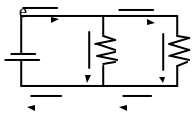
Series and Parallel Circuits

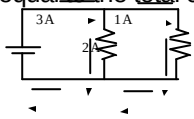
Parallel Circuits

- Circuit in which there are two or more paths for the current to travel.



General Rules for Parallel Circuits

- The voltage drop across each of the branches of a parallel circuit is the same as the rest.
- The sum of all the currents in each branch is equal to the total current in the circuit.



Kirchoff's First Law

- The sum of the currents at any junction in a circuit is zero
- Kirchoff's laws summarize the basic principles of all electric circuits—energy and current are conserved

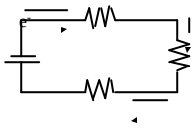
Resistance in Parallel Circuits

- The equivalent resistance of resistors in parallel can be found by

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + etc.$$

Series Circuit

- Circuit in which there is only one path for the current to take.

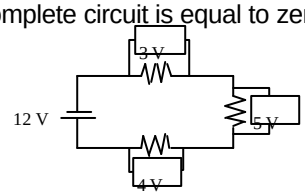


General Rules for Series Circuits

- The current in all parts of the circuit has the same magnitude
- The sum of all the separate voltage drops is equal to the applied emf
- The total resistance in a series circuit is equal to the sum of the individual resistances

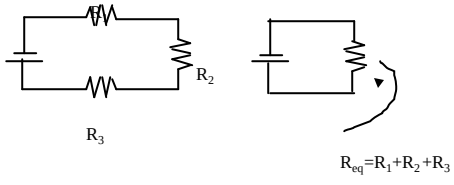
Kirchoff's Second Law

- The sum of all changes in potential in a complete circuit is equal to zero



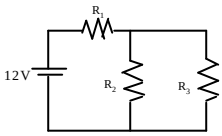
Equivalent Resistance (Series)

- A single resistor that can be placed in a circuit in place of all other resistors in the circuit



$R_{eq}=R_1+R_2+R_3$

Simple Networks



	V	I	R
Batt	12 V		
R_1	8.0 V		
R_2		4.0 A	
R_3		2.0 A	

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