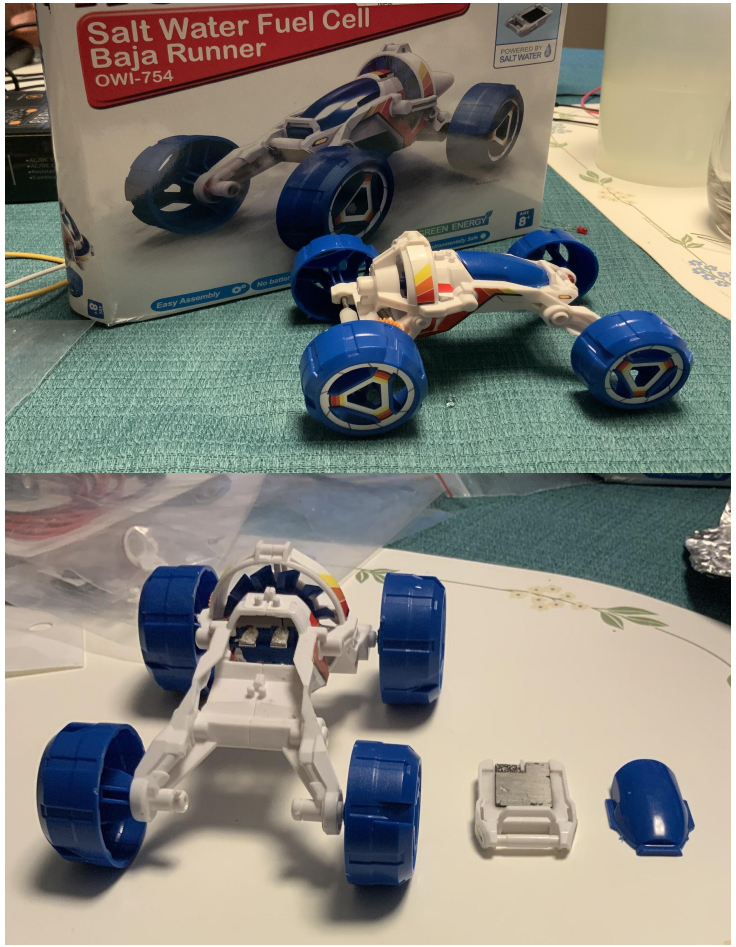
Powering a Fuel Cell Car with Household Liquids

Introduction

Inspiration

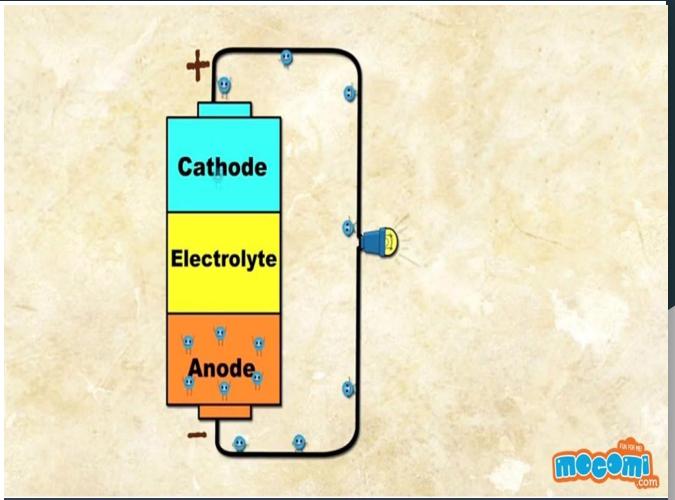
I got inspired to do this project when I received the fuel cell car as a gift and was fascinated on how it was powered. You had to use salt water to make it work. I wanted to see if other household liquids would it power it too.

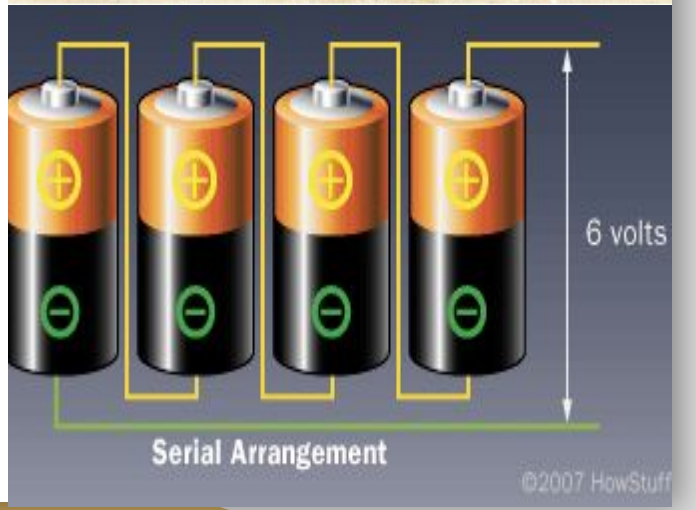


How a battery works?

The blue square which is a cathode is the positive part. The orange square is the anode which is the negative side. Both of the sides are needed to power up the car. They are in a circuit. They are inside the battery. They go through the wires to power up the terminal. An electrolyte is a substance that produces a electrically conducting solution.

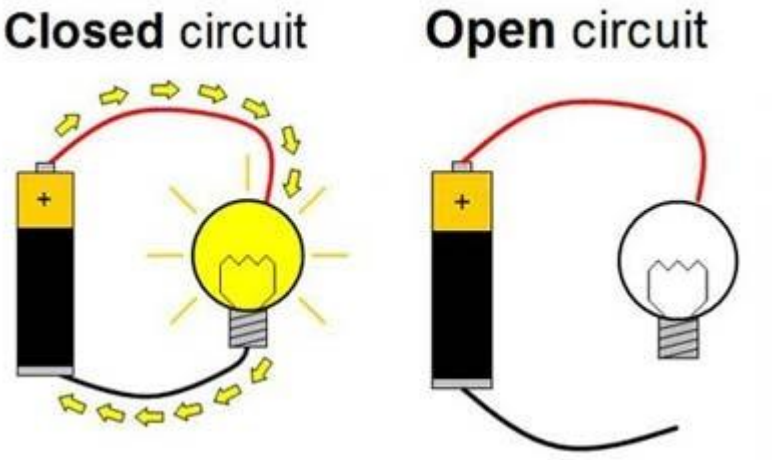
If you put multiple batteries and you connect them together, you get a high voltage because the batteries have a lot of power.





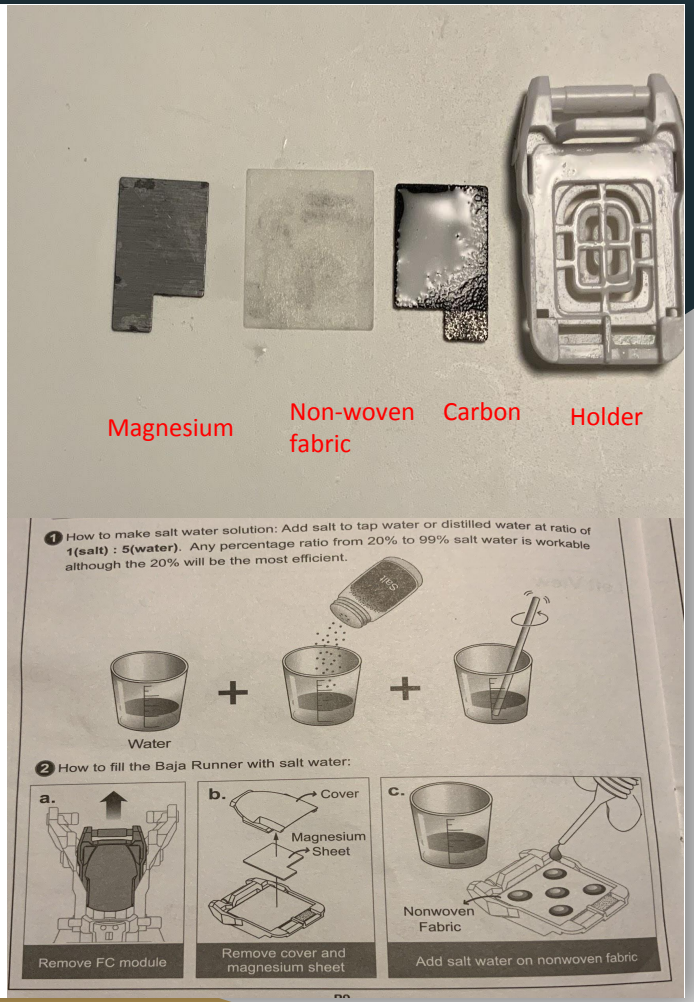
How do circuits work?

A circuit is a path that electricity flows through. The electricity flows through wires that are connected to a battery and the thing that is being powered like a lightbulb. An closed circuit is a circuit where the atoms can move in a circuit freely without any thing stopping it. The atoms can move from the battery and go into the light to power it. It will come back out and go in a circle and go back in. This circuit powers the light.



How the car works?

To make the car work you have to drop salt water on carbon and a magnesium sheet. Then you put on top of the white holder and put the blue cover on. Then you insert it into the car.



Hypothesis

Main Question:

Can all the materials equal up to or make up to the car's battery and power the car?

Hypothesis:

I think Coke is going to have the highest voltage because it is acidic, and acids are electrolytes.

Materials & Setup

Materials

1.Copper

2.Zinc

3.Coke

4.Lemon Juice

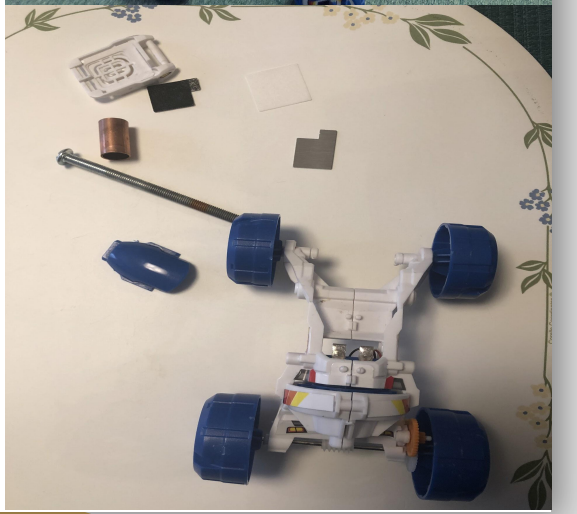
5.Vinegar

6.Salt Water

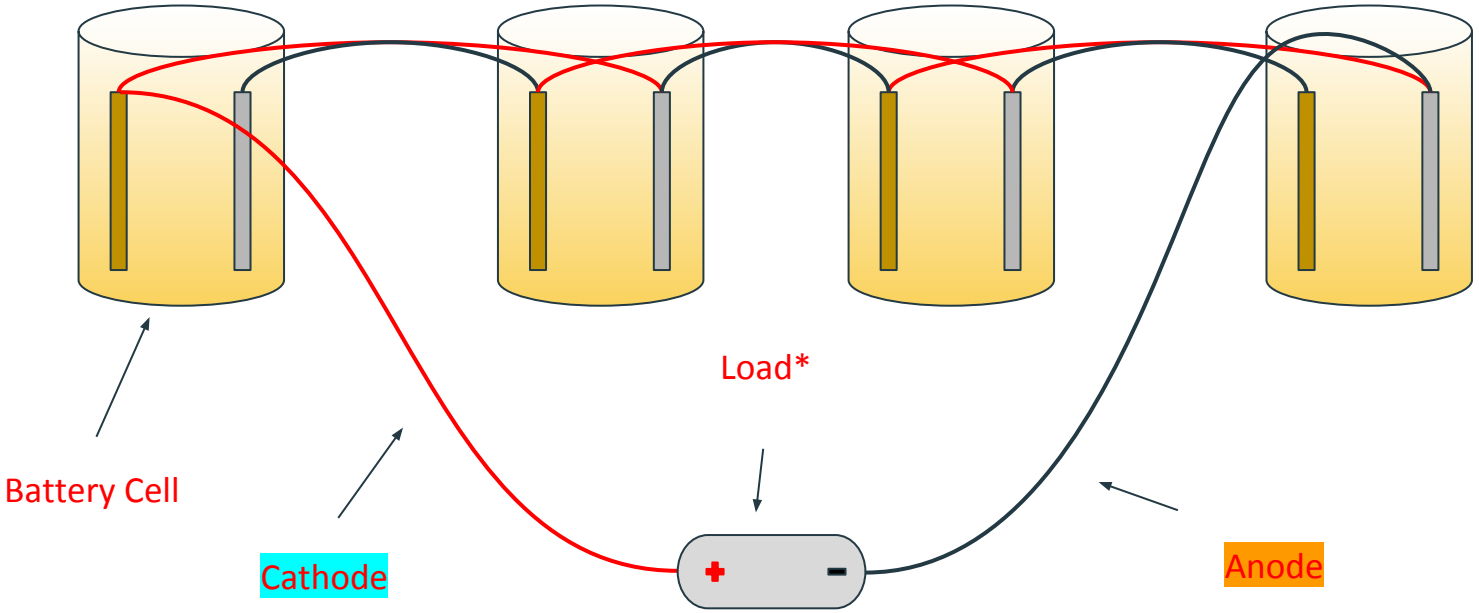
7.Gatorade

8.Cups

9. Salt Water Powered Car



Setup



* load was light bulb and car

Procedures

Procedures

1. Gather all of the materials

2. Have a notebook to record your data

3.Have something act as your cathode and anode, I used copper as my cathode and zinc as my anode

4. Add the liquid into the cup

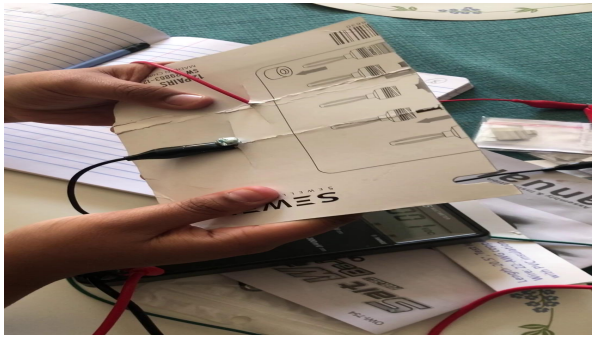
5.Put the copper and zinc on opposite sides of the cup so they won’t touch

6. Record the voltages in your notebook

Voltage Testing

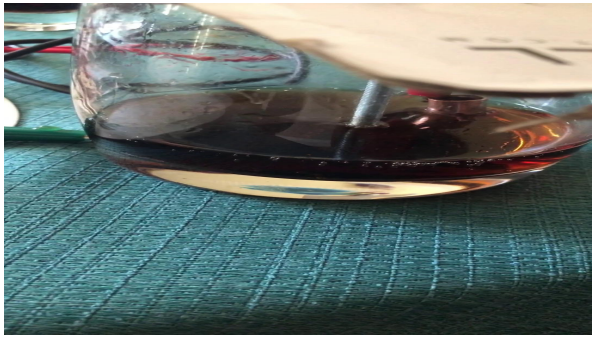
Coke

1st Attempt



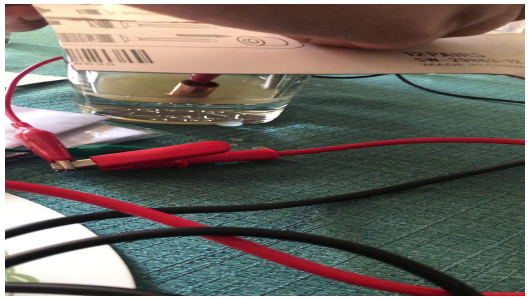
2nd Attempt

3rd Attempt

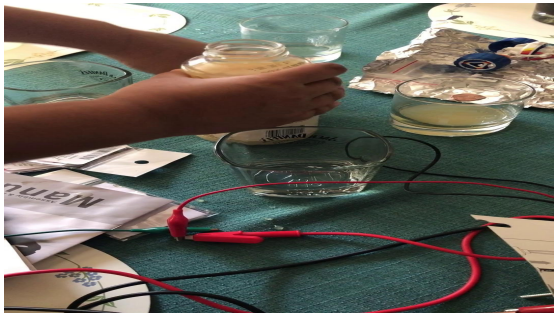


Lemon Juice

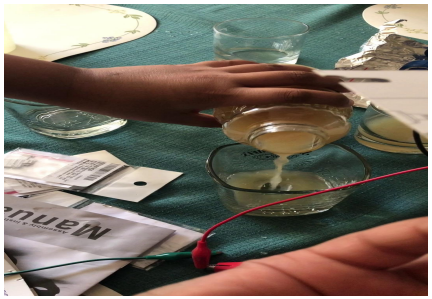
1st Attempt



2nd Attempt

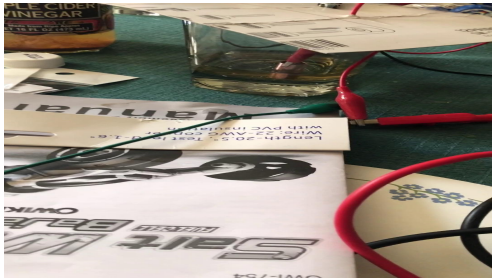


3rd Attempt



Vinegar

1st Attempt



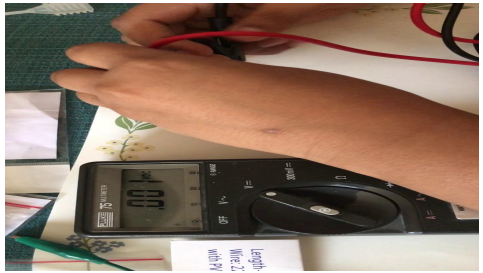
2nd Attempt

3rd Attempt

Salt Water

1st Attempt

2nd Attempt



3rd Attempt

Gatorade

1st Attempt

2nd Attempt

3rd Attempt

Light Bulb Testing

Light Bulb Testing

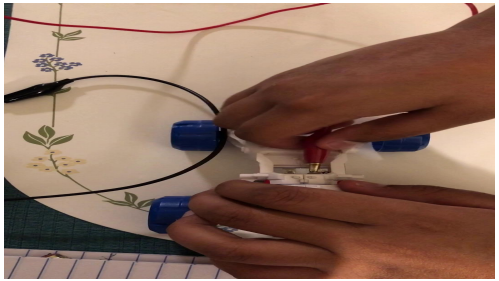
The test:

We wanted to see if the salt water

can power two light bulbs.

We used 4 saltwater cups.

We also wanted to see the current and voltage. We tried it with 1 cup then 2, 3 and 4.



Car Testing

The car working with the battery

Results

Power Standard for Car

Using the Magnesium-Carbon battery with salt water allowed for the car to work as expected. These were the measurements.

Voltage = 1.592

Current = \

Results for voltage

Liquids	1	2	3	4
Coke	0.94	1.87	2.77	3.71
Lemon Juice	0.84	1.75	2.60	3.49
Vinegar	0.81	1.68	2.58	3.39
Gatorade	0.94	1.92	2.87	3.81
Salt Water	0.84	1.70	2.54	3.36

Results for current

Liquids	1	2	3	4
Coke	0.86	0.59	1.06	0.54
Lemon Juice	1.33	1.32	1.28	1.16
Vinegar	1.33	0.52	0.75	0.68
Gatorade	2.05	1.29	1.33	1.66
Salt Water	0.85	0.72	0.87	0.95

Results

Liquid	Small Light Bulb	Large Light Bulb	Car
Salt + Water	yes	yes	no
Coke	yes	yes	no
Gatorade	yes	yes	no
Vinegar	yes	yes	no
Lemon Juice	yes	yes	no

Conclusion

Conclusion

I think salt water gives the most power to the car because of how much electrolytes it has, so it powers the car. The other materials don’t power it because they don’t have a lot of electrolytes. My hypothesis was, can all of the house items equal up to the car battery to power the car. No, because the materials didn’t have enough electrolytes to power the car. My hypothesis was wrong because the coke was acidic, but it couldn’t power the car. I know that it doesn't have enough electrolytes.