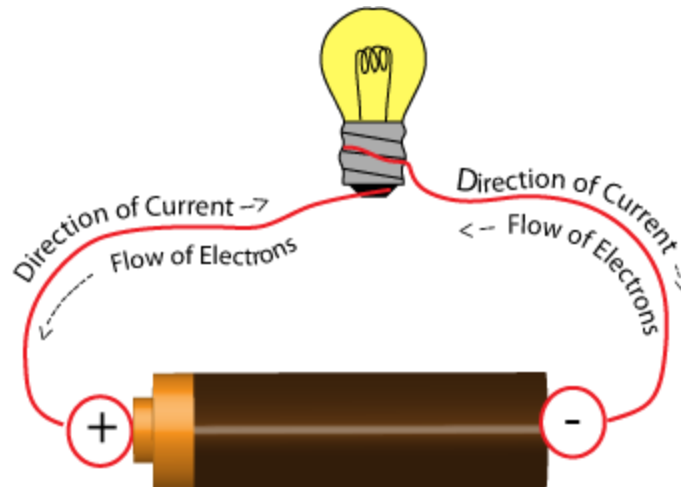# The Flow

The movement of charges is called current (I). The unit is the Ampere, Amps, (A).

The direction of current is OUT from the positive. Even though it is the electrons that move, and the move IN to the positive.

Current is defined as the charge per second.

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

Easy warm up question:

4.8x10⁻⁶C of charge pass a point in 4.0ms. Determine the current.

Hint: 1.2mA

Don't confuse this with the total charge:

    6.0×10^{20} electrons flow past a point in 12s.
  a) What is the total charge that passed the point?
  b) What is the current?

Ohm's Law:

The current flowing between two points is directly proportional to the potential difference between those points and inversely proportional to the resistance between them.

$$I = \frac{\Delta V}{R} \quad , \quad V = IR$$

We use certain metals for wires due to their good conductivity. Copper is a popular pick as it is highly conductive and as well as inexpensive.

Most of our questions will assume that all wires are perfect and do not contribute to the net resistance of our system. However, this is not true. The resistance of a wire depends on its composition, length, and cross sectional area.

$$R_{wire} = \frac{\rho l}{a}$$

A resistor of resistivity 1200Ω/m and a length of 1.0cm and a radius of 0.50cm is connected to a 12V power supply in a circuit. Determine the current.

Circuits:

These can be tough. Our first step will be simplification.

If we have resistors in series:

If we have resistors in parallel:

What is the equivalent resistance to three resistors set up in parallel if their respective resistances are 3Ω, 4Ω, and 6Ω?

Hint: 1.33Ω

Pg 255 QuickCheck 1-3. Pg 229 1-3, 8.