Series & Parallel Circuits

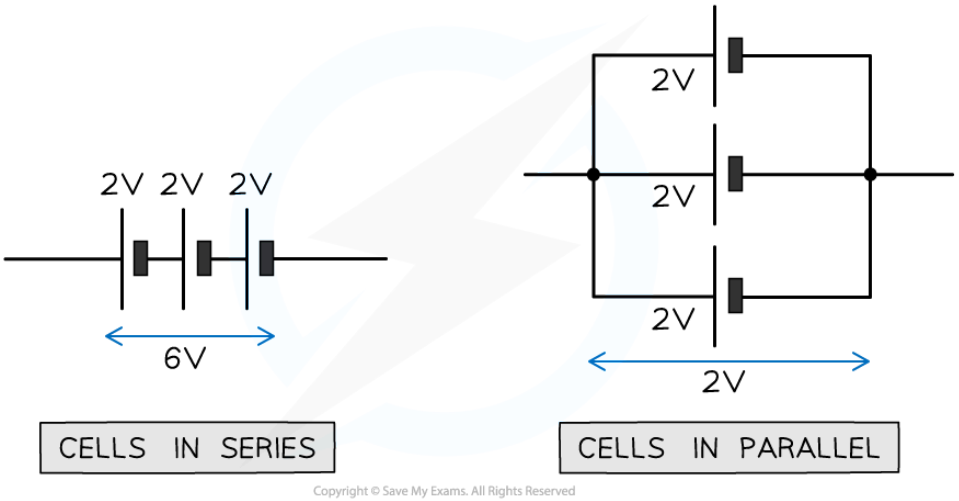
Current

- In a series circuit, the current is the same for all components
- In a parallel circuit, the current is split across the different branches (or junction). The total current into a junction must equal the total current out of a junction
    - The amount of current in each branch depends on the total resistance of the components within that branch

Potential Difference

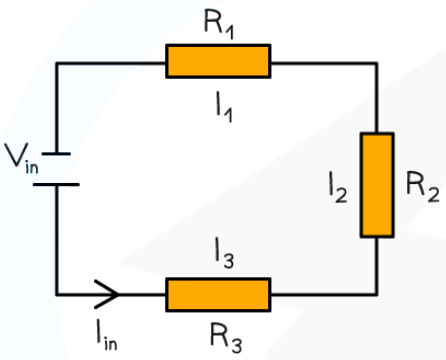
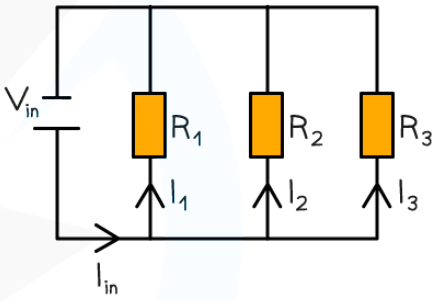
- In a series circuit, the e.m.f of the power supply is shared amongst all the components in different amounts, depending on their resistance
- In a parallel circuit, the voltage of all the components in each branch is equal to the e.m.f of the power supply

- Cells can also be connected in series or parallel
- The total voltage of the combined cells can be calculated in the same way as voltage
    - If the cells are connected in series, the total voltage between the ends of the chain of cells is the sum of the potential difference across each cell
    - If the cells are connected in parallel, the total voltage across the arrangement is the same as for one cell



- A summary of the current, voltage and resistance within a series and parallel circuit are summarised below:

Table of Voltage, Current & Resistance in Series & Parallel Circuits

	Series	Parallel
Circuit		
Voltage	$V_{in} = V_1 + V_2 + V_3$	$V_{in} = V_1 = V_2 = V_3$
Current	$I_{in} = I_1 = I_2 = I_3$	$I_{in} = I_1 + I_2 + I_3$
Resistance	$R_{total} = R_1 + R_2 + R_3$	$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$