

# Electrical Circuits

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## Electric Current

Voltage is the rate of change of electric potential.

$$V \equiv \frac{w}{q}$$

measured in voltage  $\frac{J}{C} = V$

Current is defined as the amount of charge flowing through a cross sectional area per unit time:

$$I \equiv \frac{\Delta Q}{\Delta t}$$

measured in amperes:  $\frac{C}{s} = A$ .

Resistance is the ratio of the voltage drop to the current flow through a conductor:

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

measured in ohms:  $\frac{V}{A} = \Omega$ .

Fraaday Cage, A circuit with a copper wire with have equally charged haowever when connected to a battery EMF is the energy per unit charge delivered to the circuit when a given charge travels Current through the wire.

## Drift Speed Formula

During a small frame find how far a charge moves so  $V * \Delta T$  is the distance traveled. Then volume of the an area wher  $Av * \Delta T$  is the distance traveled. Then the new charges crossed the area A and now reside in the new volume the amount of charges is  $n * Av\delta t$ . The total amount of charge is  $q * nAv\Delta t$  so the final current would be

$$I = qnAv$$

To calculate the drift speed of a particle we use the formula:

$$\frac{v}{c} = \frac{v_0}{c_0}$$

where v is the velocity in m/s and c is the speed of light in m/s.