

Circuit

Circuit means closed path

Simplest electric circuit

- 1. source of potential difference (battery or power source)
- 2. resistor (appliance)
- 3. connecting wires

Direction of flow

- Conventional current flows from positive to negative
- Electron current flows from negative to positive. Once the electrons have reached the positive pole, all of their energy has been expended.

Ohm's Law

- Ohm's Law is the fundamental relationship in electric circuits.
- $V = IR$
- So, $I = V/R$
- So, $R = V/I$

Power = rate that energy is supplied

- Potential difference x current =
- volts x amps =
- joules/coulomb x coulomb/sec =
- joules/sec =
- watt =
- POWER
- Therefore, $P = V I$ (watt)

Example

- Calculate the rate at which energy is supplied by a 120 volt source to a circuit if the current is 5.5 amps.
- $P = V I = 120 \times 5.5 = 660$ watt

Substituting with Ohm's Law into Power

- $P = V I$
- $= I R I = I^2 \times R$
- $= V^2 \times R$

- Power = Energy/time

- Energy = Power x time

Series Circuit

- One path
- $R(\text{total}) = R1 + R2 + R3 + R4$ (add resistances)
- $V(\text{total}) = V1 + V2 + V3$ (add batteries)
- $I(\text{circuit}) = V(\text{total})/R(\text{total})$
- Current, I , is the SAME ALL THROUGHOUT
- Voltage drop for each appliance
- $I(\text{circuit}) \times R(\text{appliance}) = \text{Voltage drop.}$