What are batteries made of

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Life without batteries would be a trip back in time, a century ortwo, when pretty much the only way of making portable energy was either steam poweror clockwork. Batteries—handy, convenient power supplies as smallas a fingernail or as big as a trunk—give us a sure and steadysupply of electrical energy whenever and wherever we need it.Although we get through billions of them every year and theyhave a big environmental impact, we couldn"t live our modernlives without them.

You might think a battery looks just about as dull as anything you"veever seen. But the minute you hook it up to something, it starts buzzing with electricity.That dull little cylinder turns into your very own micro power plant! Let"s see what"s going on in there...

Photo: Disposable batteries like this one arereally convenient, but they can be expensive in the long haul and they"re bad for the environment.A better option is to use rechargeable batteries.They cost more to begin with, but you can charge them hundreds of times—so theysave an absolute fortune and help save the planet.

A battery is a self-contained, chemical power pack that canproduce a limited amount of electrical energy wherever it"s needed.Unlike normal electricity, which flows to your home through wiresthat start off in a power plant, a battery slowly converts chemicalspacked inside it into electrical energy, typically released over aperiod of days, weeks, months, or even years.

It"s important to note that the electrodes in a battery are always made from two dissimilar materials(so never both from the same metal), which obviously have to be conductors of electricity.This is the key to how and why a battery works: one of the materials"likes" to give up electrons, the other likes to receive them. If both electrodeswere made from the same material, that wouldn"t happen and no current would flow.

Artwork: Have you ever made a simple battery by pushing a zinc nail and a copper coin into a lemon? It works because these two different metals have atoms with different abilities to hold on to the electrons they contain. The zinc atoms in the nail lose their electrons (blue, e), which flow out through the circuit you"ve made to the copper atoms in the coin. This flow of electrons makes a current that delivers useful power,capable of lighting up a tiny bulb or LED (red). Read more about how to make a lemon battery and the chemical reactions that power it.

Here"s my battery hooked up to a flashlight bulb to make a simplecircuit. I"ve unwrapped a paperclip to make a piece of connecting wire and I"mholding that between the bottom of the battery and the side of the bulb.If you look closely, you can see the bulb is shining. That"s because electrons are marching through it!

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Now here"s what"s going on inside. The battery"s positive terminal (shown justabove my left thumb in the photo and colored red in the artwork below) isconnected to a positive electrode that"s mostly hidden inside the battery.We call this the cathode.The outer case and the bottom of the battery make up the negativeterminal, or negative electrode, which is also called the anodeand colored green in the artwork.The paperclip wire is represented in the art by the blue line.