



## Electricity (Physics)

### Year 6

#### End Points:

- Electricity can flow from one place to another - this is called electrical current
- We can control the flow of electricity in a circuit
- Circuit components need electricity to work
- Circuits components turn electrical energy into different energy forms
- Voltage is the pressure from a battery that pushes electricity around a circuit
- The voltage of a battery or the number of batteries can change the brightness/volume of components
- Switches control the flow of electricity in a circuit
- A switch creates makes a circuit complete or incomplete
- Making a gap in a circuit prevents electricity from flowing

This unit builds on content from Year 2 Electricity (non-statutory) and from Year 4 Electricity. In the previous two units, children have worked scientifically to make simple circuits and to investigate how electricity behaves within a circuit. Children will have experienced using batteries, wires and bulbs. They will build on their learning in this unit, recapping that electricity carried energy that can be converted into heat, light and energy in our homes, schools and places of work. Children will develop this knowledge to understand that electricity can only travel if there is a complete circuit.

In this unit, children will use symbols to represent components of a circuit including batteries, wires, bulbs and switches. Children will learn about the importance of switches for conserving energy and for safety reasons. Children will build their understanding of batteries and their voltage. They will make the link between Alessandro Volta and his interactions with Napoleon Bonaparte, referencing their knowledge of Napoleon from the Year 5 History unit on the French Revolution. They will learn that adding more batteries to a circuit can increase the brightness of a bulb.

In this unit children will design, make and evaluate an electrical device. They will design a device for a purpose, which can be set by the teacher. They will work scientifically to consider the purpose for which they are designing their device and what it must be capable of. They will make their device using simple materials such as wires, batteries, buzzers and switches.

They will create labelled diagrams when planning their design, using symbols. At the end of the unit they will apply their knowledge to design an intruder alarm.

**Lesson Sequencing:**

In lesson one, children will revisit learning from Years 2 and 4, learning that electricity flows in a circuit. Lesson two will look at voltage and how it affects the brightness of a bulb or the volume of a buzzer. In lesson three, children will learn how switches control the flow of electricity in a circuit, looking at kill switches. In lessons four and five, children will design and build a circuit for a purpose, designing a toy that uses electricity for a function (e.g. toy car). In the assessment lesson, children will use the knowledge learnt in this unit to try and make an intruder alarm.

**Misconceptions:**

- Electricity works by coming out of one end of a cell
- Electricity comes out of both ends of a cell
- A circuit uses up electric current (rather than electric energy)
- Voltage makes a circuit work by travelling around the wires
- Bigger batteries make bulbs brighter
- Components in a circuit that are closer to the battery get more electricity

**Working Scientifically criteria met in this unit:**

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments