and develop electrical products by studying customer requirements.

Throughout the unit, children will be able to draw upon other subject disciplines such as Mathematics, Science and Art. This will include the following:

Mathematics – apply understanding and skill to carry out accurate measuring using standard units i.e. cm/mm.

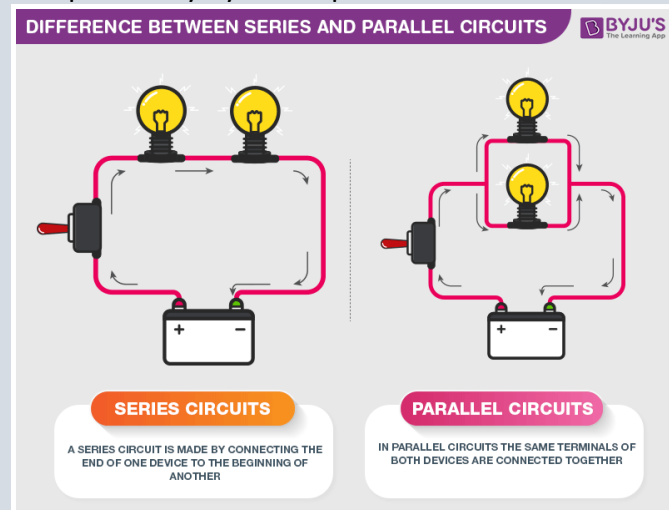
Science – apply knowledge and understanding of circuits, switches, conductors and insulators.

Computing – design, write and debug programs that accomplish specific goals, including controlling physical systems. Use sequence, selection, and repetition in programs. Work with variables and various forms of input and output.

Spoken Language – ask relevant questions, give well-structured descriptions and explanations. Build technical vocabulary.

Computing – use technologies for research purposes and be discerning when evaluating digital content.

appropriate, parallel circuits where two output devices are controlled independently by two separate switches.



Lesson 3:

LO: To know how to plan a functional product linked to the design brief.

Develop an authentic and meaningful design brief with the children.

Ask the children generate innovative ideas by drawing on research and develop a design specification for their product, carefully considering the purpose and needs of the intended user.

Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. Drawings should indicate the design decisions made, including the location of the electrical components and how they work as a system with an input, process and output.

Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate, allocate tasks within a team.

[To celebrate personal creativity \(self\)](#)

Lesson 4:

LO: To know how to make a complex electrical product.

Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Create and modify a computer control program to enable

Science – apply knowledge and understanding of circuits, switches, conductors and insulators.

Children to follow the four aspects of Design and Technology- research, design, make and evaluate whilst building upon technical knowledge to make their finished product.

the product to work automatically in response to changes in the environment.

Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product.

Lesson 5:

LO: To know how to make a complex electrical product.

Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Create and modify a computer control program to enable the product to work automatically in response to changes in the environment.

Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product.

Lesson 6:

LO: To know how to evaluate an electrical product against the design brief.

Critically evaluate throughout and the final product, comparing it to the original design specification. Test the system to demonstrate its effectiveness for the intended user and purpose.

Reflect on how effective product is and how it would be used by the consumer (self, others)

Concepts

Functionality

Pupils should design and make products that work/function effectively in order to fulfil users' needs, wants and purposes.

Understand the meaning of 'functionality' and its importance to design and technology.

Know how functionality is relevant to the product they are designing.

Know how the materials and components they use assist the functionality of the product.

Contrast the functional properties of materials and components with their aesthetic qualities.

Understand that how products work affects how they are used.

Authenticity

Carry out projects that are real and meaningful to them and others.

Work within a range of relevant contexts, ranging from domestic to industrial.

Work towards realistic and credible outcomes that can be evaluated in use.

Engage in activity that mirrors design and technology in the wider world.

Create products with a genuine purpose and for a real user.

Create products which need to work in some way in order to be successful.

Understand the difference between genuine D&T products and outcomes created in other areas of the curriculum.

Innovation

Significance

ASSESSMENT

KNOW MORE, REMEMBER MORE, DO MORE...

In this unit of learning, progress has been made when a learner knows more. This 'distance travelled' from the starting point is evidenced through them remembering more and doing more: in books, low stakes quizzes, retrieval, use of mind maps, answering the big question and being able to feel more confident about this unit.