

Voltage

SECTION 11.1 AND 11.2 (PG. 452- 453)

SNC1D

Recap . . .

What is current electricity (vs. static)?

What are the two requirements for current electricity?

Optional components

Discuss with your neighbour . . .

What does it mean to have **potential**?



Potential Energy

Potential energy :

What other types of energy can it be converted to?

light energy

heat energy

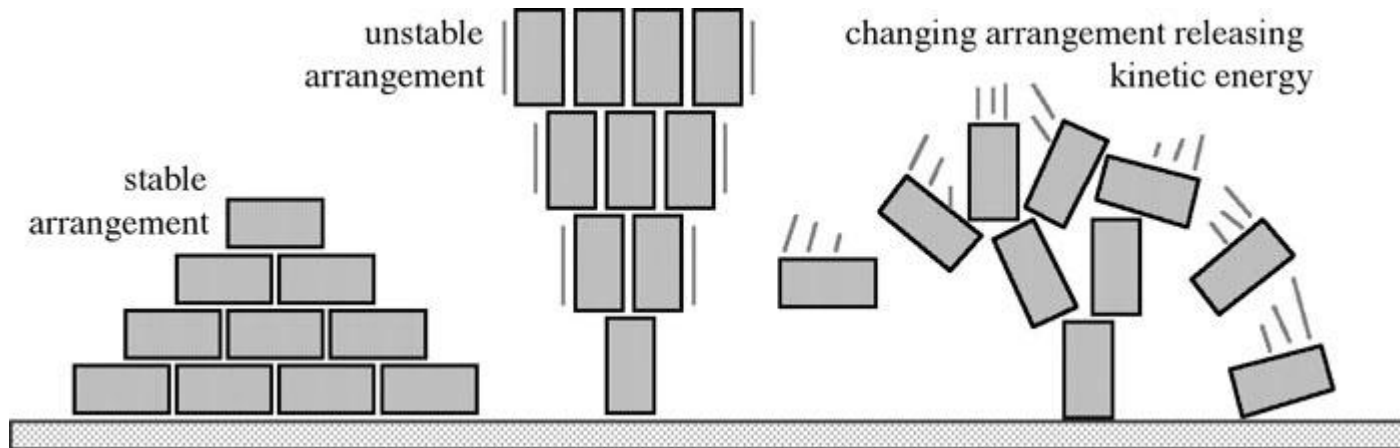
kinetic energy (movement)

sound energy

Objects that have high amounts of potential energy are

_____ *.

They can become stable by releasing some of their potential energy (through _____ ** it to another form).



Cells & Batteries

Batteries contain chemical compounds, that have _____ *

potential energy stored in their bonds.

Each battery is made up of one or more smaller units, called a _____ ** .

Every cell has two terminals (ends), called _____ *** .

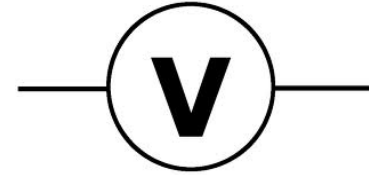
Each terminal is made of a different metal.



Chemical reactions in each cell cause a build-up of electrons at one terminal of the cell.

- This build-up produces another form of potential energy:
_____ ***potential energy.***
- The amount of electrical potential energy is measured as the **voltage** of the battery.

Voltage



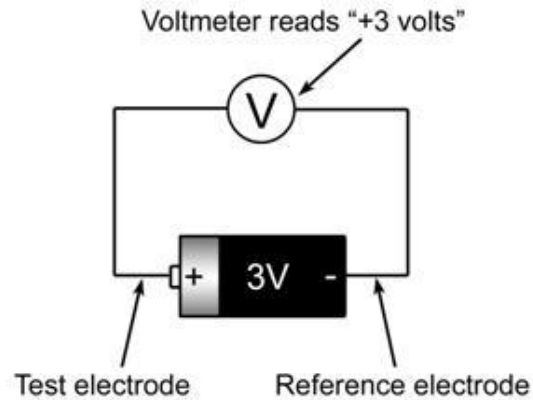
Voltage –

- also called: potential difference
- measured using a voltmeter
- unit: volts (V)

| Quantity | Unit of measure |
|----------------------|----------------------------------|
| energy | joule (J) |
| charge | coulomb (C) |
| potential difference | joule/coulomb (J/C), or volt (V) |

$$\text{Potential difference} = \frac{\text{difference in potential energy (J)}}{\text{charge (C)}}$$

The voltage of a battery is the difference in potential energy at the two terminals.



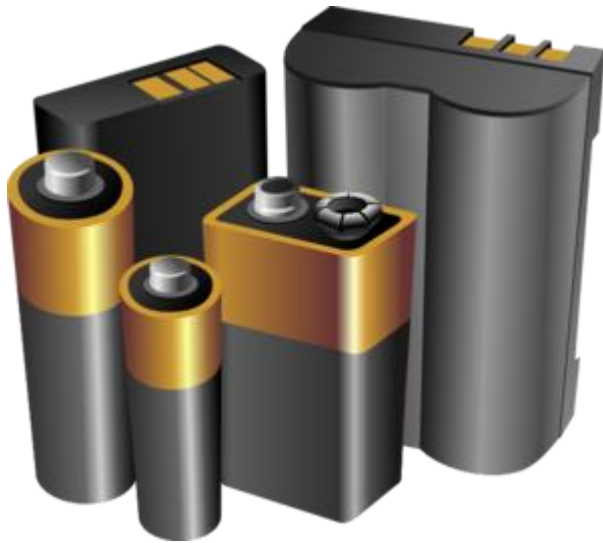
Each of these batteries generates a potential difference of 1.5 V.

What do you think is responsible for the difference in size?



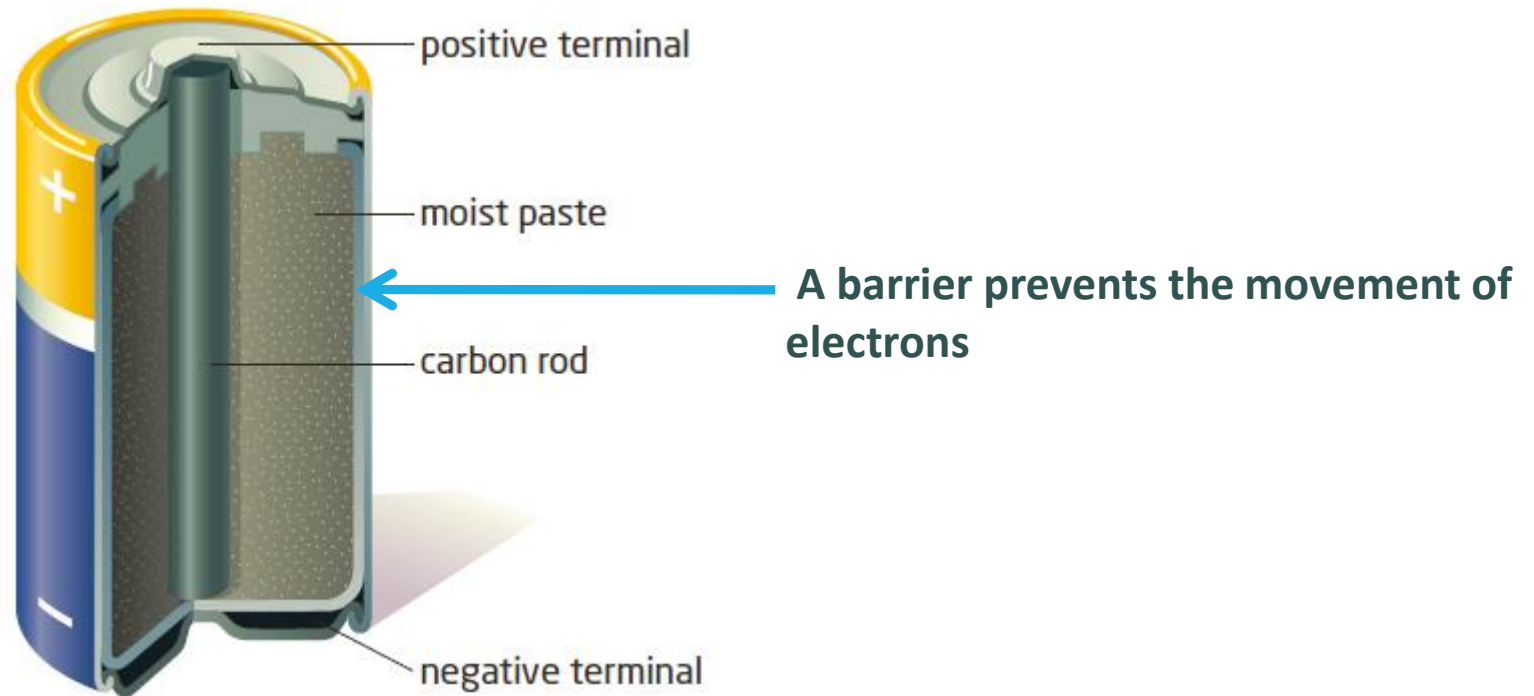
Generating Electrical Potential

Video: [How Batteries Work](#)



The unstable electrons at the negative terminal can become stable by travelling to the positive terminal.

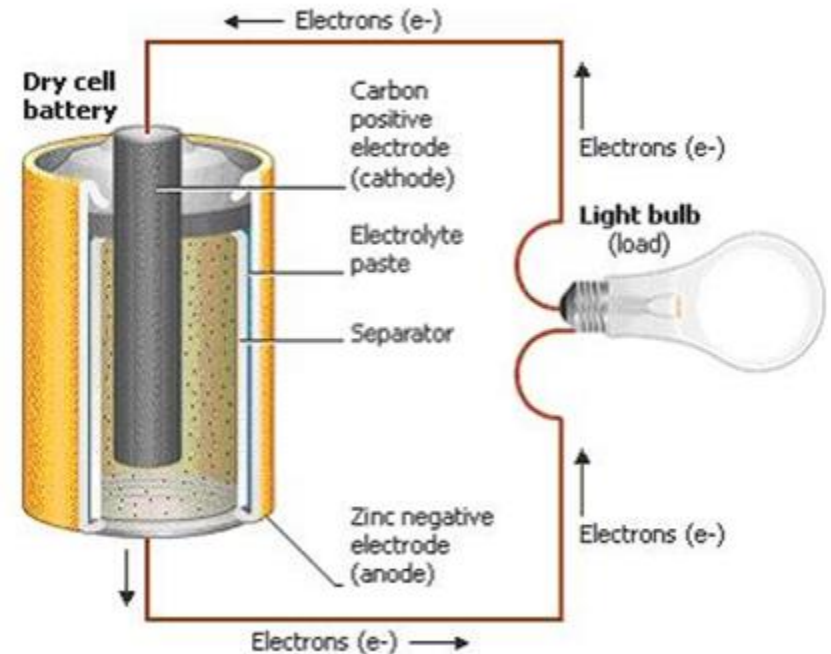
However, a physical barrier inside the battery prevents the electrons from travelling to it directly.



Electron Path

Connecting the terminals together using a conducting _____* provides a path for the electrons to flow.

The energy that they release in the process can be _____** converted to other useful forms of energy!



Classifying Cells

All cells contain an _____*, which is a solution or paste that allows ions to move within the cell.

Cells can be classified as either dry or wet:

- **Dry cells** – The electrolyte is a paste.
(e.g., common household batteries)
- **Wet cells** – The electrolyte is a liquid
(e.g., car batteries)

Cells can also be classified as either primary or secondary:

- **Primary cells** – Can only be used once. The cell runs out of voltage when the chemicals are used up.
- **Secondary cells** – Can be recharged many times. Providing energy will reverse the chemical reaction inside the cell, so that it can occur again.

What kind of cell do you find in mobile phones and laptops?



Other types of cell...

Fuel cell – Generates electricity through chemical reactions, but the fuel must constantly be replenished

- example: hydrogen fuel cells

Solar cell – Converts sunlight into electrical energy



Homework

Read pages 437 - 444 (section 11.1)

Read pages 452 - 453 (section 11.2)

Page 445 #2, 5, 8

Page 454 #2, 3, 4 b), 8