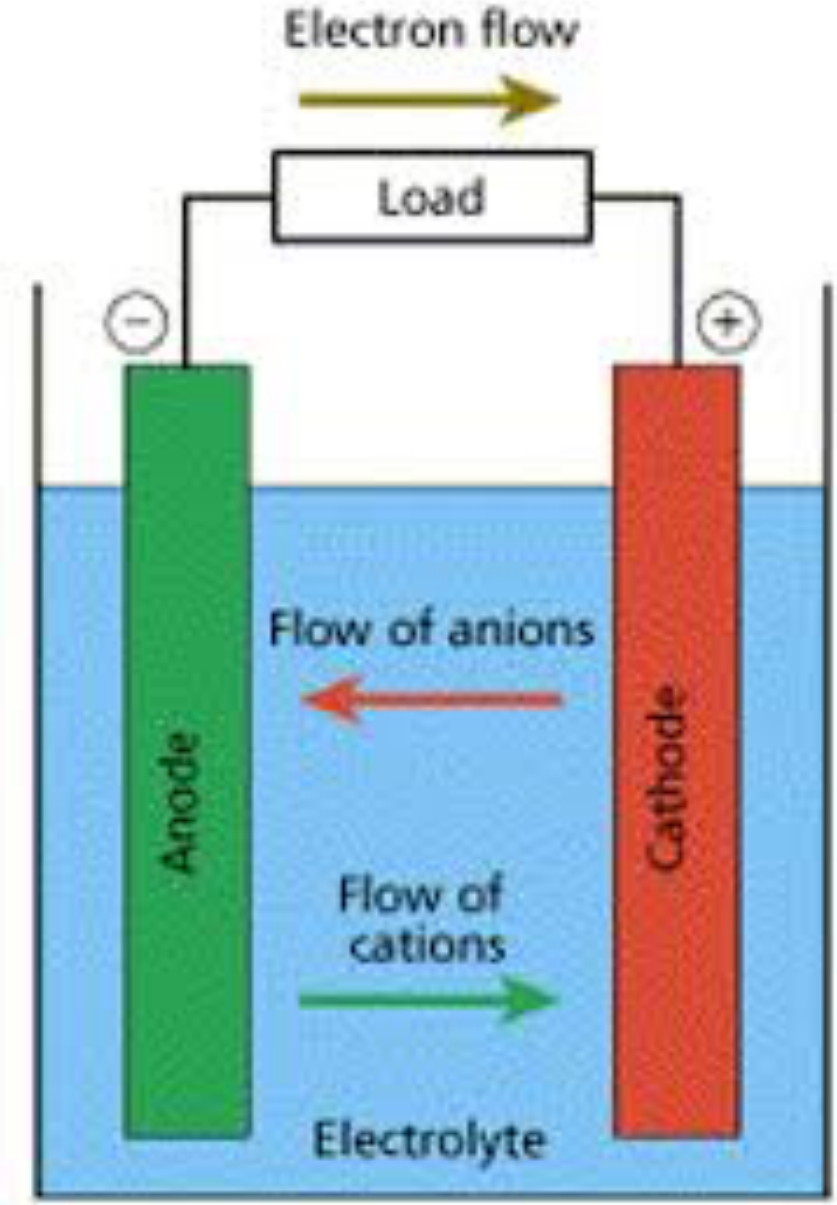
Battery Power

What is a Battery?

- It is made up of two oppositely-charged metals, the **cathode** (or positively charged end) and the **anode** (the negatively-charged end), an electrolyte, and a conductor.
- stores **electrical energy** by transforming it into **chemical potential** energy.
- Lithium-ion batteries are generally used for household storage (currently). While batteries can be recharged, they eventually degrade and require disposal.


Electron flow
Load
Flow of anions
Anode
Cathode
Flow of cations
Electrolyte

Voltage

- Is a measure of **electric potential**, or the **amount of energy a unit of charge gains** when it travels through the battery (or loses as it travels through a circuit).

**Batteries are usually identified by their voltage.

Power

- Is the **voltage times current** or, **energy per unit time**.
- The current depends on:

  a) the resistance of the load

  or

  b) the number of appliances drawing on the battery.

$$P=IV=\Delta E/\Delta t$$

Energy Use Calculations

- Our energy bills are calculated in terms of kWh. This is a measure of how much energy is used over a certain period of time (energy = power x time).

$$P*\Delta t=\Delta E$$

Efficiency

- Another important calculation is efficiency.

Efficiency=

(Energy output)/(Energy input)×100%

Did you know: The Tesla Powerwall has an energy rating of 7 kWh and an efficiency of ~92%