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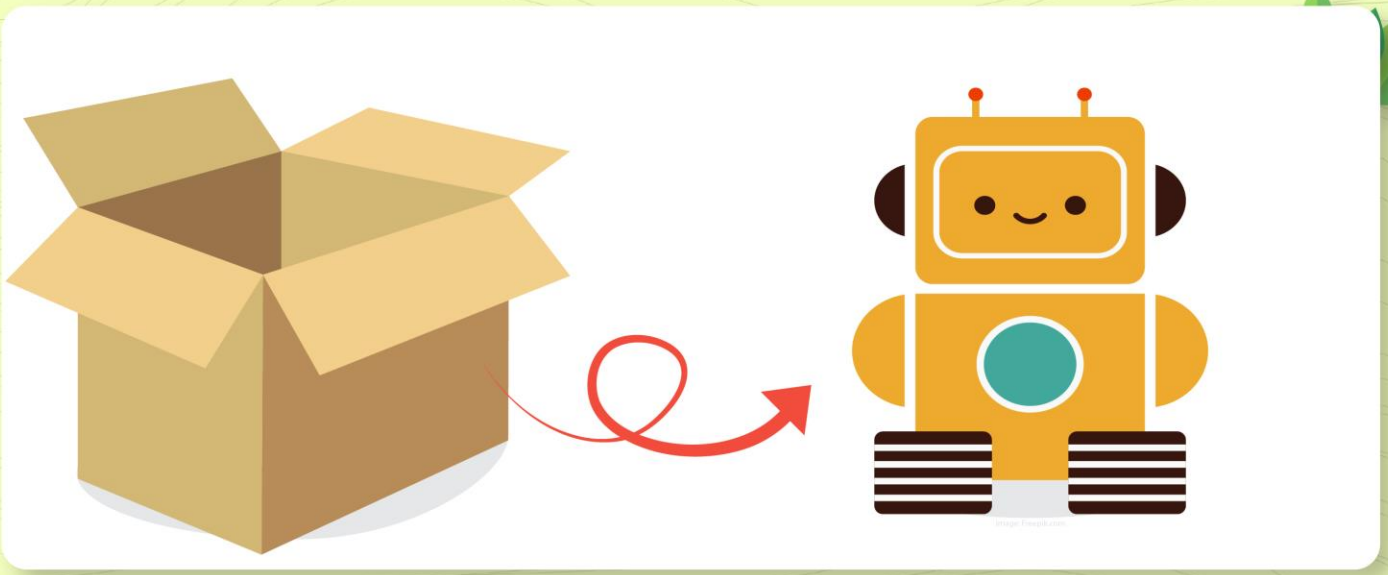
2023 BACK TO SCHOOL CAMPAIGN

STEM Alliance – Lenovo Competition:

Turning Waste into Educational Wonder

Supported by SCIENTIX
The community for science education in Europe

In conjunction with Microsoft intel



Prepared by: **Slavica Bernatović**

Title: **The Battery**

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Slavica Bernatović and students
Student experiment: making a battery

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IMPLEMENT AND ADAPT THE ACTIVITY IN THE CLASSROOM

What are the educational goals set for your students?

Improve students' awareness of rational energy consumption and see the advantages of new forms of energy.
The student develops his creativity and the foundations for innovation in the field of new energy sources.
Raising students' awareness of the achievement of the 17 global goals for sustainable development: G 4, G 5, G 7.

How does the activity align with your curriculum?

PHYS C.2.7.
The student applies the laws of electrodynamics in an electric circuit.
The student constructs a problem-solving plan
The student concludes qualitatively by applying physical concepts and laws
The student investigates physical phenomena by performing a student experiment.

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THE FINAL PROJECT

Briefly illustrate the working process, materials used, and number of students involved:

* activities are organized in groups
* The students make a battery, developing an awareness of the rational consumption of energy and resources, observing and learning the application of the laws of physics through the practical making of a battery
* the idea was realized and implemented with 37 students

Competences developed and learning objectives achieved:

* The student becomes more aware of the importance of sustainable development according to the goals of the SDGs, and the connection of professional knowledge and knowledge of physics
* The student chooses solutions that are in line with the SDGs
* The student develops STEM skills, 4C skills: communication, cooperation, creativity, critical thinking

How did you incorporate inclusivity in the working process?

* The student participates in activities organized by group work
* The student participates in work with his peers, where collaborative learning is also possible
* Activities are organized for a group in which opportunities and rules are applied equally for all genders, girls and boys

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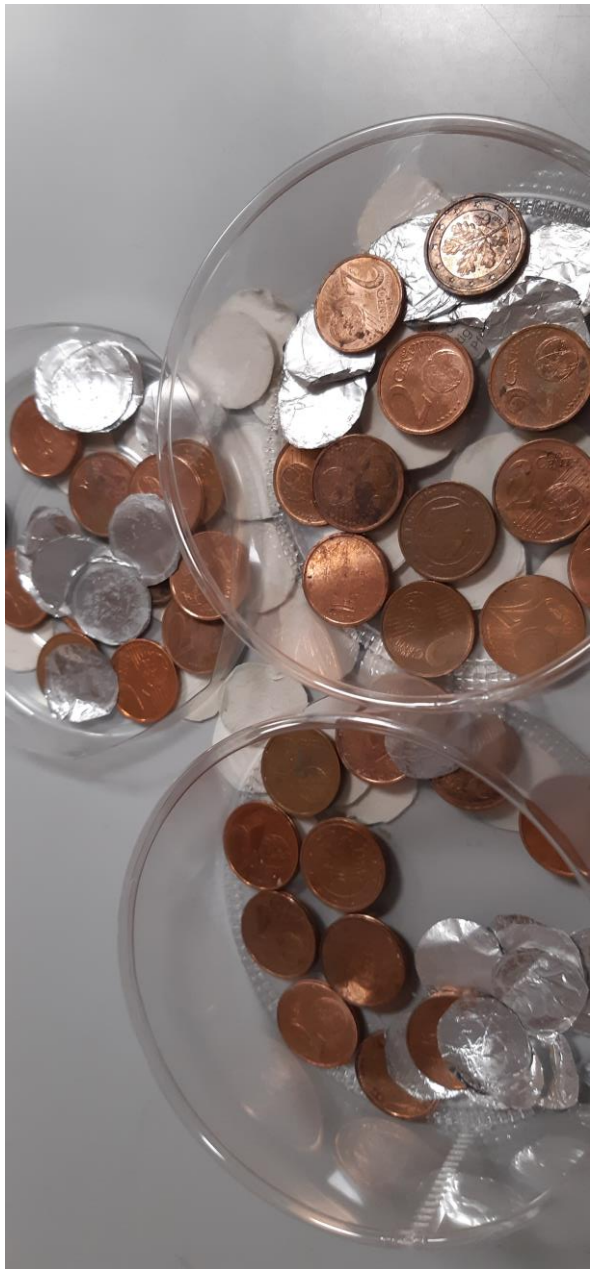

Material needed to make a battery:

coins, for example, 2 cents, or 5 cents
aluminum foil
paper
vinegar

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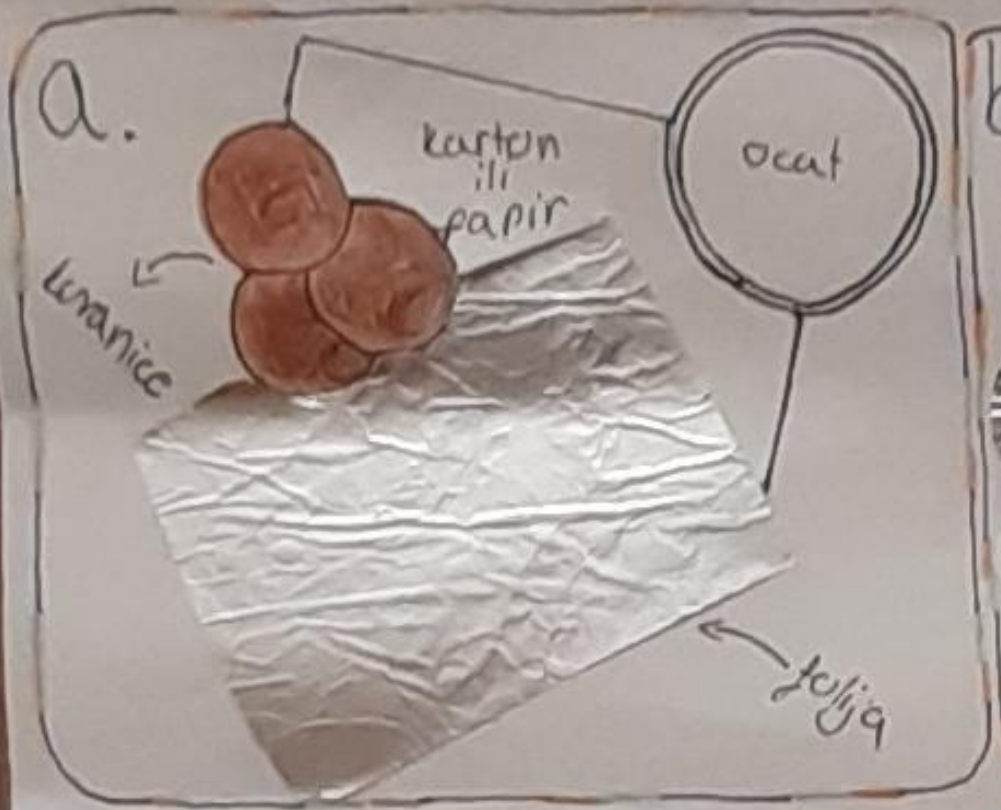
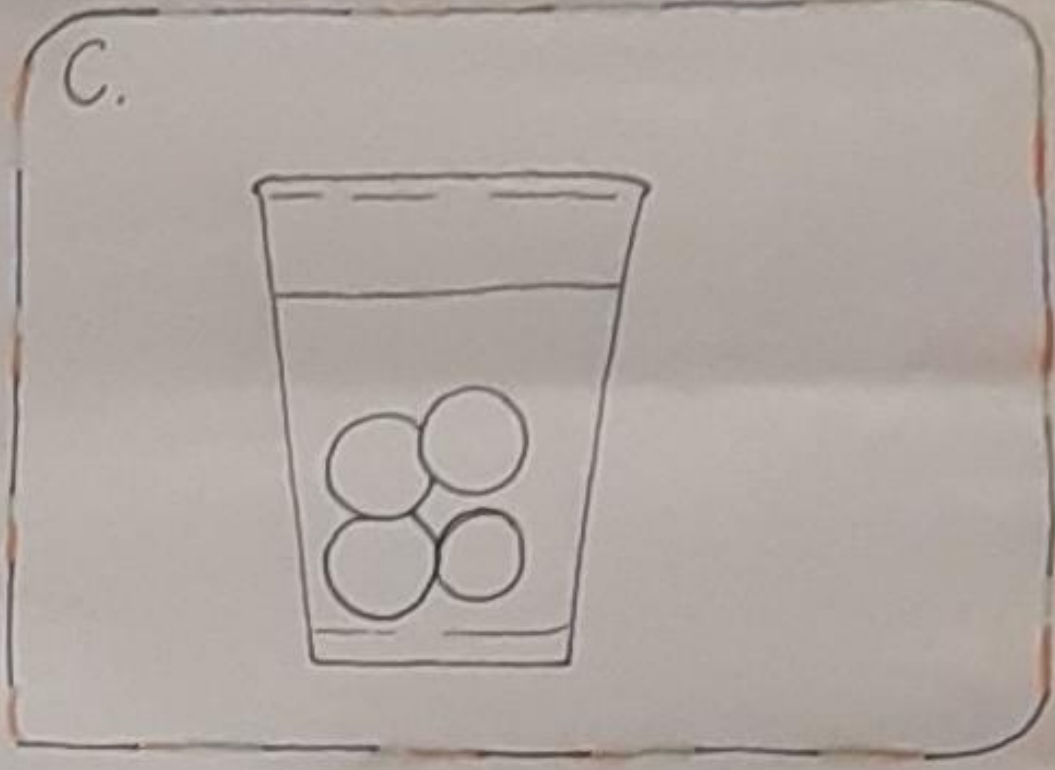
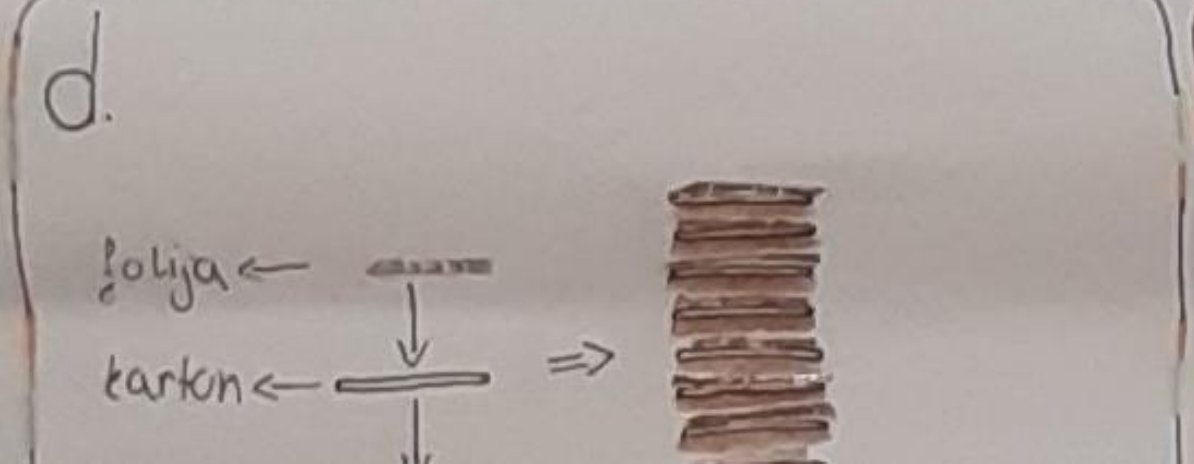
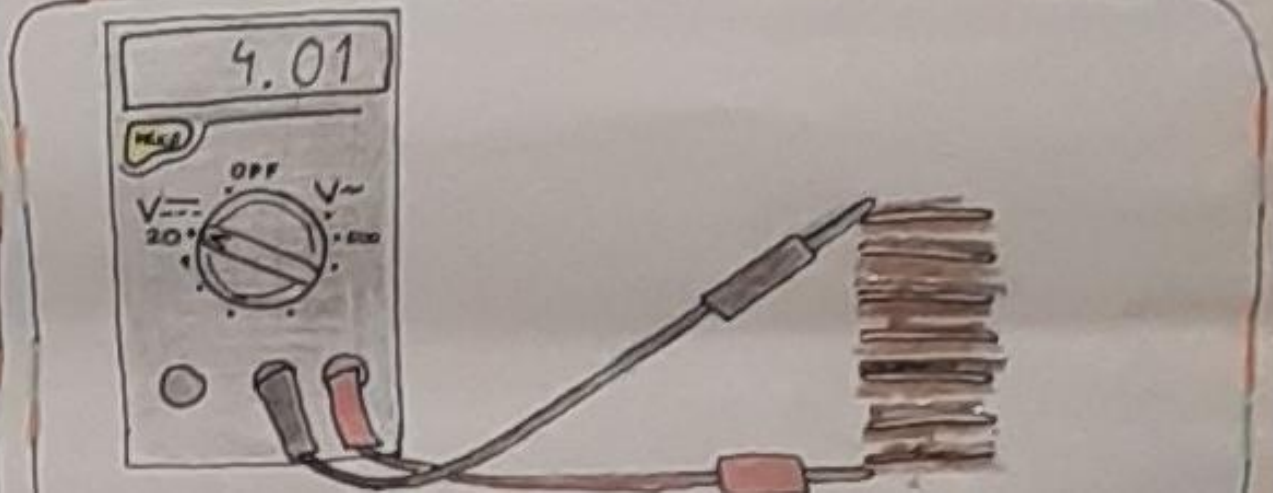
Material needed to make a battery:









BY PARTICIPATING IN THE EXPERIMENT AND MAKING THE BATTERY, THE STUDENT DEVELOPS AWARENESS OF RATIONAL ENERGY CONSUMPTION AND THE PRODUCTION OF CHEAPER AND CLEANER ENERGY SOURCES.
THE MATERIAL THAT THE STUDENT USES IS MUCH MORE FAVORABLE AND CHEAPER THAN THE BATTERY THAT WE BUY IN THE STORE.

By participating in making a battery, the student:

* develops STEM skills - acquires and applies knowledge from physics about voltage sources,

* 4 C skills - collaborate, communicate, think critically and develop creativity,

* develops and adopts the foundations for innovation through this example for new energy sources

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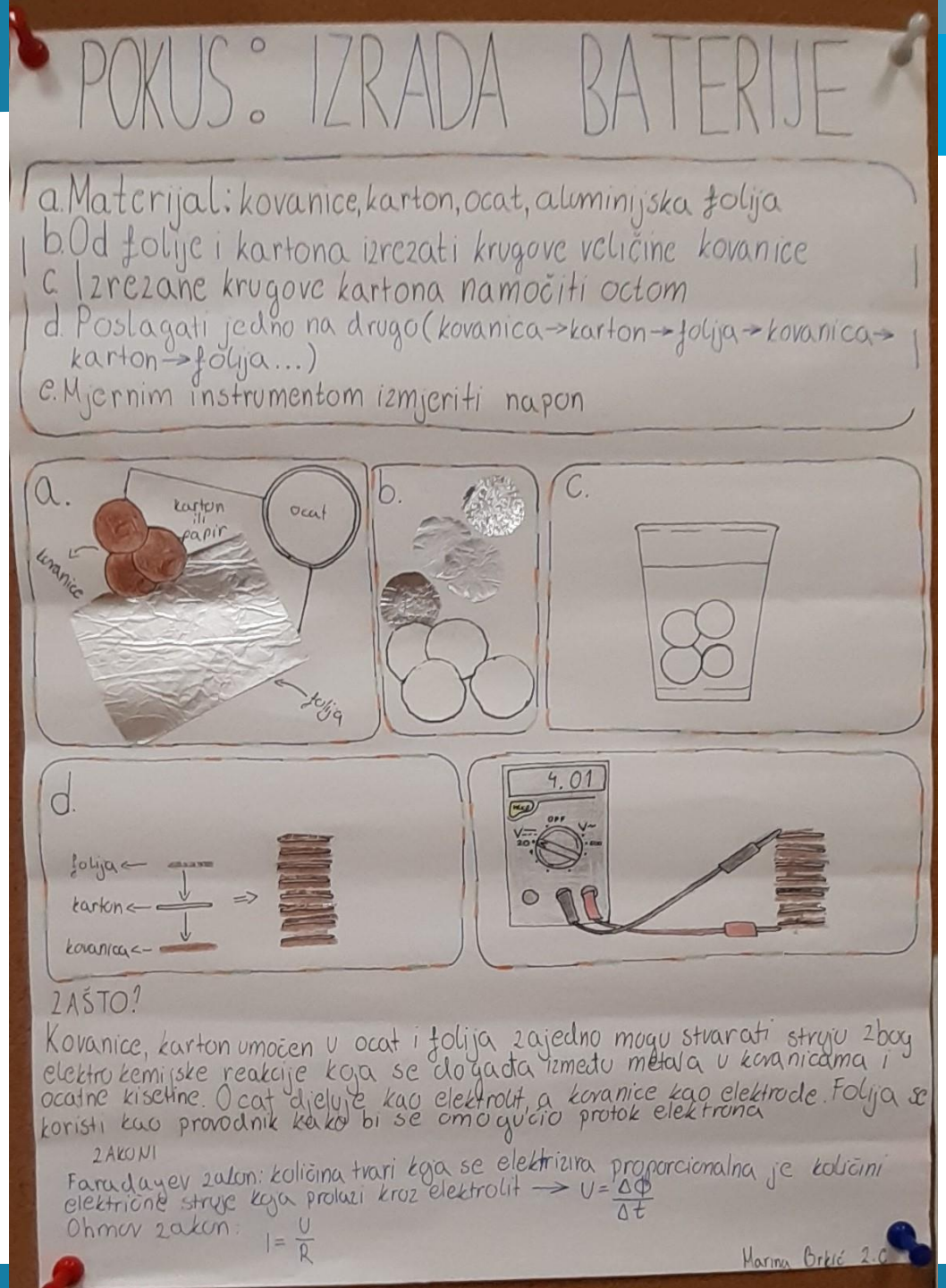
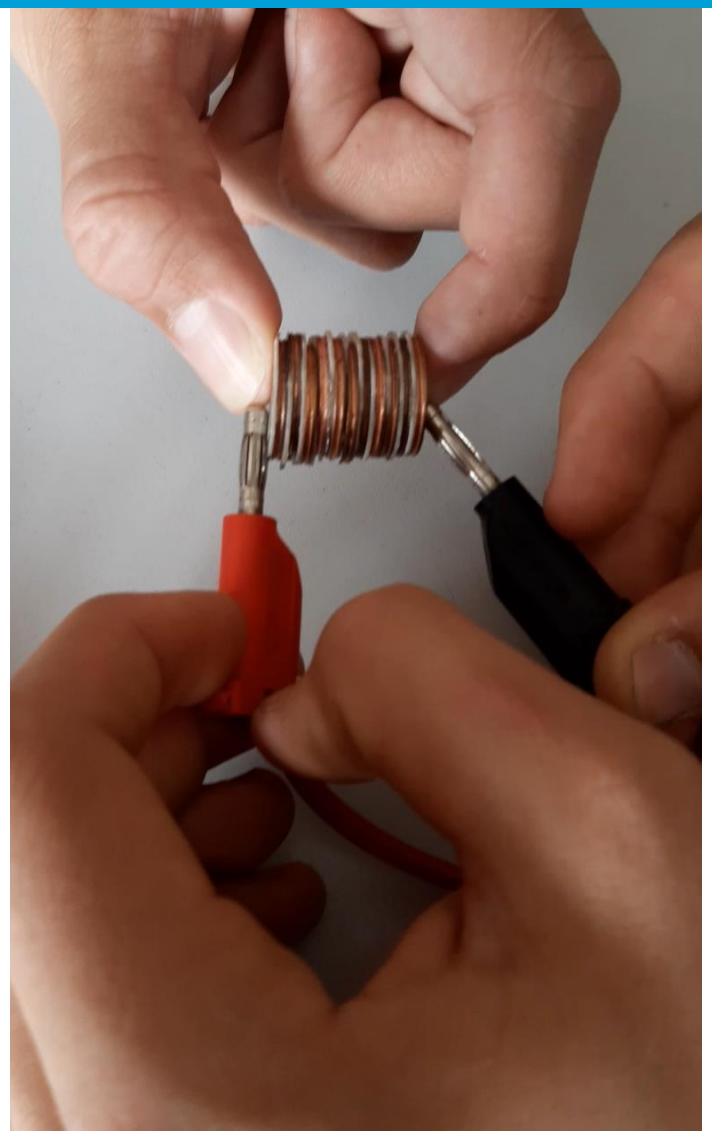
Material product of teaching activities and learning: The battery is the voltage source





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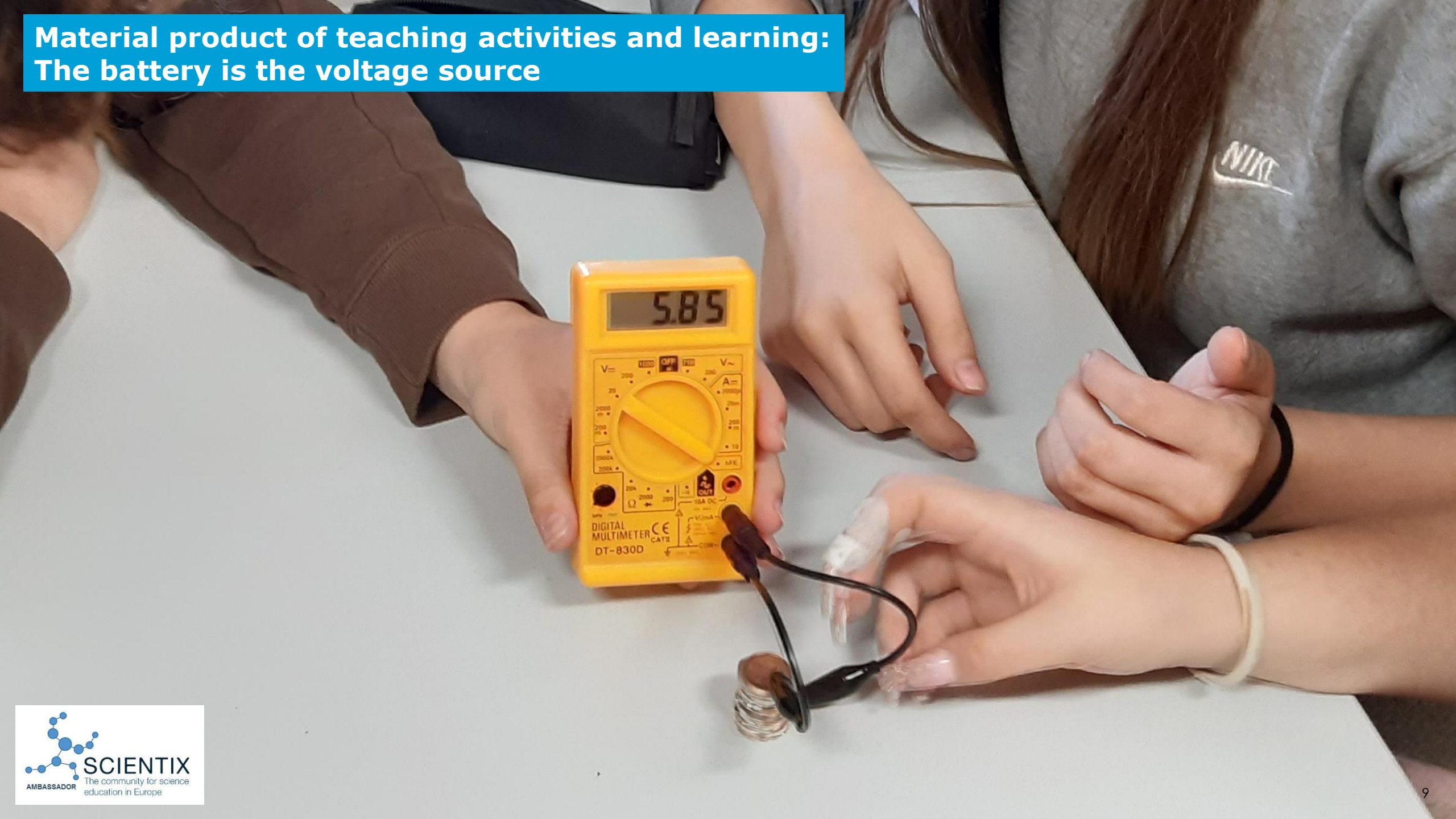

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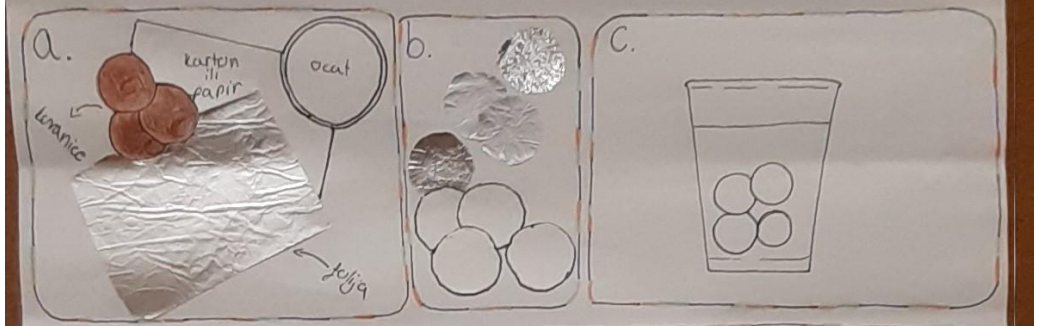
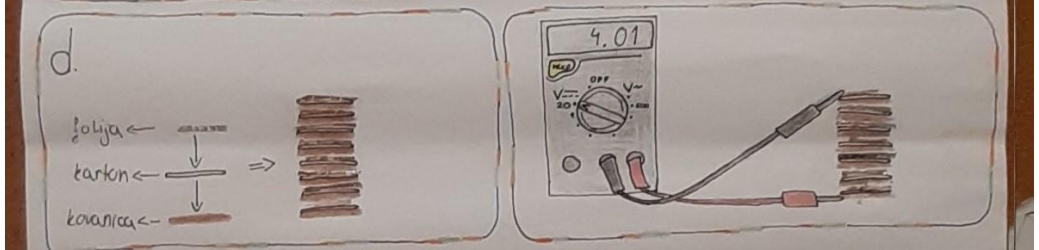
Experiment:
The battery making

a. Materijal: kovanice, karton, ocat, aluminijska folija
b. Od folije i kartona izrezati krugove veličine kovanice
c. Izrezane krugove kartona namočiti octom
d. Poslagati jedno na drugo (kovanica → karton → folija → kovanica → karton → folija...)
e. Mjernim instrumentom izmjeriti napon





ZAŠTO?

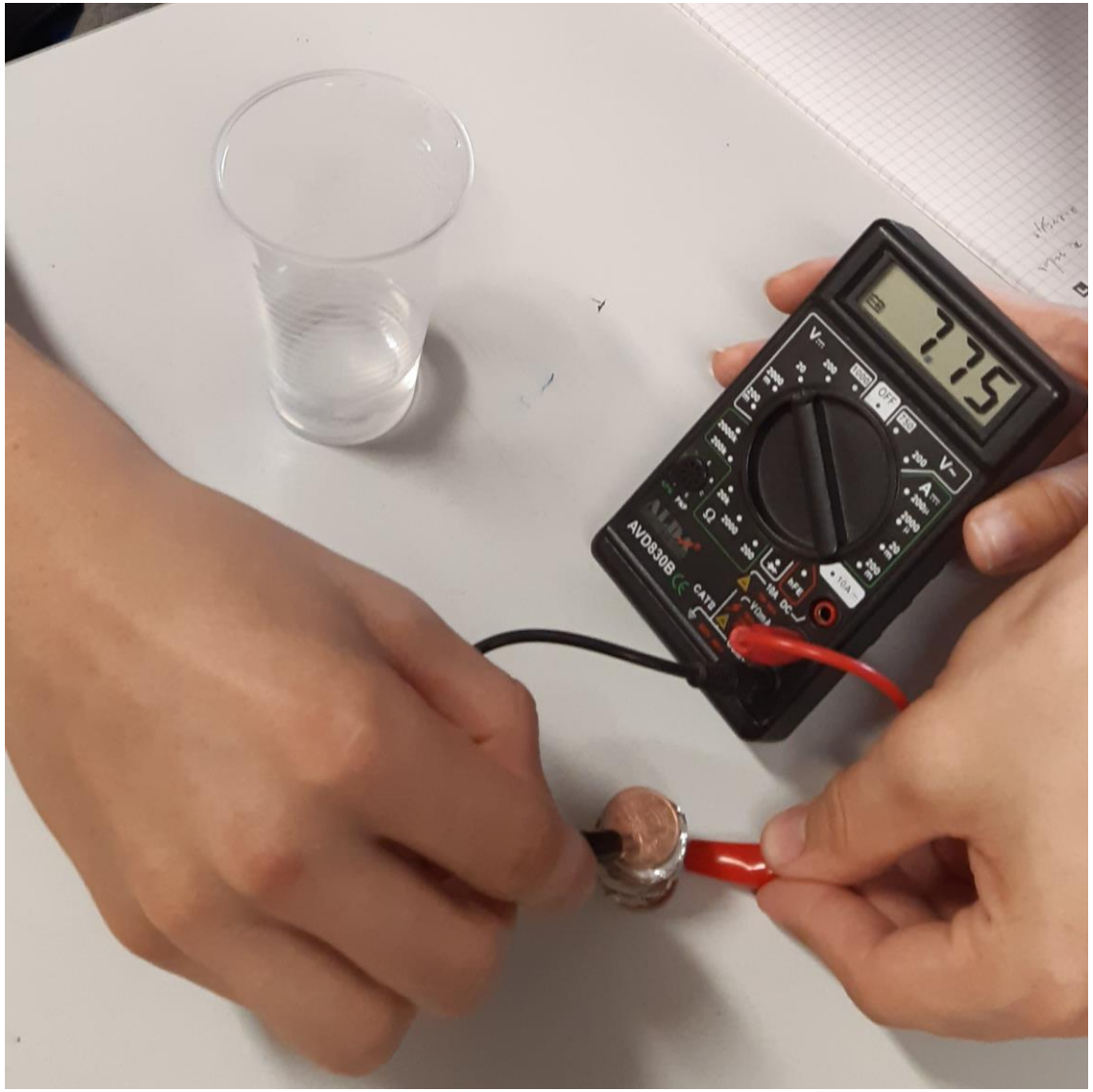
Kovanice, karton umočen u ocat i folija zajedno mogu stvarati struju zbog elektrokemijske reakcije koja se događa između metala u kovanicama i octene kiseline. Ocat djeluje kao elektrolit, a kovanice kao elektrode. Folija se koristi kao provodnik kako bi se omogućio protok elektrona

ZAKONI

Faradayev zakon: količina tvari koja se elektrizira proporcionalna je količini električne struje koja prolazi kroz elektrolit → $U = \frac{\Delta\Phi}{\Delta t}$

Ohmov zakon: $I = \frac{U}{R}$

Marina Brkić 2.c



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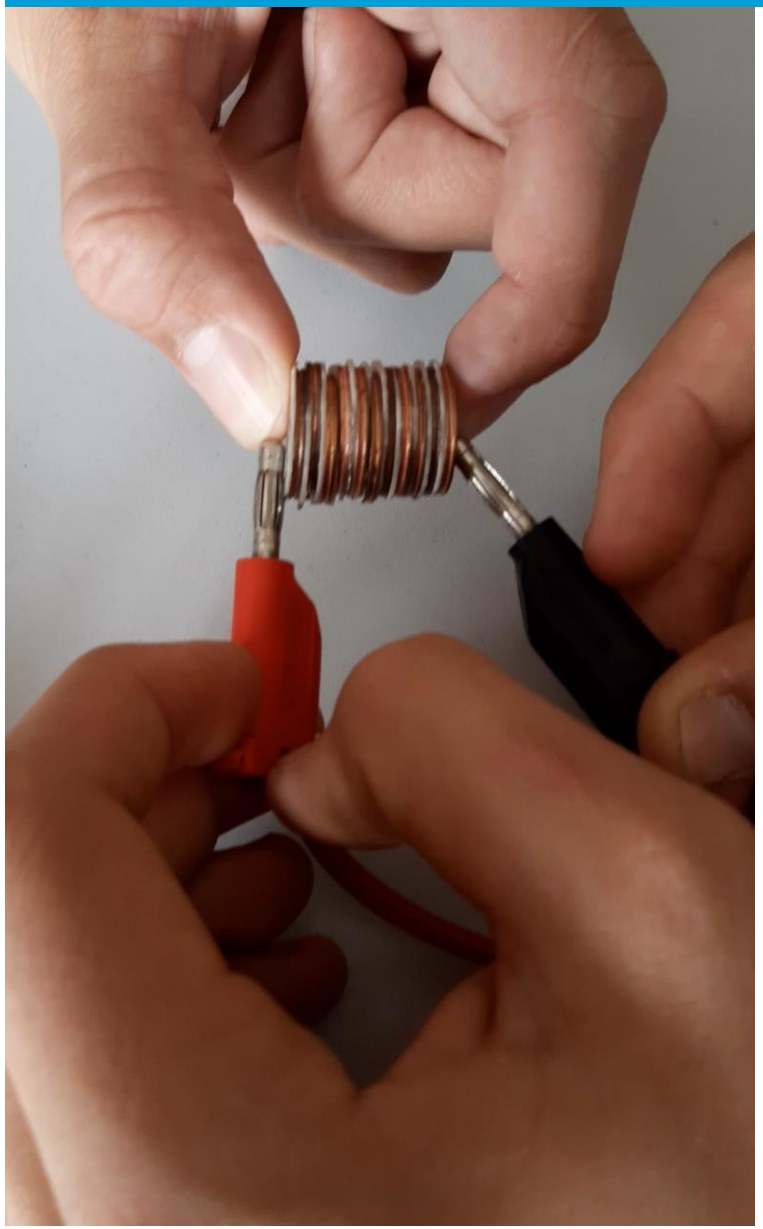
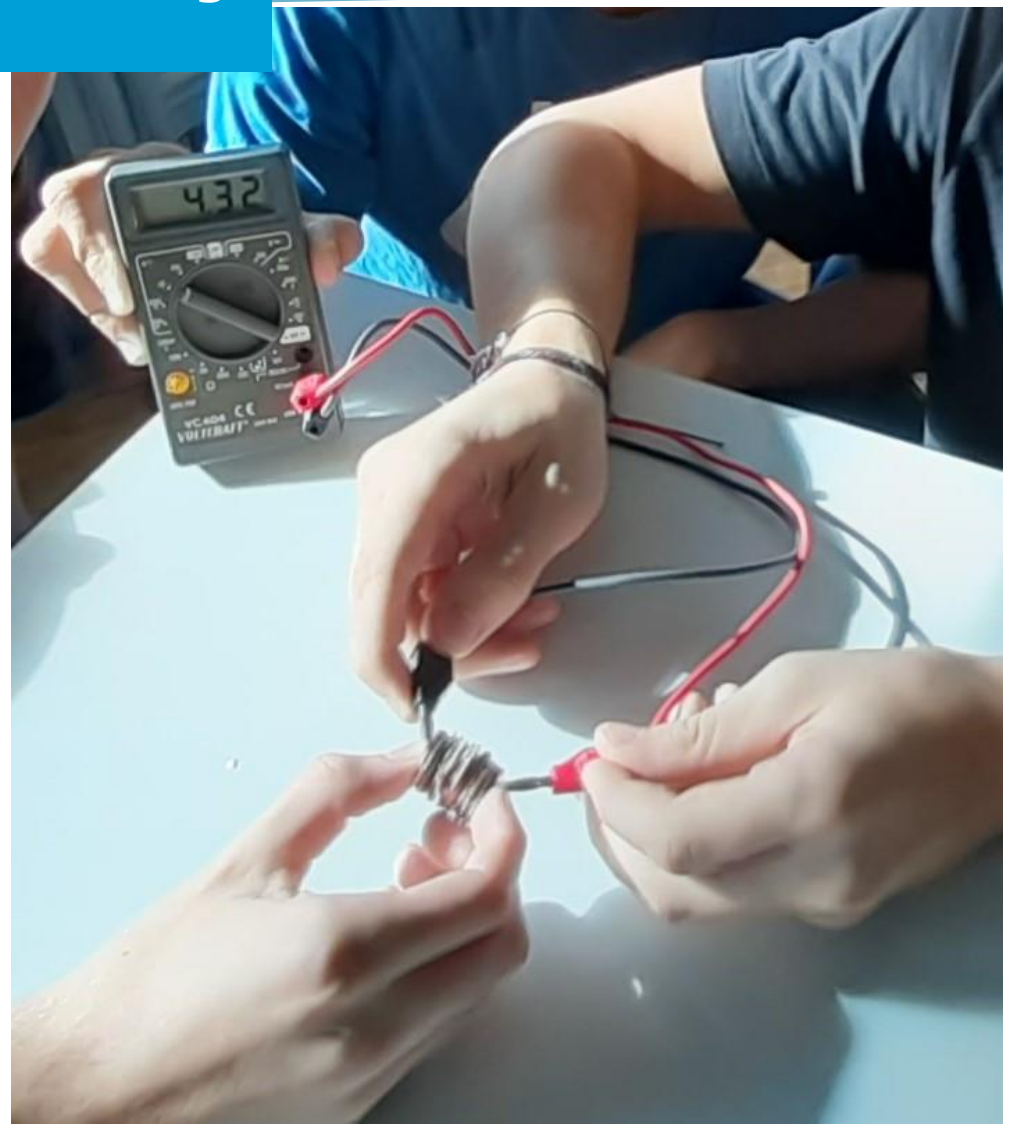
Material product of teaching activities and learning: The battery is the voltage source





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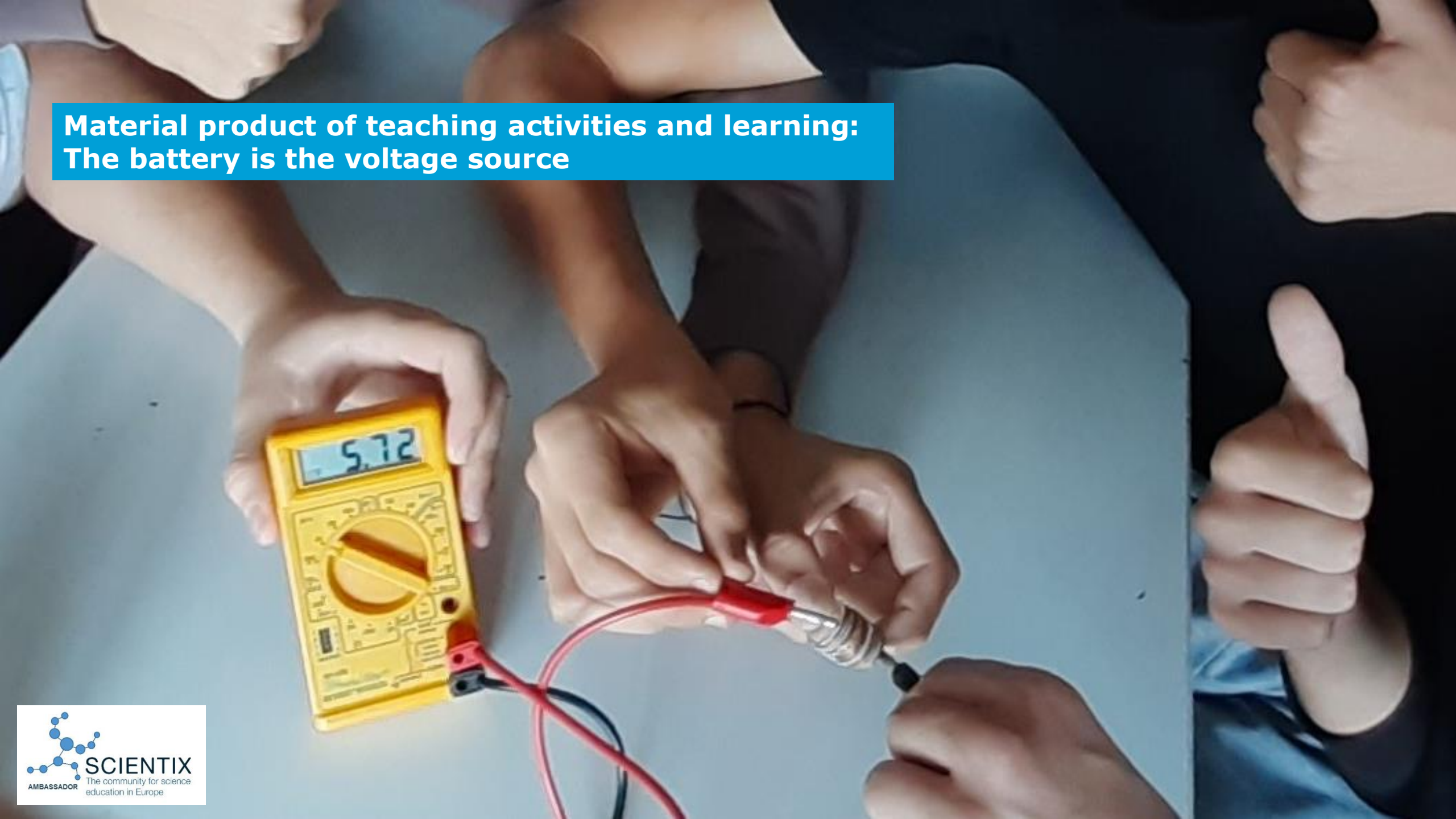

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ANNEX

https://youtu.be/nv_RbbEoM84