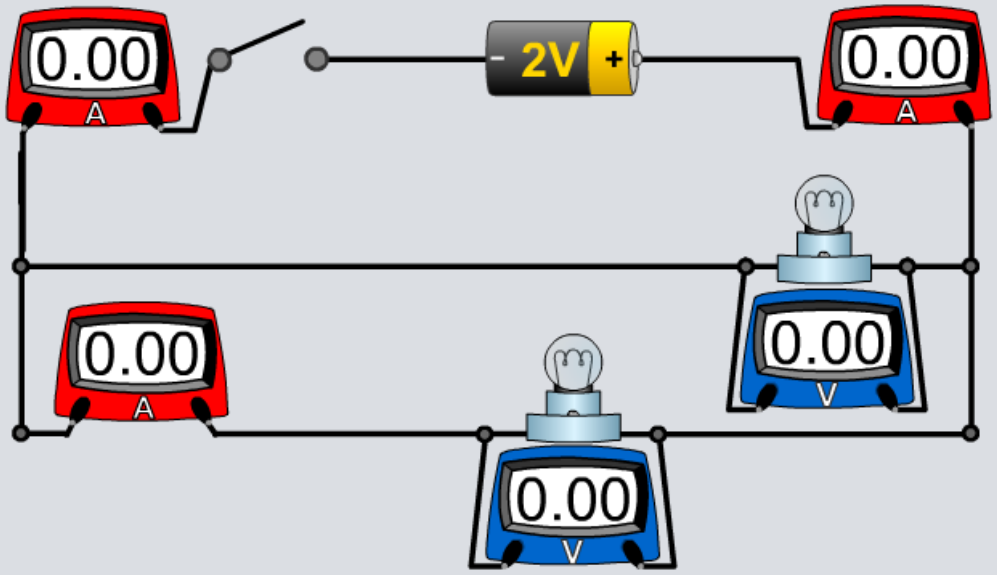
Series and Parallel Circuits



Series and parallel circuits

Circuit components can be wired in **series** or **parallel**.

A series circuit has all its components wired in the same loop.

These tree lights are wired in series.

A parallel circuit contains junctions, and so there is more than one path for the current.

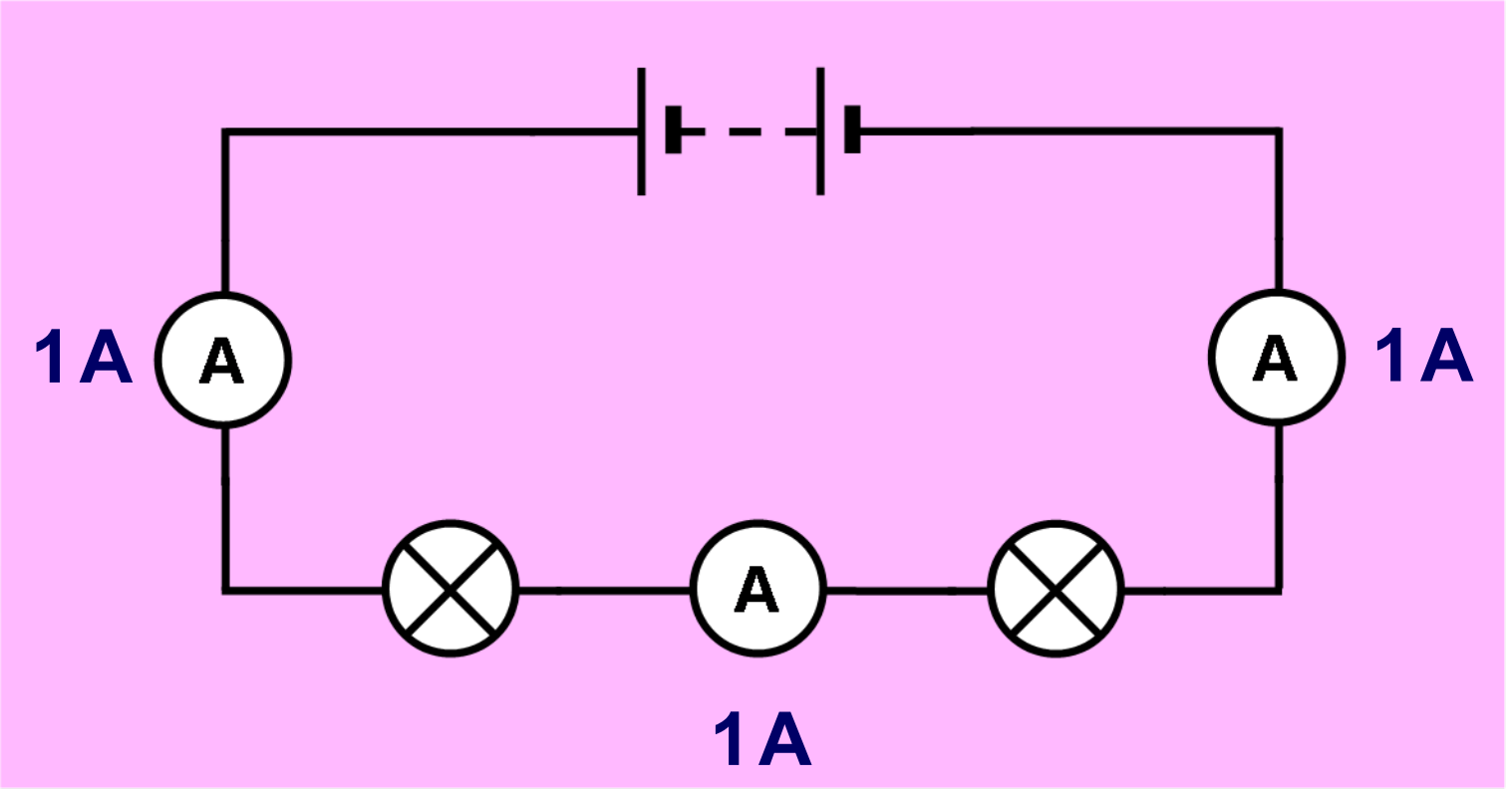
Car headlights are wired in parallel. What would happen if they were wired in series?

Series circuits – experiment

Current in a series circuit

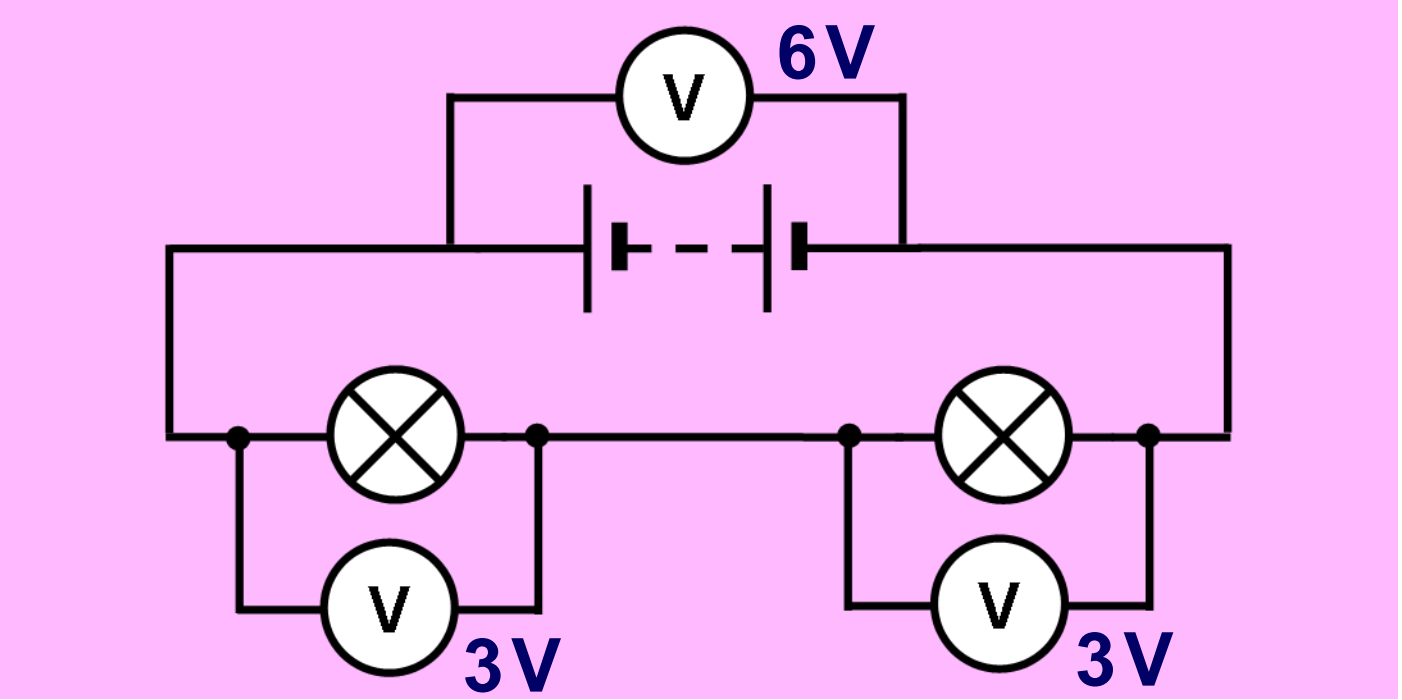
In a series circuit, the current flows through one continuous pathway.

So, the current is the **same** in all parts of a series circuit.



Voltage in a series circuit

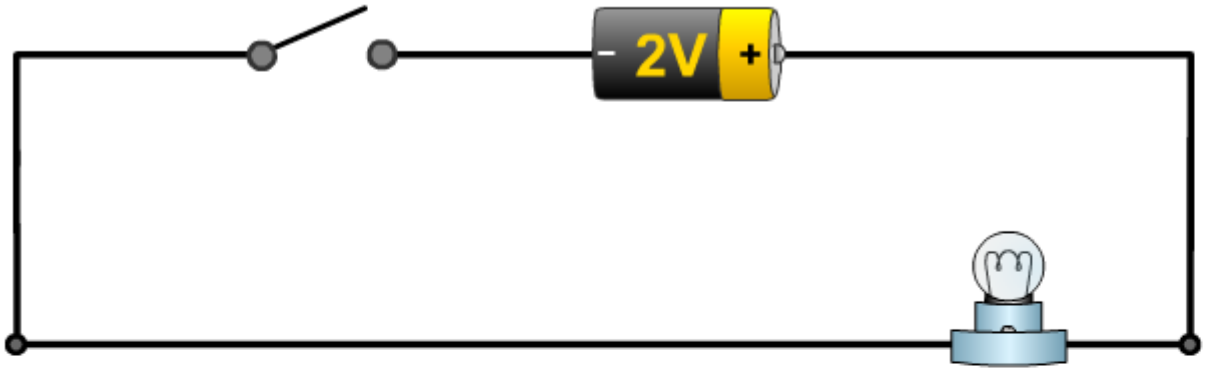
In a series circuit, the voltage supplied by the battery is **shared** by the components. So, the sum of the potential difference across the components equals the battery voltage.



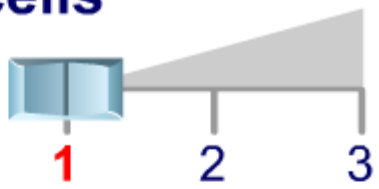
As more bulbs are added in series, each bulb has less potential difference, and so the bulbs become dimmer.

Parallel circuits – experiment

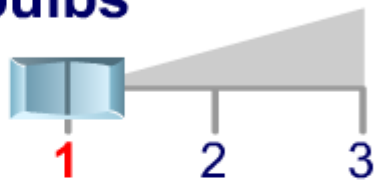
Investigating parallel circuits

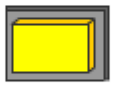


cells

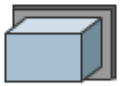


bulbs

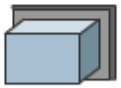




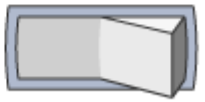
no meters



ammeters



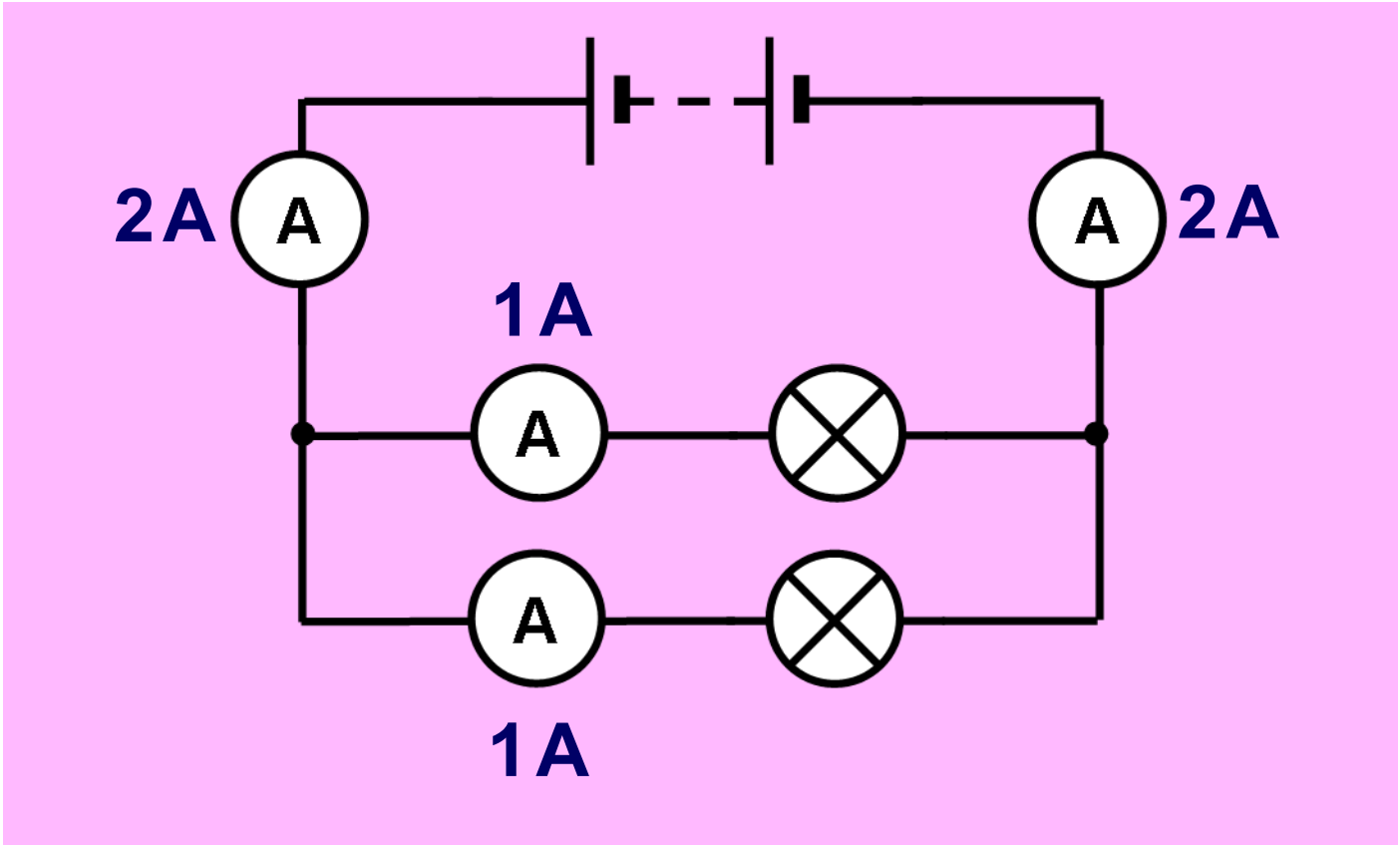
voltmeters

off  on

Current in a parallel circuit

In a parallel circuit, the current **divides** at the point where the circuit branches and then recombines to complete the circuit.

So, the current is **not** the same in all parts of a parallel circuit.

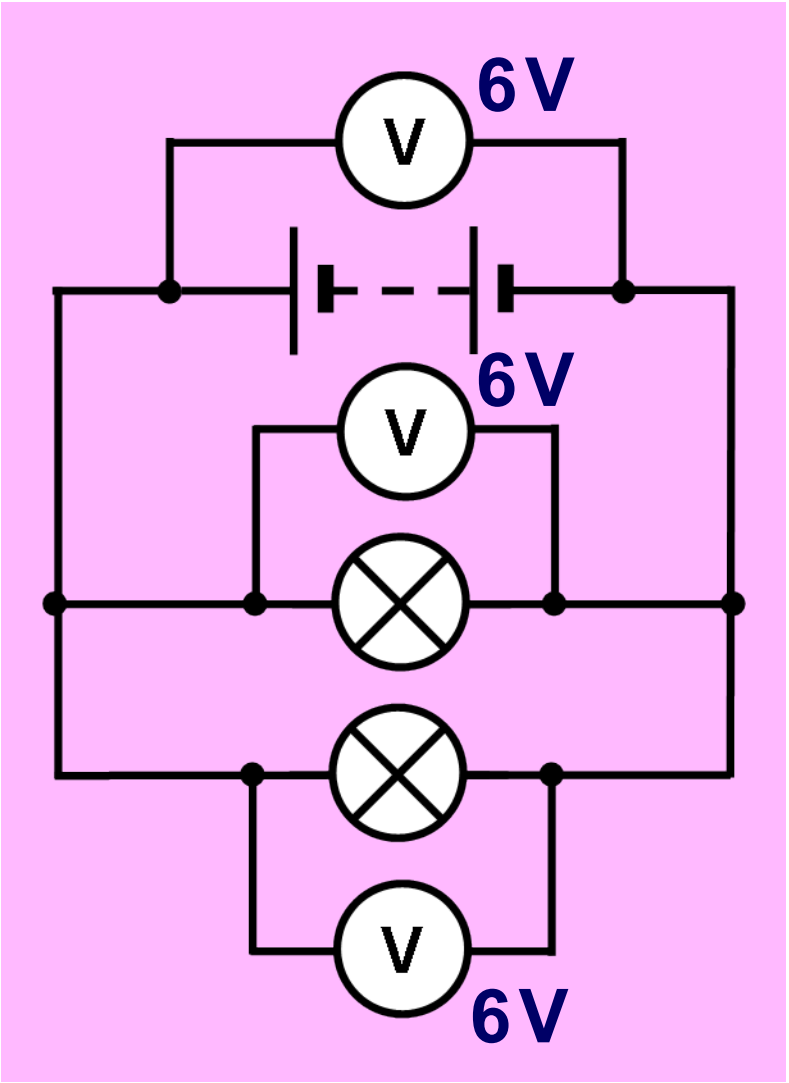


Potential difference in parallel circuits

In a parallel circuit, the potential difference across each bulb is the **same** as the potential difference across the battery.

This means that all the bulbs have the same brightness, and they are brighter than the same number of bulbs in a series circuit.

However, this also means that the battery will run down faster in a parallel circuit.



Comparing circuits

Which type of circuit does each statement describe?

series	parallel

If one bulbs breaks, the other bulbs remain lit.

solve