

Medium Term Plan: Supporting Implementation of LTP/Progression Grid

Subject: DT- More complex electrical systems Year: B - Autumn (UKS2)

NC/PoS:

- 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.
- To generate, develop, model and communicate their ideas through discussion, annotated sketches and cross-sectional.
- Select from and use a wider range of materials and components according to their functional properties and aesthetic qualities.
- 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.
- To apply their understanding of computing to programme, monitor and control their products.
- To understand and use electrical systems in their products.

Prior Learning (what pupils already know and can do)

- Children can design an electrical circuit for a product. For example: a torch
- Children can draw an annotated sketch of an electrical circuit and can label it with materials and components.
- Children can select from batteries, switches, foil, paper clips, buzzers, bulbs to create their product and can use a crumble to control it.
- Children can name products that use electrical circuits – lights, torches, children’s toys.
- Children can state if their electrical circuit and final product is suitable for the intended user and purpose. They can offer a way to improve their product.
- Children can understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers.

End points (what pupils MUST know and remember)

- Children can design an electrical circuit for a product. For example: a night light
- Children can draw an annotated sketch of an electrical circuit and can label it with materials and components. They should also consider time restraints and the resources required.
- Children can select from batteries, switches, foil, paper clips, buzzers, bulbs to create their product.
- Children can name products that use electrical circuits and respond to the environment– automatic nightlights, alarm systems, security lighting
- Children can state if their electrical circuit and final product is suitable for the intended user and purpose. They can offer a way to improve their product.
- Children can use a crumble to control their electrical system.
- Children can understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers.

Key Vocabulary

series circuit, parallel circuit, input device, output device, system, monitor, control, program, crumble, light dependent resistors (LDRs), push-to-make switches, push-to-break switches, toggle switches, micro switches and reed switches.

Session 1:

Exploring existing products

- Research and discuss a range of relevant products that respond to changes in the

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environment using a computer control program such as automatic nightlights, alarm systems, security lighting etc

- Consider: Who have the products been designed for and for what purpose? How and why is a computer control program used to operate the products? What input devices, e.g. switches, and output devices, e.g. have bulbs been used? Is there a monitor?
- Children should investigate electrical sensors such as light dependent resistors (LDRs) and a range of switches such as push-to-make switches, push-to-break switches, toggle switches, micro switches and reed switches.
- Evaluate and discuss the different circuits – series and parallel
- Children could research famous inventors related to the project e.g. Thomas Edison – light bulb.

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Session 2:

Practising skills

- Recap measuring, marking out, cutting and joining skills with construction materials that children will need to create their electrical products.
- Demonstrate and enable children to practise methods for making secure electrical connections e.g. using wire strippers, twist and tape electrical connections, screw connections and connecting blocks.
- 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 appropriate, parallel circuits where two output devices are controlled independently by two separate switches.
- Drawing on related computing activities, ensure that children can write computer control programs that include inputs, outputs and decision making. Test out the programs using electrical components connected to interface boxes or standalone boxes.
- Teach children how to avoid making short circuits.
- Teach children how to use a crumble to control and electrical system.

Vocab: series circuit, parallel circuit, input device, output device, system, monitor, control, program, crumble

Session 3:

Designing

- 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 and cross-sectional diagrams.
- Annotated sketches to show external shape. Cross sectional diagram to show internal and external components. Children should label the type of circuit and the switches used.
- Individual liberty – children are encouraged to make their products different and unique.

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Session 4:

Making

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- 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 (bulb/buzzer, wires, battery, container shape/size)
- Resilience – during the entire making process, we discuss keeping on trying and never giving up even if the task gets tricky.

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Session 5:

Evaluating

- Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work (include user and purpose across evaluation – what is effective to your audience? Would they buy this product? Why? If not, how could you improve it?)
- How did the crumble improve the use of the electrical system?
- Honesty – during the evaluation stages we discuss being honest with ourselves (self-reflection) and others to ensure we can improve ourselves and our work.

Vocab: evaluate

Future learning this content supports:

KS3 – science

KS3 - electronics