

“Houston, we have a problem”

Those famous words were uttered by Captain Jack Swigert on April 13, 1970, moments after a loud explosion was heard aboard the Apollo 13 lunar mission, the 3rd lunar mission in the history of the National Aeronautical and Space Administration (NASA). The explosion was the result of a faulty mechanism attached to the No. 1 oxygen tank aboard the shuttle. After the explosion, the team was forced to move into the Lunar Module (LM) in order to conserve both supplies and electricity for the return trip to Earth. They were approximately 200,000 miles from home.

During their return trip, the mission team had issues that arose with the conservation of battery power. The Apollo team was forced to shut down all non-essential systems while operating other essential systems only occasionally to have enough battery power for the navigational systems to work. The scientists at Mission Control were tasked to create a start-up sequence for the shuttle that would not overload the available power supply and thus render the shuttle inoperable. It was estimated that upon landing, there was less than 2 hrs of battery power left in the LM, which would have resulted in colossal rescue failure.

YOUR MISSION:

Recently, an group of researchers who have been studying the Bermuda Triangle have been concerned about the possibility of becoming marooned on one of the hundreds of islands that are located off the southern coasts of Florida and Cuba in the Caribbean region. Your team has been tasked with preparing a contingency plan in the event that they are unable to power their Global Position System and Tracking Beacon (GPS-TB). This equipment is vital to your rescue and requires energy sources. You will only have the supplies available to you that the research team has in their possession in the field. Unfortunately, extra batteries are not on that list.

Your research team must be able to power a Samsung GPS-TB 9000, which is usually powered by one standard AA alkaline battery possessing a voltage of 1.5V. Utilize the supplies you have available to you, your team is required to generate the required voltage and write a description of your work for the research team to carry with them in the field. Diagrams/Illustrations may help.

Good Luck.

-The Management.

THINK ABOUT IT:

This experiment deals with constructing a battery from household items. However, it would first be pertinent to know how a battery works. Consult the following website before continuing.

<http://www.howstuffworks.com/battery.htm>

This is an excellent website and will probably give you everything you need to know to construct your homemade battery.... So instead let's talk quickly about what is going on.

Chemistry is all about change. Bonds can be made or broken, then remade with new molecules or atoms. This all involves moving electrons. Electrons are not static, meaning they stay in one place. They are active, and continuously travel around space in the vicinity of the nucleus of any atom. They can be shared or "stolen" in any bond, depending on the species involved in bonding. There are several types of bonds in chemistry:

Ionic bonds, Covalent bonds, polar bonds, and London forces.

However, electrons can also be shuffled around and, if done correctly, forced to do work. This is how batteries work. The electrons are moved from one chemical species to another chemical species (the "shuffling") and in the course moved through a resistor (known as a "load") to accomplish some electrical work. We know of this phenomenon as "electricity" and we utilize it almost every second of every day.

Electron movement can be accomplished either via a magnetic field (more for a physics class) or via chemical methods (this experiment). This is accomplished by shuttling electrons from a chemical with a low affinity for electrons (an oxidant) to a chemical with a high affinity for electrons (a reductant). Electrons move from the oxidant to the reductant in any electrochemical reaction.

For more information on redox reactions, consult your text and the following websites:

<http://en.wikipedia.org/wiki/Oxidation>

KEYWORD SEARCHES:

Oxidation, reduction, Volta, electron movement.

Did chemistry occur? How do you know?

Voltaic pile

From Wikipedia, the free encyclopedia

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A [copper-zinc](#) Voltaic pile

A Voltaic pile on display in the [Tempio Voltiano](#)

The **Voltaic pile** is the first modern electric [battery](#), invented by [Alessandro Volta](#) in [1800](#). Volta demonstrated that when [metals](#) and [chemicals](#) come into contact with each other they produced an [electrical](#) current. In his research, Volta placed together several pairs of alternating [copper](#) (or [silver](#)) and [zinc](#) discs separated by cloth or cardboard and soaked the cloth or cardboard in [brine](#) (salt water) to increase conductivity, and an electrical [current](#) was produced. On [March 20, 1800](#), Volta wrote to the London Royal Society to describe the technique for producing electrical current using his pile.

[William Nicholson](#) and [Anthony Carlisle](#) discovered [electrolysis](#) of water using the Voltaic pile. [Humphry Davy](#) showed that electricity from Voltaic piles was caused by a chemical reaction (not by differentials between metals as previously believed). [William Hyde Wollaston](#) showed that electricity from Voltaic piles was identical to electricity produced by [friction](#). Davy also used the Voltaic pile to decompose and discover materials.

[Contact tension](#) was an early theory that attempted to explain the action of the voltaic pile; it is now an [obsolete scientific theory](#) and has been replaced by the current theories of [electrochemistry](#). A number of high-voltage [dry piles](#) were invented between the early 1800s and the 1830s in an attempt to determine the source of [electricity](#) of the wet voltaic pile, and specifically to support Volta's hypothesis of contact tension. Indeed Volta himself experimented with a pile whose cardboard discs had dried out, probably accidentally. The first to publish was [Johann Wilhelm Ritter](#) in 1802, (albeit in an obscure journal) however over the next decade it was announced again and again as a new discovery.

