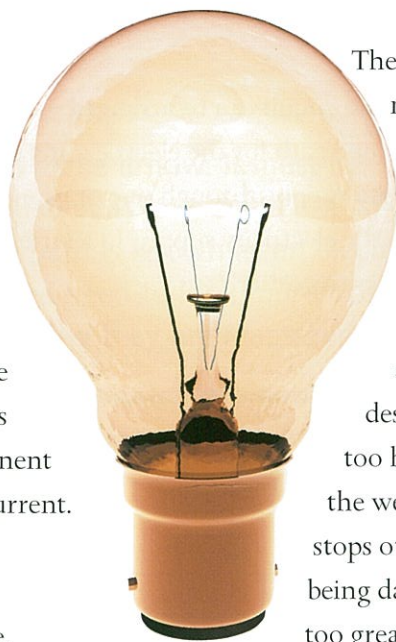


SISTANCE AND FUSES

Components in a circuit make it harder for electric current to flow. One light bulb connected in a series circuit would glow brightly, two light bulbs would be dimmer, and three are dimmer still. The more light bulbs there are, the harder it is for the current to flow because there is more 'sistance' in the circuit. Most components provide some resistance. The more a component restricts the flow of electrons, the lower the current.

Water acts in a similar way when travelling through a hose pipe. If the hose pipe is wide, water can flow freely and a large amount can pass through. If you stand on the hose pipe, it is narrowed and the flow slows down. The walls of a hose pipe provide resistance in the same way as components in a circuit.



The filament of a light bulb is made from the metal tungsten and deliberately causes resistance. It slows down the electrons, which heat the filament and make it glow brightly. Fuses work in the same way, except that they are designed to melt when they get too hot. By doing so, they provide the weakest point in a circuit, which stops other parts of the circuit from being damaged if the current becomes too great. Fuses protect our homes from fires caused by electrical faults.

▲ The filament of a light bulb glows white-hot when electricity passes through it.

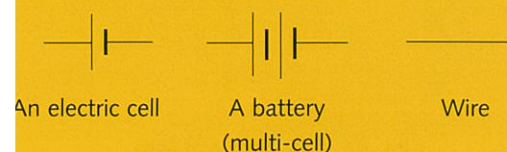
DID YOU KNOW?

► Graphite bombs, also known as blackout bombs, are detonated over an enemy's electrical power plants in times of war. They release clouds of ultra-fine graphite particles and because graphite is a good

conductor, the particles cause short circuits and massive disruption to a nation's electricity supply. In 1999, NATO used graphite bombs to take out 70 per cent of Serbia's power supply.

KNOW YOUR SYMBOLS

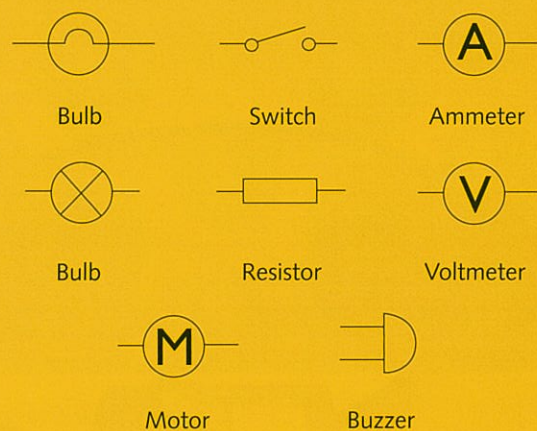
The following symbols are used to represent components of a circuit. They are internationally recognised so that speakers of different languages can understand a diagram wherever they are in the world.



An electric cell

A battery (multi-cell)

Wire



Bulb

Switch

Ammeter

Bulb

Resistor

Voltmeter

Motor

Buzzer

SHORT CIRCUITS

Electricity always takes the path of least resistance. If wires in a circuit are not insulated and touch each other, the electric current takes the quickest route to the positive terminal of the electricity supply. This prevents the circuit from working properly and is called a 'short circuit'. Old cables with worn coverings are dangerous because they

can easily create short circuits. Another frequent cause of short circuits is the presence of water. Water is a good conductor of electricity and is able to find its way into the smallest of places to make annoying and unwanted electrical connections.

▼ Short circuits can have devastating consequences. Sparks from a short circuit blew up this oil tanker and engulfed it in flames.



MEASURING CURRENT

Electric current is measured in amperes, or amps (A). One amp is about one million billion electrons per second flowing around the circuit. Electric current is not 'used up' by components in a circuit. This means that exactly the same number of electrons enter and leave each component. An ammeter is a device that is used to measure the size of the current. In a series

► In a series circuit, electric current is the same at all points of the circuit. Both of these ammeters would show the same reading.

MEASURING CURRENT IN A SERIES CIRCUIT

