



## Fruit Battery Experiment

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Ever heard of a fruit battery? Who knew we could make our own batteries? Batteries are the most common source of electricity especially for smaller gadgets and devices that need electric power to work. It comes in different forms, in varying voltages; again depending upon the power requirement of the gadget or device we will be using them for.



Fruit Battery Experiment, Travis V.

Batteries store chemical energy and transform this energy into electricity. This is how batteries make gadgets and electronic devices work, like mobile phones, MP3 players, flashlights, and a whole lot more.

There are two main types of batteries based on the type of electrolyte it uses. There is what we call the wet cell, which makes use of liquid electrolytes in the form of a solution, and there is also what we call dry cell, which makes use of electrolytes in the form of paste. There are many more types of batteries available on the market now, like carbon-zinc cell, alkaline cell, nickel-cadmium cell, Edison cell and mercury cell.

In this simple experiment, we will be creating our own battery with the use of citrus fruits, with a power that is strong enough to make a small bulb light up. Later on, we will discuss how citrus fruits work as batteries.

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## Materials

To make our fruit battery work, we have to secure the following materials:

- citrus fruits such as lemons, limes, oranges, etc
- copper nail (recommended size in length is 2 inches or longer)
- small light bulb (preferable coloured or opaque with a 2-inch lead with enough wire to connect it to the nails)
- electrical tape
- zinc nail or galvanized nail (also 2 inches or longer)
- micro ammeter (optional)

## Procedure

The estimated experiment time for this activity is about five to ten minutes. It does not take long to create your fruit battery!

Now, the first step is to take your citrus fruit of choice in hand, and squeeze it on all sides with your hands without breaking the skin. Your aim is to soften the citrus fruit enough to extract its juices.

The next step is to puncture the citrus fruit with the nails. Insert the nails into the fruit about 2 inches away from each other, in such a way that the two nails stop at the centre of the fruit without touching. Be careful inserting each nail. Go slowly, being sure not to go through the fruit completely.

With the nails inserted into the citrus fruit, it is time to prepare your bulb. Take your bulb and peel off its plastic insulation, expose the wire underneath. Wrap the exposed wires around the head of the 2 nails. Use the electrical tape to secure each end of the wire on the nails.

With the bulb's wires attached securely to both the copper nail and the galvanized nail, your coloured bulb will light up!

## Discussion

Citrus fruits have an acidic content, and the more acidic it is, the better it is for conducting electricity. This is the reason why even though the nails were not touching each other, your fruit battery still worked! The fruit contains positively charged ions. When you inserted the galvanized or zinc nail into the fruit, the negatively charged ions or the electrons started to move from the fruit to the zinc nail thus leaving the protons in the fruit. This transfer of electrons generates electricity as soon as you attach the wires to the nail, and the bulb lights up! Amazing huh?

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