WJEC (Eduqas) Physics GCSE

7.2: Series and Parallel Circuits

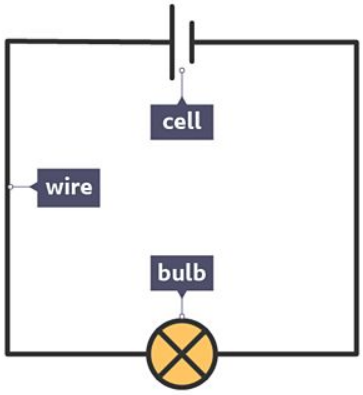
Detailed Notes

(Content in **bold** is for higher tier **only**)

Types of Circuit

Series

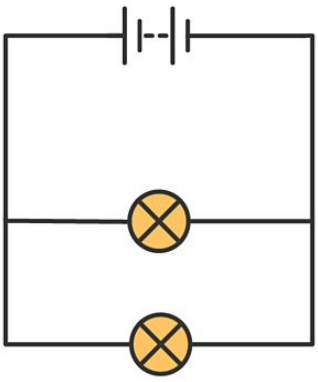
A series circuit is a **closed** electrical system with a **single path** for current to flow. This current is the **same everywhere** in the circuit and the **sum of p.ds** is equal to the supply voltage.



A simple series circuit (bbc.co.uk)

Parallel

A parallel circuit is a **branched** electrical system with **multiple paths** (branches) for current to flow. The total current at a circuit junction equals the **sum of current** along each of the branches. The p.d. across each branch is the **same**.



A simple parallel circuit (bbc.co.uk)

Calculating Resistance

Total resistance in a circuit varies depending on whether the components are connected in series or parallel.

Series

Adding components in **series increases** the total resistance as it is the **sum** of separate resistances:

$$R_T = R_1 + R_2 + ...$$

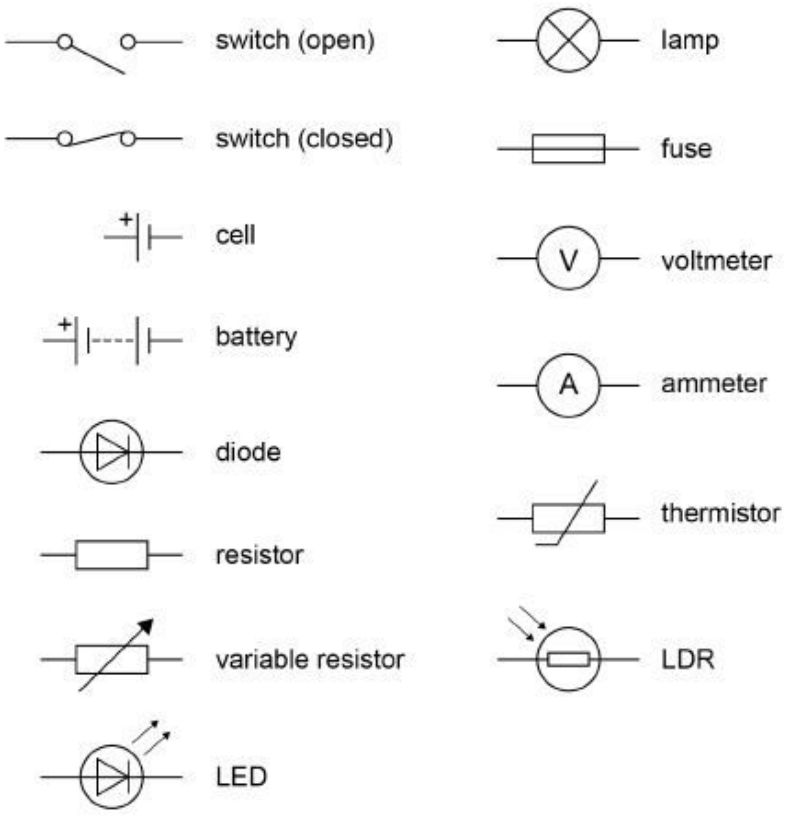
Parallel

Adding components in **parallel reduces** the total resistance in a circuit. **This total resistance can also be calculated as the sum of the reciprocals of each component resistance:**

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + ...$$

Circuit Symbols

Symbols are used to represent the different **components** of electrical circuits.



Common electrical circuit symbols (studyrocket.co.uk)