

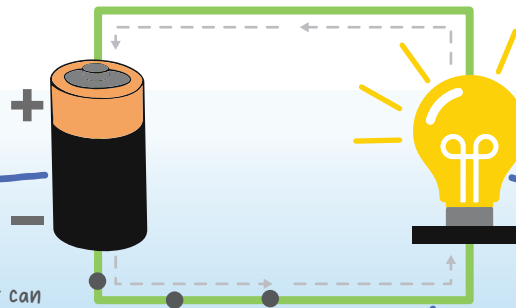
LEMON BATTERY

WHAT IS ELECTRICITY?

Electricity is a form of energy created by the movement of tiny particles called electrons.

The **power source** provides a steady flow of electrons eg. battery, power plant or even a lemon battery!

Electrons are tiny particles that can carry tiny electric charges from one place to another, this is called **electricity or an electric current**.



When the electrons flow through the wires & create an electric current it can power things like lights.

For electricity to flow, it needs a complete path, called a **circuit**. A circuit is a closed path usually made of metal.

LEMON BATTERY

How can a lemon be a power source?

A BATTERY REQUIRES 3 THINGS

2 ELECTRODES

a material, such as metal, that can carry electricity



Zinc Screw: zinc has a negative charge (-) & will give up electrons.



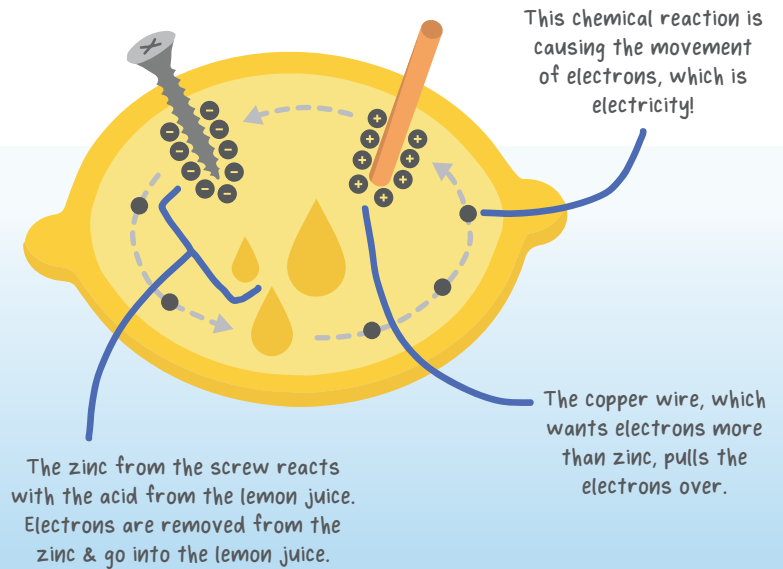
Copper Wire: copper has a positive charge (+) & will pull electrons.

1 ELECTROLYTE

a solution that conducts electricity



Lemon Juice: The lemon juice inside the lemon has citric acid and acids contain ions which conduct electricity.

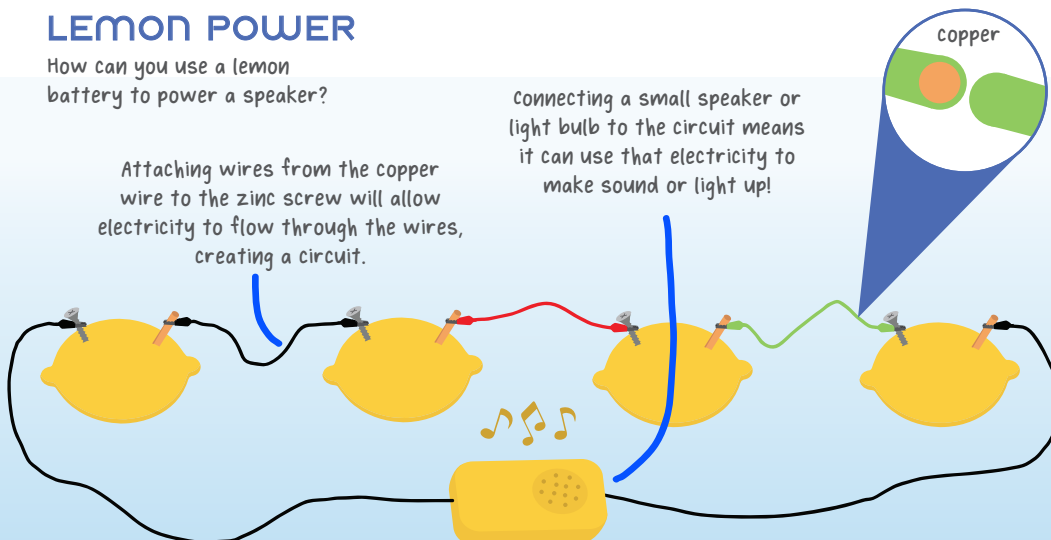


LEMON POWER

How can you use a lemon battery to power a speaker?

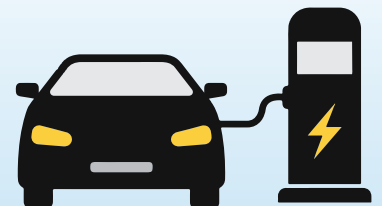
Attaching wires from the copper wire to the zinc screw will allow electricity to flow through the wires, creating a circuit.

Connecting a small speaker or light bulb to the circuit means it can use that electricity to make sound or light up!



WHAT'S INSIDE THE WIRE?

Copper is excellent at conducting electricity, which allows it to efficiently carry electrical current with minimal energy loss.



Copper is an important mineral in the automotive industry, widely used in electrical components or electric vehicles.

HOW TO MAKE A LEMON BATTERY



STEPS

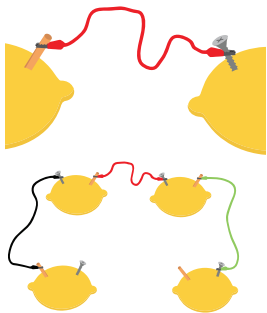
1. PREPARE THE LEMONS

- Roll each lemon on the table with your hand to make them juicy inside.



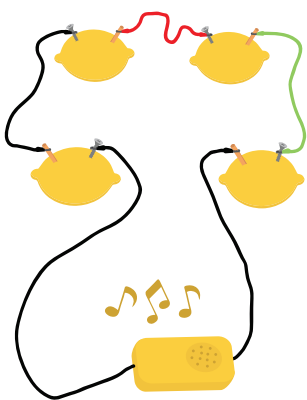
2. INSERT THE ELECTRODE

- Push one copper wire and one zinc screw into each lemon. Make sure they don't touch each other inside the lemon.



3. CONNECT THE LEMONS

- Use the wires with alligator clips to connect the lemons in a chain (circuit). Clip one wire from the copper wire of the first lemon to the screw of the next lemon.
- Repeat until all lemons are connected in a chain.
- The last lemon should have one free copper wire and the first lemon should have one free screw.



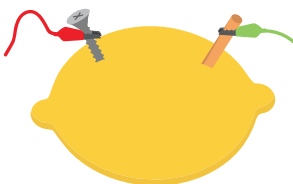
4. CONNECT TO THE DEVICE

- Attach one wire from the free copper wire at the end of the chain to the positive terminal of the speaker.
- Attach another wire from the free screw at the beginning of the chain to the negative terminal of the speaker.

5. OBSERVE

- Once everything is connected, the speaker should make a small beeping noise. Listen closely.

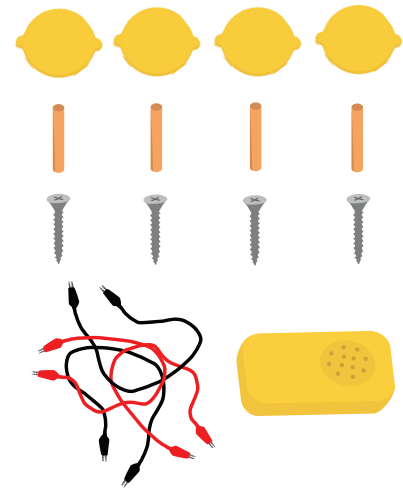
TIPS



- Ensure that the copper wire and zinc screw is directly between the teeth of the alligator clip.
- If there is no sound coming from the speaker and all the wiring is correct try squeezing the lemons again to release more juice.

MATERIALS

- 4-5 lemons
- 4-5 pieces of copper wire
- 4-5 zinc screws
- 5-6 alligator clip wires
- One small speaker



FUN FACTS

- You can create a similar battery by using other citrus fruits like oranges and grapefruits, or even potatoes. This is because they also contain electrolytes.
- Even though lemon batteries do not produce a lot of electricity, they can still power tiny objects. Can you imagine what a bigger version could do?
- Lemon batteries are safe and eco friendly!