



# Electricity

## Expected prior learning

- Everyday experience of electrical appliances and safety rules.
- Electric light sources.
- The 'invisible' force exerted by magnets.

## Overview of progression

By the end of this chapter children should be able to:

- identify common appliances that use mains or batteries
- construct a simple electrical circuit
- explain that whether or not a bulb will light depends upon whether the circuit is complete
- recognise that a switch breaks and closes a circuit
- recognise some common electrical conductors and insulators.

## Creative context

- The topic of electricity provides opportunities for design and technology, as the practical work often takes a problem-solving approach.
- Children could link making models with electrical components to other areas of the curriculum.
- They could research the development of electric light, or, taking a broader view of energy to link with geographical themes, they could find out about the use of electricity globally and its environmental impact.

## Background knowledge

In order for current to flow, there must be a complete circuit. Batteries provide the 'push' to create the flow of electricity; when they 'run out', it is not that the circuit has run out of electricity, but that the battery can no longer push it (particles called *electrons*) around.

Some materials are good electrical conductors; metals, and also graphite are commonly available. Materials that electricity cannot flow through easily are insulators, such as plastic and air. At high voltages, electricity will flow through almost anything!

## Speaking scientifically

- Children do not need to use the terms 'current' and 'voltage' at this stage. Instead the phrases 'flow of electricity' and 'push' help to clarify what is going on. Insulators and conductors can be thermal as well as electrical, and this can sometimes lead to confusion: often a good thermal insulator is also a good electrical insulator. Explaining the importance of using causal connectives in science – because, causes, so – helps children provide clear explanations.

## Preparation

**You will need to provide:** box, paper clips, magnet, electric lamp, torches, magazines and catalogues with images of items that use electricity, wind-up toy, battery-powered toy, toy windmill, toy waterwheel, photographs (water wheels, old windmills and modern wind turbines), secondary sources on generation of electricity, books and internet access, batteries, bulbs, bulb holders, crocodile clips, leads, buzzers, motors, motor holders, magnifying glasses, simple circuit (battery, bulb in bulb holder and two leads), loop of rope, balls or beanbags, hoops, collection of battery-powered devices/toys that make a sound, spinning bow tie, plastic propellers, screwdrivers, reel of wire, wire strippers, junk materials, homemade switches, paper fasteners, drawing pins, aluminium foil, clothes pegs, balsa wood, collections of materials that do and do not conduct electricity, electrical cables cut to show the different parts inside, three-pin plugs with the covers removed, a (free) software package such as Yenka Basic Circuits, images of Earth at night from space

**On the CD-ROM you will find:** interactive activities 'Switch it off!', 'Will the bulb light up?', 'Conductors and insulators'