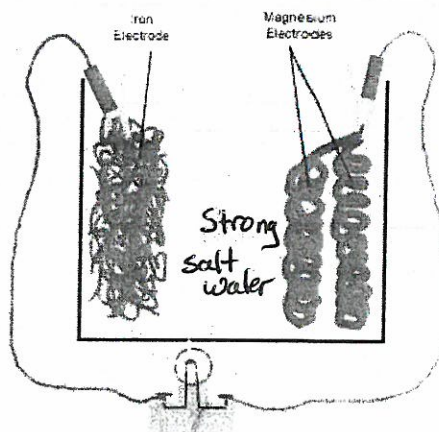
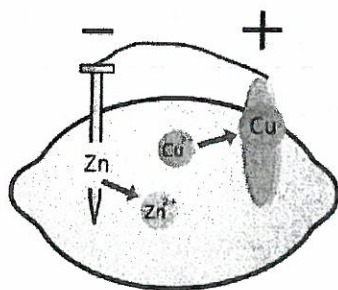


S90 Topic 4: Portable Power: Batteries

Discovery of Batteries

Luigi Galvani discovered electricity could be produced in living tissues: he found a frog leg would twitch when touched with 2 different metals (just like we can make a battery in fruits and veggies if we put in 2 different metals and connect with wires).

Alessandro Volta found you didn't need living tissues to produce electricity. You just need to put 2 different metals in solutions of salt or acid and voltage is produced.



ELECTROCHEMICAL CELL (also called a voltaic cell) (ex. battery) :

Converts chemical energy to electrical energy.

Components: 2 different metal electrodes in an electrolyte (an ionic solution that conducts electrons). When electrodes are immersed in the electrolyte, the (+) electrode gives up electrons, the (-) electrode receives electrons. When a conductor (wire) is attached, the electrons flow giving us electricity. Eventually the (+) electrode disintegrates and the cell dies.

Activities:

1) http://www.teachersdomain.org/asset/nvms_vid_cleaneract/ In this clip see how batteries work and info on batteries for electric motorcycles and cars

Types of Batteries

What metals are used for electrodes? It depends on the job the battery is used for. The name of the battery usually tells you the type of metal used for the two electrodes: ex. NiCad battery uses nickel and cadmium. **One electrode loses electrons and one gains electrons as the battery generates electricity.**

What's the difference between a wet cell and a dry cell battery? The electrolyte used. A dry cell battery uses a paste electrolyte (ex. most batteries we use for portable electronics: laptops, watches, cell phones, cameras....), a wet cell battery uses a liquid electrolyte (ex. car, snow mobile, motorcycle batteries – use sulfuric acid).

What's the difference between a primary and a secondary cell? A primary cell is non rechargeable. The amount of chemicals in it will determine how long it lasts.

A secondary cell is rechargeable. Recharging reverses the chemical reactions that generated electricity, and rebuilds the original chemicals in the battery.

☐ **Activity:** Fill in the following table using pg. 304 -5.

Application	Best cell type to use	Cell Features
Laptop computer	Nickel-metal hydride or nickel -cadmium	Compact, powerful, rechargeable
Electronic wristwatch		
Emergency warning light		
Child's toy robot		
Cave explorer's headlamp		
Rechargeable flashlight		
Highpowered camcorder light		
Hearing aid		
Emergency Locator beacon		
Digital Camera		

Cells of the Future: hydrogen fuel cells

What are the advantages of using a fuel cell (i.e. hydrogen fuel cell) instead of batteries? Non polluting – the byproducts are electricity, heat, and water. 50 – 85% efficient (traditional auto engines are 25 – 40% efficient).

What are the problems scientists are working on to make hydrogen fuel cells? Finding a good source of hydrogen that is not expensive, easy to do, and non-polluting.

☐ **Assignment:** Complete Topic 5 review questions pg. 307. Wrap-up pg. 308 # 1, 7, 8. Do online quizzes for Topic 5. Complete your vocabulary.