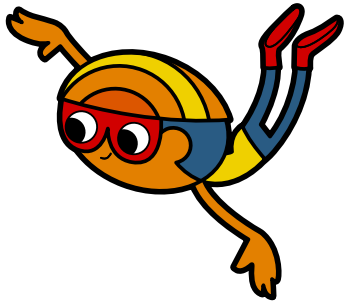
forscherwelt
A Henkel initiative

Lemon battery

Henkel

Lemon battery

Generate electricity yourself



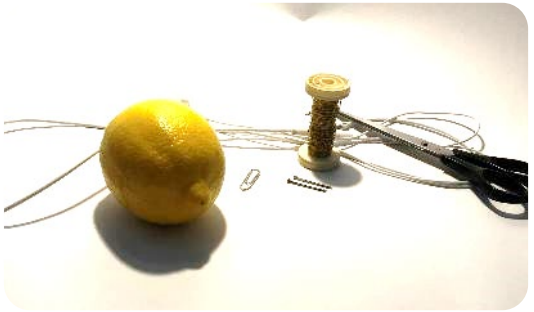
Research question

You have probably used batteries as power source before - like in your flashlight. In this experiment, you can build a very simple battery yourself.

Can you generate enough electricity to make headphones crackle?

You will need

- Iron Nail
- Paper clip (copper)
- Lemon
- Wire
- Headphones (e.g., from cell phone)



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* Aus dem Supermarkt

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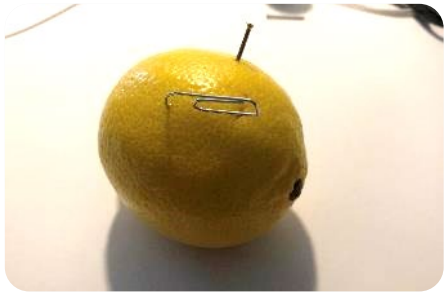
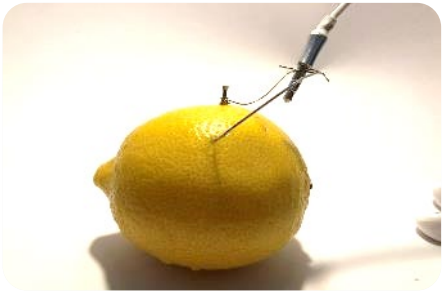
How to do it

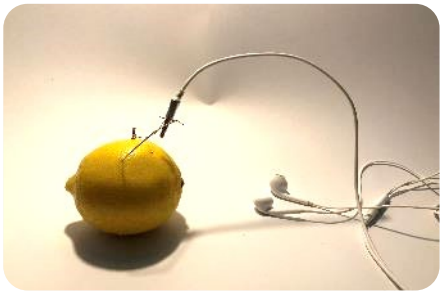
Step by step



Insert an iron nail and a copper paper clip into a lemon. Bend the paper clip so that the wire is straight at one end and remains bent at the other end. Insert the long, straight end into the lemon.



Wrap a thin 5–10-cm wire around the nail. You also need to wrap a wire around the bent end of the paper clip.



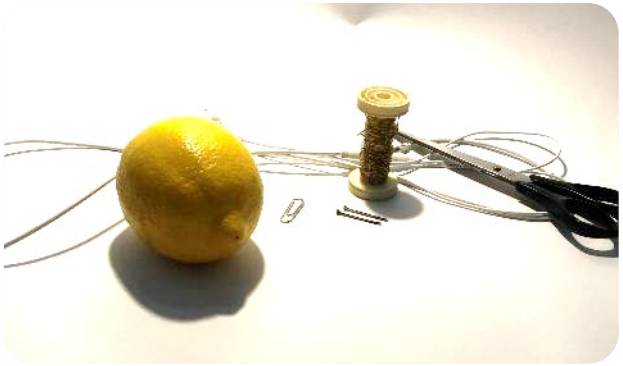
Make current audible: Now insert the plug of a headphone between the cable and the paper clip. You cannot see whether a small current is flowing, but you can make the current flow audible. Put the headphones in your ears and listen carefully: Does it crackle? Can other fruits also conduct electricity? Try it out!

Lemon battery

For parents and teachers

Context

Batteries as a power source play a major role in everyday life. Even though children of elementary school age do not yet have access to the basics at the molecular level, they can learn two basic principles in this experiment:
a) A current only flows when an electric circuit is closed, b) Electricity needs a conductor,- this can be a wire, or an "electrolyte"-containing liquid like lemon juice.



Lemon battery

If two different metals like copper and iron (or zinc) are put into a lemon (= electrodes / minus and plus pole), an electrochemical process starts. The iron oxidizes (or zinc) giving off electrons, which are transported to the copper (= current flow) via an external conductor (wire) which closes the circuit outside the lemon. Within the lemon its juice acts as electrolyte and H_3O^+ ions are reduced at the copper electrode. You can make the current flow audible by connecting a headphone in between.

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