Electrical resistance

Many electrical components reduce the flow of current in a circuit. They are said to have a **resistance**. The size of the resistance is measured in ohms (Ω). If you double the resistance in a circuit, keeping the electromotive force the same, the current is halved.

The smaller the resistance of a circuit, the higher the current that flows round it. If one part of a circuit becomes connected to another accidentally, reducing the resistance, a dangerously high current can flow and damage components in the circuit. This is called a short circuit. Fuses and circuit-breakers are automatic safety devices that cut off the electricity if the current gets too high.

Making light

One of the main uses of electricity is to make light, but how does current turn into light?

**Incandescent bulbs**
Incandescent bulbs are the type used in torches and as standard household bulbs. The current flows through a very thin wire of high **resistance**, making it so hot that it glows. The bulb contains an **inert** gas that stops the wire burning up.

**Light-emitting diode (LED)**
An LED is a special type of diode made with a **semiconductor** material that gives off light when current flows through it. LEDs need only a tiny current to make them work.

**Arc lamps**
In an arc lamp a very high voltage makes a continuous spark, called an arc, jump across a small gap in a circuit. This gives out a very bright light. Arc lamps are used for stage and film lighting or for strong floodlighting.

Light from gases
In a gas-discharge lamp there is a glass tube filled with gas. A high voltage makes the particles of gas divide into charged particles, which collide, making light. Different types of gas produce different colours of light.

Fluorescent tubes are similar, but the light is produced by the special **fluorescent** coating on the inside of the tube when it is hit by ultraviolet light created by the gas inside the tube.