

Ashtree Primary School and Nursery Medium Term Plan for DT

Year 4 – Electrical circuits

Key Vocabulary

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.

Prior Knowledge

Identify mains operated and battery operated devices **and** name some components of a simple electrical circuit. Know that batteries are sources of electricity. Recognise that for a circuit to work it must be complete,

Constructs a simple series electrical circuit from drawings provided, describe the effect of making and breaking one of the contacts on a circuit, explain why some circuits work and others do not. Describe how switches work, construct a homemade switch.

Cut and joined a variety of construction materials such as wood, card, plastic, reclaimed materials and glue,

Key Knowledge: To know that mechanical and electrical systems have an input, process and output. To know that a battery contains stored electricity and can be used to power products. To know what electrical conductors and insulators are.

Key Skill: To make a product which uses both electrical and mechanical components.

KS2 Design and Technology National Curriculum

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 select from and use a wider range of materials and components

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.

Design and Evaluate

Children can be taught key knowledge by learning the skills below:
What could children design, make and evaluate - Siren for a toy vehicle
reading light noise-making toy nightlight illuminated sign torches table lamp
lighting for display hands-free head lamp buzzer for school office.

- 1) To investigate a variety of lights and how they are designed and used.
- 2) To investigate which metal components can be used in a simple circuit.
- 3) To investigate how to use switches to control a bulb.
- 4) To be able to design a light for a particular purpose.
- 5) To be able to make a product from a design.
- 6) To be able to evaluate a finished product.

Curriculum Enhancements and Designers

To look at the work of the Italian inventor Alessandro Volta.

Misconceptions

- ❖ Order of design sequence – eg must a design *always* come before you make anything?
- ❖ Evaluation of product – if final product does not match the initial design is that a bad thing? Can it be good? What can we learn from adapting our design?

Suggested Activities

Curriculum links

Science - know how to construct simple series circuits and have a basic understanding of conductors, insulators and open and closed switches.

Spoken language - participate in discussion and evaluation of battery-powered products. Ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.

Art and design - using and developing drawing skills.

Computing - design, write and debug programs that accomplish specific goals, including controlling physical systems.

This will lead children...

To build on skills previously learnt in Science.

To make a bulb light up in a simple circuit.

To create their own switches and know how to place them in a circuit to control a bulb.

To make suggestions about how they will use their ideas in their own light designs.

To design a product which takes into account some of the needs of the user.

To apply what they have learnt when making a final product and follow a design.

To be able to evaluate a finished product against original design criteria and identify ways in which they could modify or improve their product if they were to make it again?