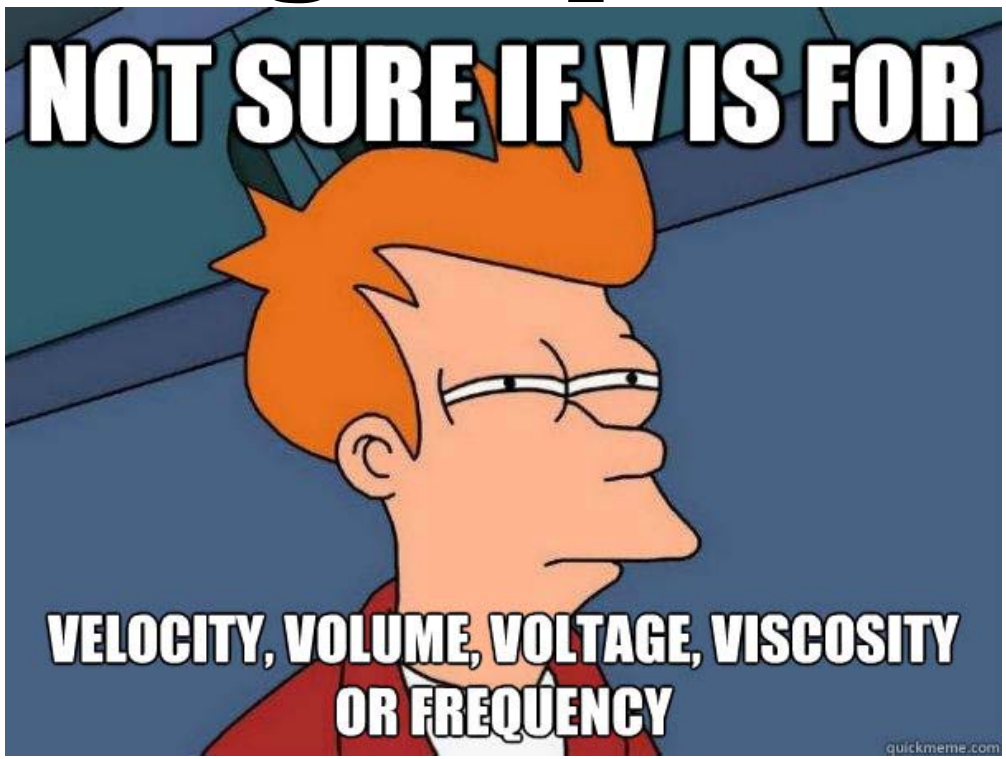
Voltage Equation

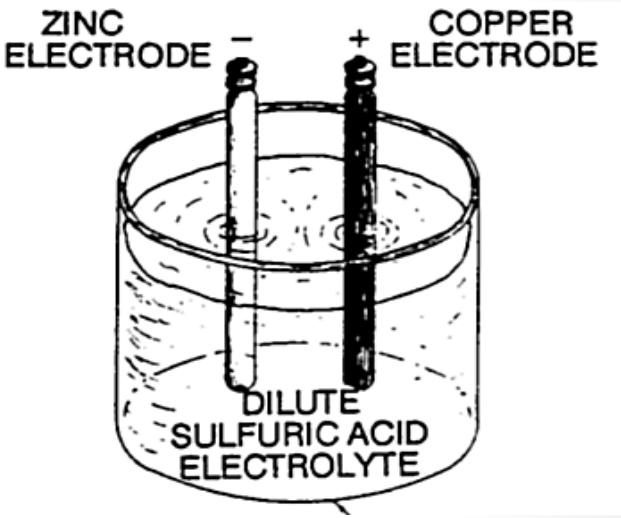


S1-3-10 Define voltage (electric potential difference) as the energy per unit charge between two points along a conductor and solve related problems. Include: V = E/Q.

The Voltage Equation…

When a charge is moved from one point to another, an **ELECTRIC POTENTIAL DIFFERENCE** is created.

→ An electron will leave the **NEGATIVE TERMINAL** with a **HIGHER PRESSURE** (**ENERGY**) than when it returns to the **POSITIVE TERMINAL**.



This **POTENTIAL DIFFERENCE** is the **VOLTAGE** of the cell.

1 Volt (V) is the amount of energy (measured in Joules (J)) to move 1 Coulomb(C) of charge.

The Voltage Equation…

We just said that voltage is the energy per coulomb, so we get the formula:

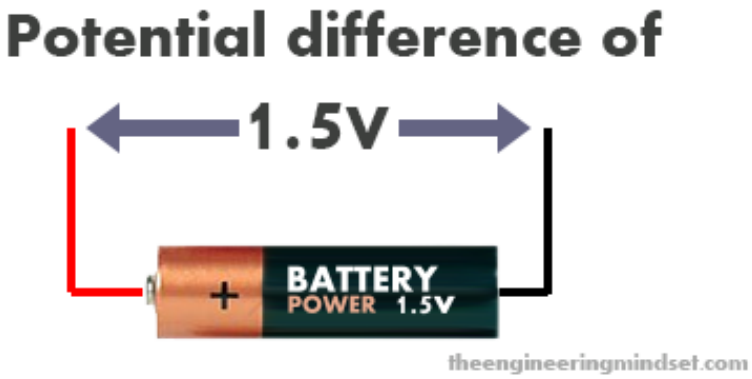
$$V = \frac{E}{Q}$$

Where

V = **POTENTIAL DIFFERENCE** measured in **VOLTS** (**V**)

E = **ENERGY** measured in **JOULES** (**J**)

Q = **CHARGE** measured in **COULOMBS** (**C**)



Voltage Example Problems…

$$V = \frac{E}{Q}$$

1. 300 J of energy is used to move 100 C of charge through a circuit. How much voltage is there?

2. You have a 12 V battery. How much energy is used when you move 6 C?

Voltage Example Problems…

$$V = \frac{E}{Q}$$

3. How much charge is used when a 9V battery uses 220J of energy?

Try these ones…

$$V = \frac{E}{Q}$$

1. How many volts are there if it takes 1000J to move 100 Coulombs?

2. Find the amount of energy if a battery puts out 12V and moves 10C of charge.

3. Determine the amount of charge if a 9V battery has 900J of energy.