

Electric Current

Definition: rate of positive charge flow

Symbol: i

Units: Coulombs per second \equiv Amperes (A)

$$i = dq/dt$$

where q = charge (in Coulombs), t = time (in seconds)

Note: Current has polarity.

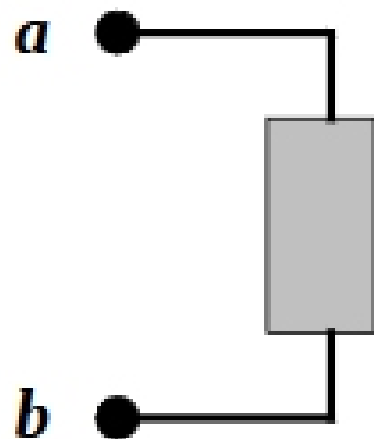
Electric Potential (Voltage)

- **Definition:** energy per unit charge
- **Symbol:** v
- **Units:** Joules/Coulomb \equiv Volts (V)

$$v = dw/dq$$

where w = energy (in Joules), q = charge (in Coulombs)

Note: Potential is always referenced to some point.



Subscript convention:

v_{ab} means the potential at a minus the potential at b .

$$v_{ab} \equiv v_a - v_b$$

Electric Power

- **Definition:** transfer of energy per unit time
- **Symbol:** p
- **Units:** Joules per second \equiv Watts (W)

$$p = dw/dt = (dw/dq)(dq/dt) = vi$$

- **Concept:**

As a positive charge q moves through a drop in voltage v , it loses energy

- energy change = qv
- rate is proportional to # charges/sec