

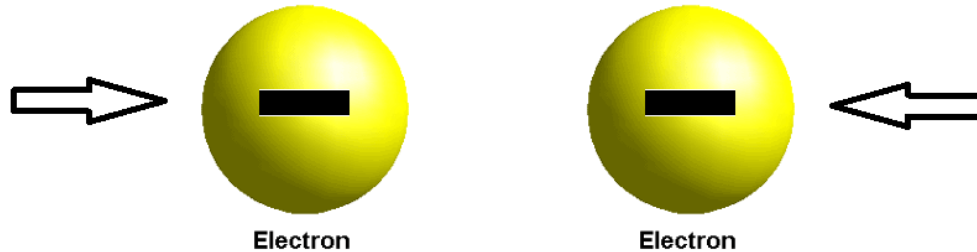
Electric Potential Energy (voltage)



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: $V = E/Q$.

Voltage Intro...

If you had two ELECTRONS, what would happen if you pushed them TOGETHER?



Since they are the SAME CHARGE, they would want to REPEL each other.

When we push them together, we are increasing their STORED ENERGY or POTENTIAL, and when we let them go, this POTENTIAL pushes them apart.

We call this stored energy:

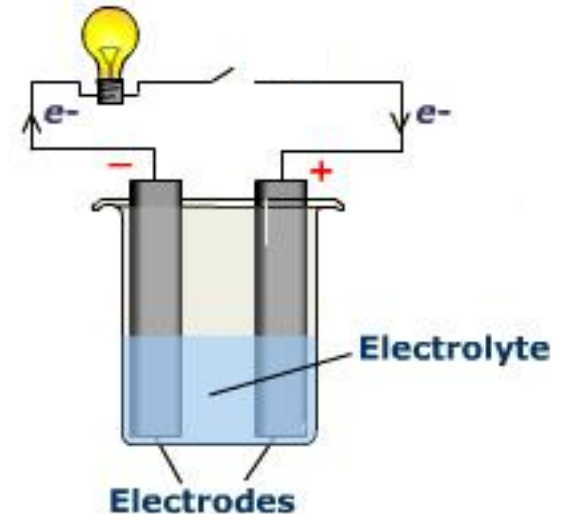
ELECTRIC POTENTIAL ENERGY or VOLTAGE

Chemical Cells...

- A chemical CELL is a device that uses CHEMICAL REACTIONS to produce ELECTRIC POTENTIAL ENERGY.
- A BATTERY is made of TWO or MORE CELLS.

How does it work?

A simple cell consists of two rods called ELECTRODES, which are immersed in an ELECTROLYTE (a conducting fluid)



A chemical reaction between the electrodes and electrolyte causes one electrode to GAIN ELECTRONS and the other to LOSE ELECTRONS, giving each a different CHARGE...and causing a POTENTIAL DIFFERENCE (voltage) between electrodes

Water Analogy for Current and Voltage...

Current moving through a wire is the same idea as water flowing through a PIPE. What happens if you have:

a small pipe:

→ A SMALL AMOUNT of WATER will be let through the pipe.



a large pipe:

→ A LARGER AMOUNT of WATER will be let through the pipe.



Therefore...

The larger the wire, the more current that can pass through

Water Analogy for Current and Voltage...

Now what happens if you have:

a small pump:

→ A small pump will only pump a **SMALL AMOUNT** of water with **LOW PRESSURE**.



a large pump:

→ A large pump will pump **MORE WATER** with a **HIGHER PRESSURE**.



Therefore...

- ***A large pump = more pressure = More Potential Difference = More voltage***

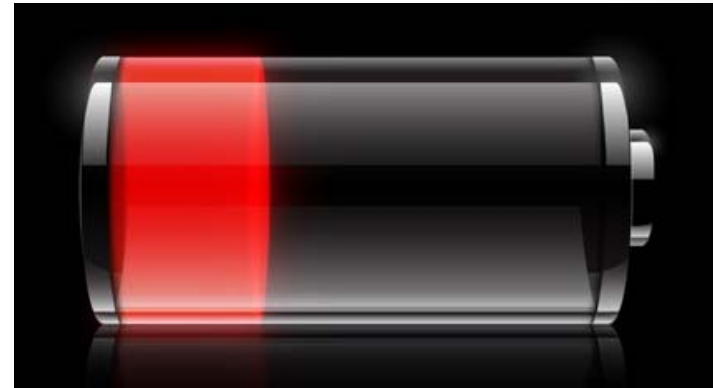
Water Analogy for Current and Voltage...

Current (I)

- The NUMBER of ELECTRONS flowing
- Measured in AMPERES (A) with an AMMETER

Potential Difference (V)

- The PRESSURE with which the electrons flow.
- Measured in VOLTS (V) with a VOLTMETER.



→ When a cell/battery has “DIED”, it no longer pumps out ELECTRONS, therefore it will not produce a CURRENT or a VOLTAGE.