Design and Technology   Year 5   Electronics-More complex switches and circuits

Prior Learning

In Year 4 the children carried out a DT unit that involved using simple electronics. They explored switches and circuits and incorporated these into a product.

The children can:
Explore simple products by disassembling them and embarking on research as to what products are currently on the market and they have understood the need to speak to the target audience to understand what the consumer needs.
Create mood boards and simple diagrams such as an exploding diagram. In their previous Year 5 unit they will have experienced cross sectional drawings.

Switches and circuits in the world

More complex circuits such as a parallel circuits has two or more paths for current to flow through. This means different components can be controlled separately e.g. a light bulb can be off, while a buzzer sounds.
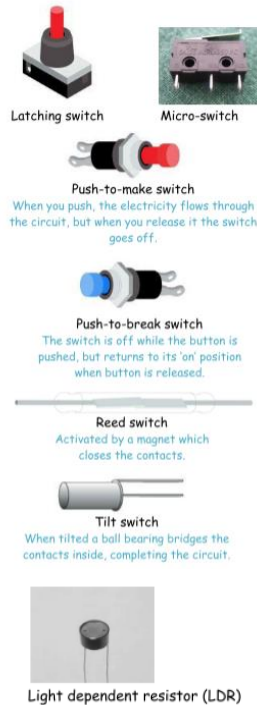
Series and parallel circuits
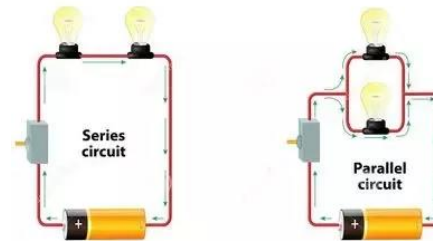
Key Vocabulary

Open switch:when a switch is positioned so electricity cannot flow through it.
Closed Switch: when a switch is positioned so electricity can flow through it.
Normally open:The term used to describe when a switch is in the off position i.e. the switch is open and not electricity can flow through.
Normally closed:The term used to describe when a switch is in the on position.
Computer control input:when a switch (micro switch) sends a signal to a computer control box to activate a sequence of events e.g.alarm sounding.
Input device:components used to control an electrical circuit e.g. switch.
Output device: components that produce an output e.g. bulbs, buzzers

Intended Outcomes

1. **To identify how control programs may be used to control electrical systems.**
2. **To explain what the steps to a control program may be.**
3. **To explore parallel circuits and contrast to those in series.**
4. **Use ICT to program a set of instructions to control a device and represent this with a flowchart.**
5. **To design and make a product that includes control technology and produce a programmed sequence of steps.**
6. **To use appropriate techniques for cutting, securing, joining and finishing.**
7. **To evaluate the effectiveness of the product by referring to the specification and include consumer feedback in the evaluation.**

Switches and sensors

Latching switch   **Micro-switch**

Push-to-make switch
When you push, the electricity flows through the circuit, but when you release it the switch goes off.

Push-to-break switch
The switch is off while the button is pushed, but returns to its 'on' position when button is released.

Reed switch
Activated by a magnet which closes the contacts.

Tilt switch
When tilted a ball bearing bridges the contacts inside, completing the circuit.

Light dependent resistor (LDR)

Control technology

Control technology is used to:

- operate systems, eg traffic lights
- control actions, eg a robot's movement
- create video games
- control manufacturing devices, eg laser cutters

Computers follow instructions or sequences programmed into them. A flowchart can be used to help design a sequence. Actions can be ordered, reordered or removed if no longer necessary.
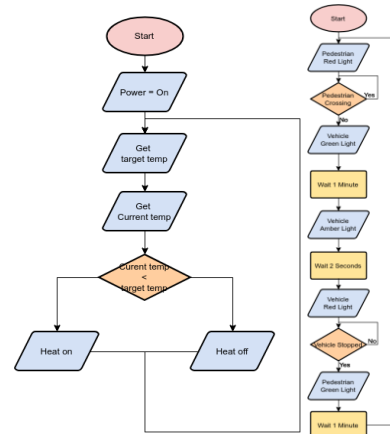
- Children need to learn how to write a sequence of instructions where a decision is made e.g. when a switch is pressed a buzzer is activated.
- They use a 'control language' or create a flowchart to produce a series of instructions.
- Children's computing knowledge and skills need to focus on using input and output devices connected to a standalone box or interface box.
- They use their learning in computing to control and monitor products they have designed and made e.g. alarm system.

https://www.youtube.com/watch?v=XSukRnxGy5c