

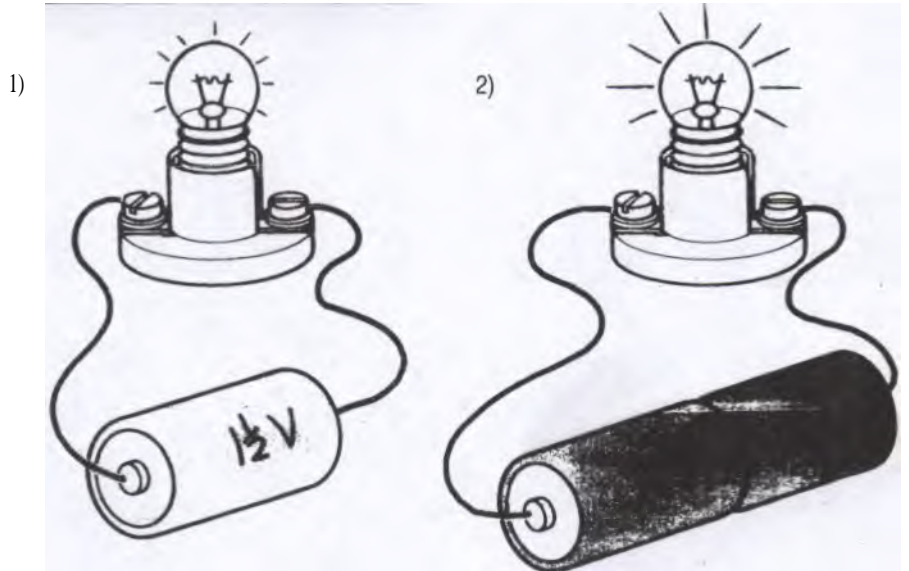
Basic electrics — revision

Voltage and current

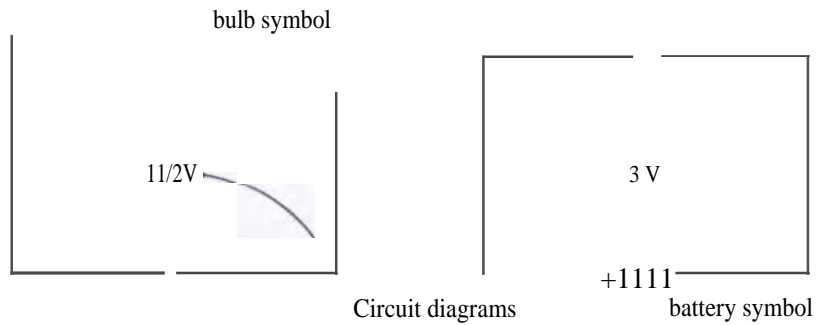
A battery is a source of electrical energy — it provides the 'pressure' which causes electricity to flow. We measure this electrical pressure in volts, V. The higher the voltage, the greater the pressure.

The flow of electricity is called current and is measured in amps, A

If a single battery makes a bulb glow dimly, two batteries connected in series as in circuit 2 will make it glow brighter. This happens because when batteries are connected in series their voltages 'add up'. Two similar batteries connected in series produce twice the electrical pressure. The greater the electrical pressure (in a given circuit) the higher the current.

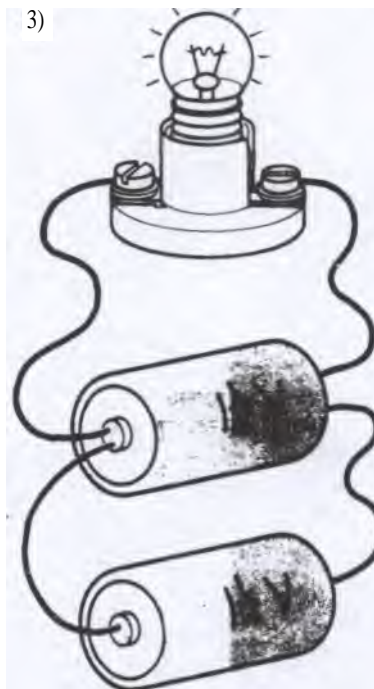


batteries connected in series

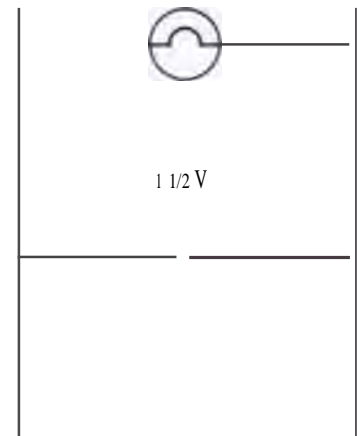


When batteries are connected in parallel however, their voltages do not 'add up'. The voltage provided by the two batteries in circuit 3 is the same as by the single battery in circuit 1.

Even so, there are reasons for connecting batteries in parallel: two batteries last longer than one, and can supply a higher current, should it be required.



batteries connected in parallel



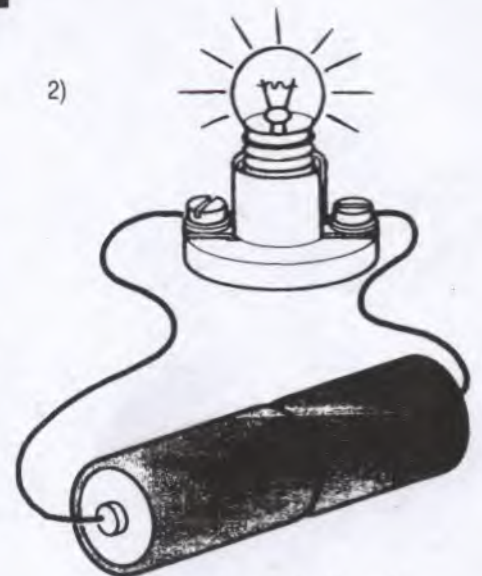
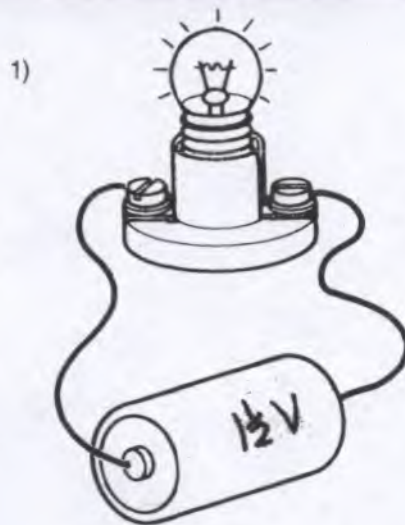
Basic electrics – revision

Voltage and current

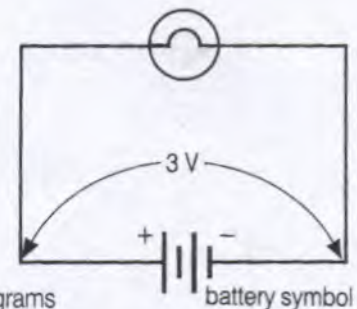
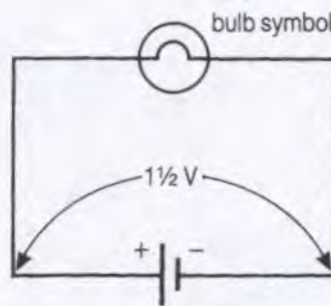
A battery is a source of electrical energy – it provides the ‘pressure’ which causes electricity to flow. We measure this electrical pressure in **volts, V**. The higher the **voltage**, the greater the pressure.

The flow of electricity is called **current** and is measured in **amps, A**

If a single battery makes a bulb glow dimly, two batteries connected in **series** as in circuit 2 will make it glow brighter. This happens because when batteries are connected in **series** their voltages ‘add up’. Two similar batteries connected in series produce twice the electrical pressure. The greater the electrical pressure (in a given circuit) the higher the current.



batteries connected in series

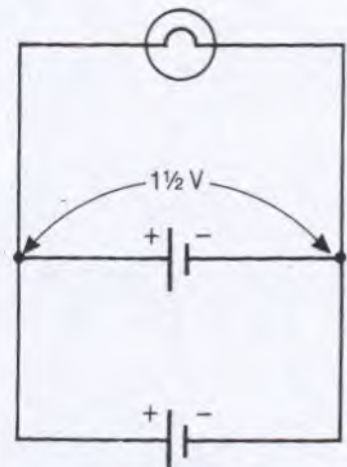
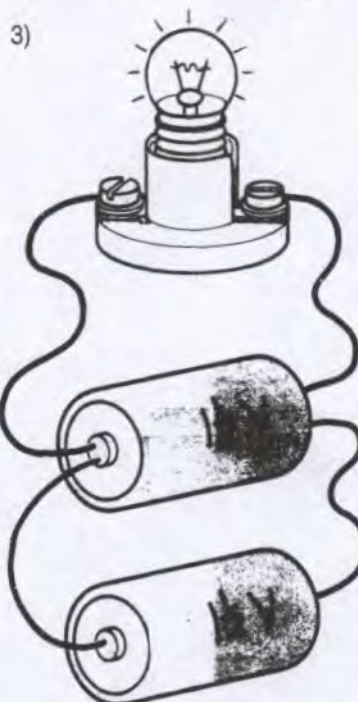


Circuit diagrams

battery symbol

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Even so, there are reasons for connecting batteries in parallel: two batteries last longer than one, and can supply a higher current, should it be required.



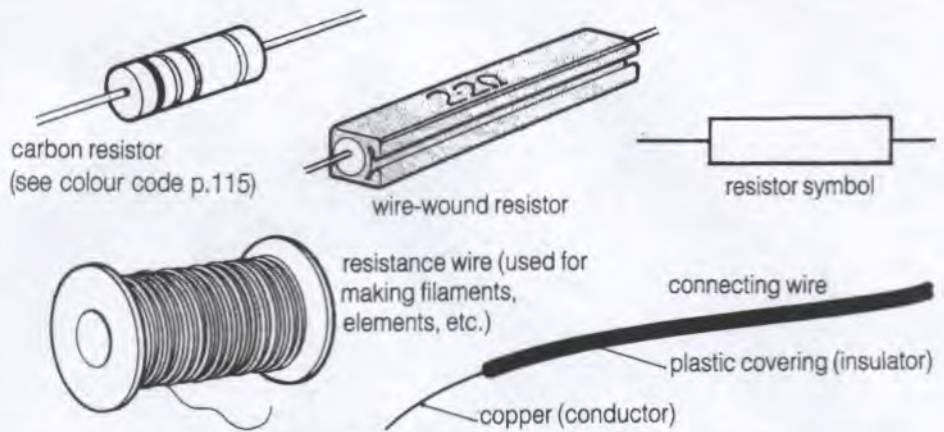
Circuit diagram

batteries connected in parallel

Resistance

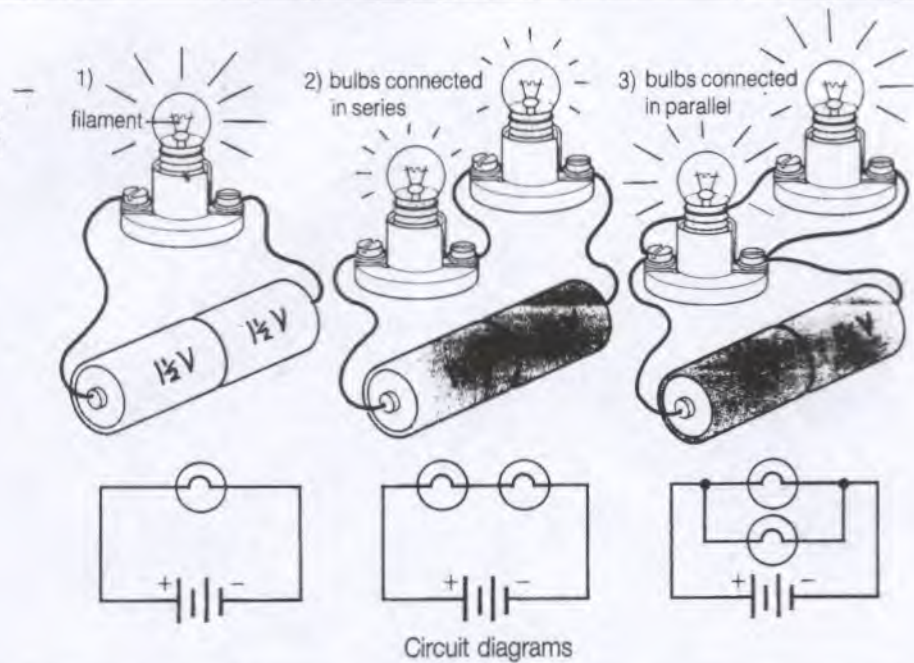
Anything which opposes the flow of current in a circuit is said to offer **resistance**. We measure resistance in **ohms Ω** .

Resistance wire, and components called **resistors** are specially made to resist the flow of electricity. Connecting wire however, has a very, very low resistance – it allows electricity to flow freely.



All electrical components offer some resistance to the flow of electricity. The filament in a bulb is a resistor which glows and gives off light.

The brightness of a bulb gives an indication of how much current is flowing in a circuit. Use this knowledge to decide which of the circuits shown offers least resistance and which offers the most.



When resistors or resistive components are connected in **series**, the effect is to add more resistance to the circuit. The total resistance can be found by simply adding up all the resistance values.

To calculate the value of resistors in series, we use the equation:

$$R_T = R_1 + R_2 + R_3 \text{ etc}$$

(total) (resistor values)

What is the effective resistance of R_1 and R_2 connected like this?

