When electrons flow in a wire, they produce an electric current.

The current is a measure of the amount of charge passing a

point in a given time

$$I = \frac{Q}{t}$$

t - sec
Q - coulombs

$I = \frac{c}{s}$, 1 Ampere

1 Amp

1 A

ex Calculate the <u>current</u> through a toaster if it takes <u>900c</u> to <u>Q</u>

toast your bread in 2.0min

$$I = \frac{Q}{t} = \frac{900c}{120s} = 7.5A$$

ex How many electrons flow through a wire in 1.0sec if

2A of current is flowing?
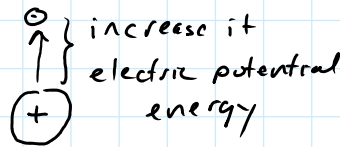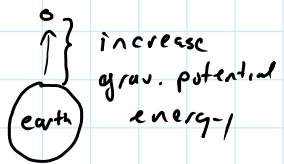
$Q = ne$
$t = 1.0 sec$
$I = 2.0 A$

$I = \frac{Q}{t}$

$2.0 = \frac{Q}{1.0s}$

$Q = 2.0 C = ne$

$2.0 C = n(1.6 \times 10^{-19} C)$

$n = 1.25 \times 10^{19}$ electrons

Voltage - Potential Difference (Change in Potential)

increase
grav. potential
energy

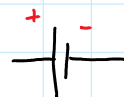increase it
electric potential
energy

similar to the
voltage output
of a battery

Voltage is measured in volts

Electric Circuit
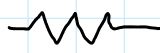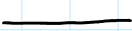
A Basic Circuit

— A source of energy: Battery, cell

schematic

- A device that uses the energy : light ─(O)─
                                  : resistor ─/\/\/─

- A closed path : wire ───

- switch : ⌐• ⌐•⌐

__Battery__ : Source of energy (makes the electrons flow)
 : output is measured in Volts
 : Potential Difference
 : Electromotive Force , Emf , ε

__Current__ : $I = \dfrac{Q}{t}$, Amps
 : Current flows from the positive terminal through the circuit to the negative terminal
 : Electrons flow away from negative to the positive.

__Resistors__ : use the energy < heat light
 : measured in Ohm's , Ω 12Ω , 150Ω

__Ohm's Law__

$$\boxed{V = IR} \ , \ \boxed{I = \dfrac{V}{R}}$$

V | / ─ slope = I = current

Determine the resistance of a toaster that uses 120v and 7.5A.

V = 120 v   V = I R
I = 7.5 A $\dfrac{120}{7.5} = \dfrac{(7.5)(R)}{7.5}$ R = 16 Ω

A 60Ω stove requires 240V to operate. Determine the current through the stove.

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