



Summary

- Necessary for an electric current to flow:
 - Source of energy
 - Conductors
 - Closed circuit
- Series and parallel

Series	Parallel
$V_T = V_1 + V_2$	$V_T = V_1 = V_2 = V_P$
<p>Explanation: $V_T = V_{\text{across battery}}$ $V_T = 3\text{ V}$ $V_T = V_1 + V_2$ $= 2\text{ V} + 1\text{ V}$ $= 3\text{ V}$</p> <p>The sum of all the voltmeter readings in a series circuit = V_T.</p>	<p>Explanation: $V_P = V_{\text{across battery}}$ $V_P = 3\text{ V}$ $V_1 = 3\text{ V}$ $V_2 = 3\text{ V}$</p> <p>The voltmeter reading over each resistor = the voltmeter reading over every other resistor = voltmeter reading across the parallel connection.</p>
$A_1 = A_2$	$A_1 = A_2 = A_3 + A_4$
<p>Explanation: In a series circuit the current is the same at all points.</p>	<p>Explanation: In a parallel connection the current is divided. The sum of the ammeter readings in parallel = A_1</p>





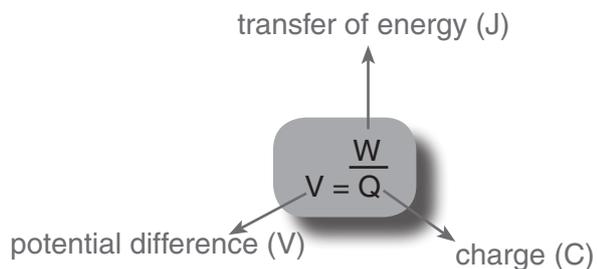
Summary

$$R_T = R_1 + R_2$$

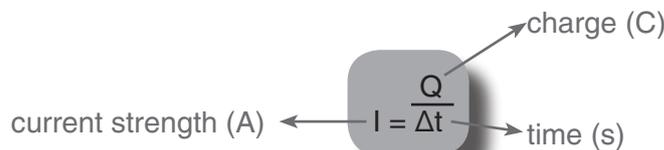
$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$$

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| <ul style="list-style-type: none"> Resistors connected in series: There is only one route for the flow of current. Resistances are added together to get the total resistance. In a series circuit, the total resistance caused by the resistors increases as more resistors are added. The greater the number of resistors in series, the smaller the current. Resistors in a series circuit are potential dividers, because the total potential difference of the battery is divided between the resistors. | <ul style="list-style-type: none"> In a parallel connection the branches offer alternate routes for the flow of current. In a parallel circuit the total resistance caused by the resistors becomes smaller when more resistors are added. The greater the number of resistors connected in parallel, the greater the current. Resistors in parallel are current dividers, because the total current is divided between the resistors. |
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- Potential difference is the difference in the electric potential energy per unit charge between any two points in a circuit.
 - Unit: V
 - Symbol: V
 - Volt = joule per coulomb
 - $1V = \frac{1J}{1C}$



- Measured with a voltmeter: always connected in parallel.
- Current strength is the rate at which electrical charge flows in a circuit.
 - Direction + →- (conventional current)
 - Unit: A
 - Symbol: I



- Measured with an ammeter, always connected in series.
- $1 A = \frac{1C}{1s}$



Summary

- Resistor: offers resistance to a flow of current.
 - Symbol: R
 - Unit: Ω
 - Measured with a multimeter or calculated.

$$R = \frac{V}{I}$$

resistance (Ω) ←

potential difference (V)

current strength (A)

- One ohm is equal to one volt per ampere.
 - Resistor converts electrical energy into other types of energy, e.g. heat or light.
 - More resistors in series: R_T increases and I_T decreases.
 - More resistors in parallel: R_T decreases and I_T increases.
- Ohm's law: The potential difference across the ends of a conductor is directly proportional to current strength, provided the temperature remains constant.

Notes

