Ashtree Primary School and Nursery Medium Term Plan for DT

Year 6 – Electrical circuits –Buzzer game/Electrical game

Key Vocabulary

Series circuit, Parallel circuit, names of switches and components, input device, output device, system, monitor, control, program, flowchart.

Prior Knowledge

Identify mains operated and battery operated devices, describe some of the dangers associated with mains electricity. 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, construct a working circuit, and make drawings of simple working circuits. Make circuits 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.

Key knowledge: To understand how more complex electrical circuits and components can be used to create functional products. To know that graphite is a conductor and can be used as part of a circuit understand how electromagnetic motors work and that switches are a break in the circuit. Know that batteries contain acid, which can be dangerous if they leak. Learning that when electricity enters a magnetic field it can make a motor

Key Skill: Competently select from and use appropriate tools and assemble materials and securely connect electrical components to produce reliable, functional Products

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:

1. To explore existing product designs and the circuits used.
2. To design a buzzer/electrical game.
3. To make a prototype of the product following a plan.
4. To adapt and improve work as necessary.
5. To evaluate finished product against original design.
6. To suggest changes for improvement.

Curriculum Enhancements and Designers

Children could research famous inventors related to the project e.g. Thomas Edison – light bulb.

Misconceptions

Some children may think that devices, such as light bulbs or batteries, create electricity. Children may think that electricity flows instantaneously through a circuit. It is important to explain that electricity flows at a constant speed and that the speed depends on the resistance of the circuit .Children may think that all wires are the same and that any wire can be used in any circuit. It is important to explain that wires have different properties, such as thickness and material that affect their resistance and suitability for a particular circuit. Children may think that adding more batteries to a circuit always increases the power of the circuit. It is important to explain that adding more batteries increases the voltage of the circuit, but it may not necessarily increase the power if the resistance of the circuit also increases. Children may think that electrical circuits always work the same way and that there is only one correct way to design a circuit. It is important to explain that electrical circuits can be designed and built in many different ways, and that the effectiveness of a circuit depends on its design and components.

Suggested Activities

1) Research and discuss a range of relevant products. *Who have the products been designed for and for what purpose? What input devices, e.g. switches, and output devices, e.g. bulbs, have been used?*

2) Review the basics of circuit design and planning. Introduce the concept of a complex circuit for an electrical game.

3) Use the necessary components to build an electrical game circuit.

4) Test their prototypes and adapt accordingly. Collect feedback and observations during the testing process.

Curriculum links

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.
Science – apply knowledge and understanding of circuits, switches, conductors and insulators.
Mathematics – apply understanding and skill to carry out accurate measuring using standard units i.e. cm/mm.

This will lead children..

To build on skills previously learnt in Science.
To create their own switches and know how to place them in a circuit in a game.
To make suggestions about how they will use their ideas in their own games
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?