

SCIENCE PROGRAM AT SCHOOL “ELECTROMAGNETIC , MECHANICAL AND THERMAL ENERGIES ” CEIP “NUESTRA SEÑORA DE LOS ÁNGELES” EL ESPARRAGAL (MURCIA)

This project is planned for second and
fourth years of primary

SERAFINA
FERNÁNDEZ
SARABIA

SCIENCE PROGRAM AT SCHOOL “ELECTROMAGNETIC, MECHANICAL AND THERMAL ENERGIES”

CEIP “Nuestra Señora de los Ángeles” El Esparragal (Murcia)

The main objective of this project is to demonstrate to our students that they can learn through experiments.

We Will follow these steps:

- 1st Discover what they know about electromagnetic, mechanical and thermal energies.
- 2nd Reaching hypothesis
- 3rd Carry out a lot of experiments.
- 4th Check the results of their experiments with their previous hypothesis.

This year we are going to investigate about electromagnetic, mechanical and thermal energies.

This Project is focused on for second and fourth years of primary.

FIRST SESSION:

1. We Will start this session with a brainstorming about the energies.
 2. 1st Experiment: We will use a rubber band and we will launch elements such as a cork.
 3. We will show different energies with this experiment: Potential, elastic and kinetic.
 4. 2nd Experiment: We will make a canal with cardboard and we will slide marbles on a ramp.
- Conclusions: Energy is neither created nor destroyed, it is transformed.

Material:

- Notebooks
- Rubber band
- Cork
- Cardboard
- Marbles
- Ramp

<u>SECOND SESSION:</u> 1. We will start this session reviewing different energies used with previous experiments. 2. 1st Experiment: Electrical motor (Lift, crane and pulley) we will do a lift with a motor, a battery, two wires and a rope. This experiment will show upload and download loads 4. 2nd Experiment: we will put a balloon on a can and we will add heat. 5. 3rd Experiment: We will work with drinking bird Conclusions: we will work different concepts such as force, work, power and energy. We will introduce new concepts: Heat and gases. When you heat the can, gases expand a long of can and balloon.	<u>Material:</u> • Notebooks • Electrical motor • Battery • Wires • Rope • Can • Balloon • Drinking bird
<u>THIRD SESSION:</u> 1. We will work in this session thermal energy. 2. 1st Experiment: Thermal motor. Stirling Motor. We will apply heat (with an alcohol burner) to a test tube (with marbles). 3. 2nd Experiment: Vapour ship. We will use a big container with water. We will introduce a ship in the container with two cooper tubes and we will apply heat with a candle. Conclusión: Thermal machine works with hot and cold air successively. When air is hot, gases will expand but when the air is cold, gases will compress. Vapour ship works, as a circuit. The gases expand and press, Gases push against cold water and it evaporate and this way successfully.	<u>Material:</u> • Test tubes • Syringe • Plastic tube • Alcohol burner • Container with water • Ship • Candles • Cooper tubes

<u>FOURH SESSION:</u> 1. Faraday and experiments with magnets and battery. 2. 1st Experiment: Creation of a battery with coins, zinc and paper with vinegar. We will switch on a led with this materials. 3. 2nd Experiment: Swing. We will use a battery, cooper wires, two wires and a magnet. Conclusion: Classification of extremes of the magnets. Laws of magnetism. Two magnets with same pole, they repel them, and two magnets with different poles, they attract them.	<u>Material:</u> • zinc • Vinegar • Cooper coins • Paper • Leds • Battery • Cooper wires • Magnet • wires
<u>FIFTH SESSION</u> 1. We will do Polarization experiments in this sessions. 2. 1st Experiment: We will use two straws joined with a rope. We will close other straw and we will show the laws of electrostatics. 3. 2nd Experiment: We will polarize a bar with paper and we will move a can. 4. 3rd Experiment: We will work with a magnet, a cardboard and iron filings.	<u>Material:</u> • Straws • Rope • Bar • Can • Paper • Magnet • Cardboard • Iron filings

SCIENCE PROGRAM AT SCHOOL “ELECTROMAGNETIC, MECHANICAL AND THERMAL”

CEIP “NUESTRA SEÑORA DE LOS ÁNGELES” EL ESPARRAGAL (MURCIA)

THE EXPERIMENTS WERE CARRIED OUT IN SECOND AND FOURTH YEARS

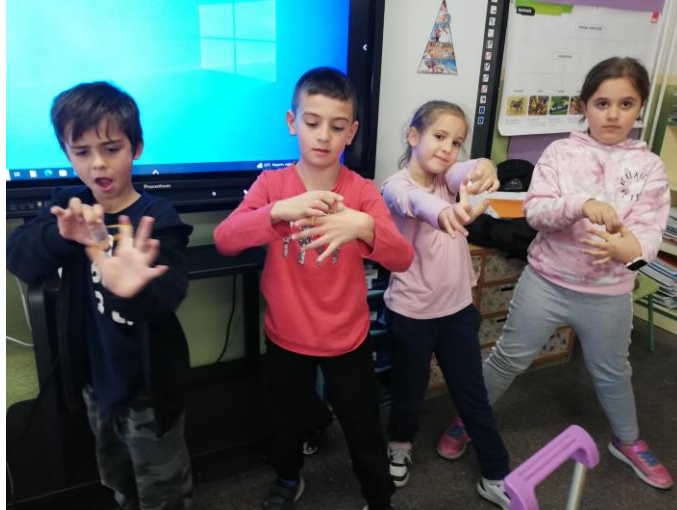
TEACHER: Serafina Fernández Sarabia

SECOND YEAR

FIRST SESSION

- Energy is neither created nor destroyed, it is transformed.

Brainstorming about different types of energies



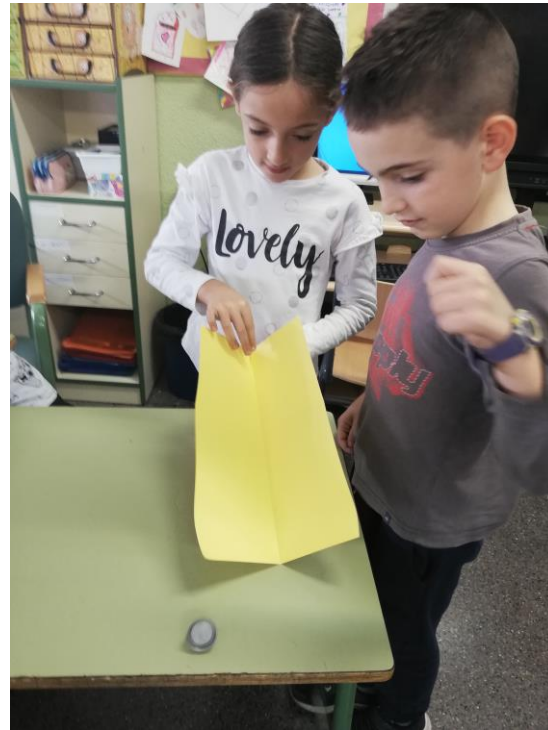
FIRST EXPERIMENT: Rubber and cork



SECOND EXPERIMENT: RAMP



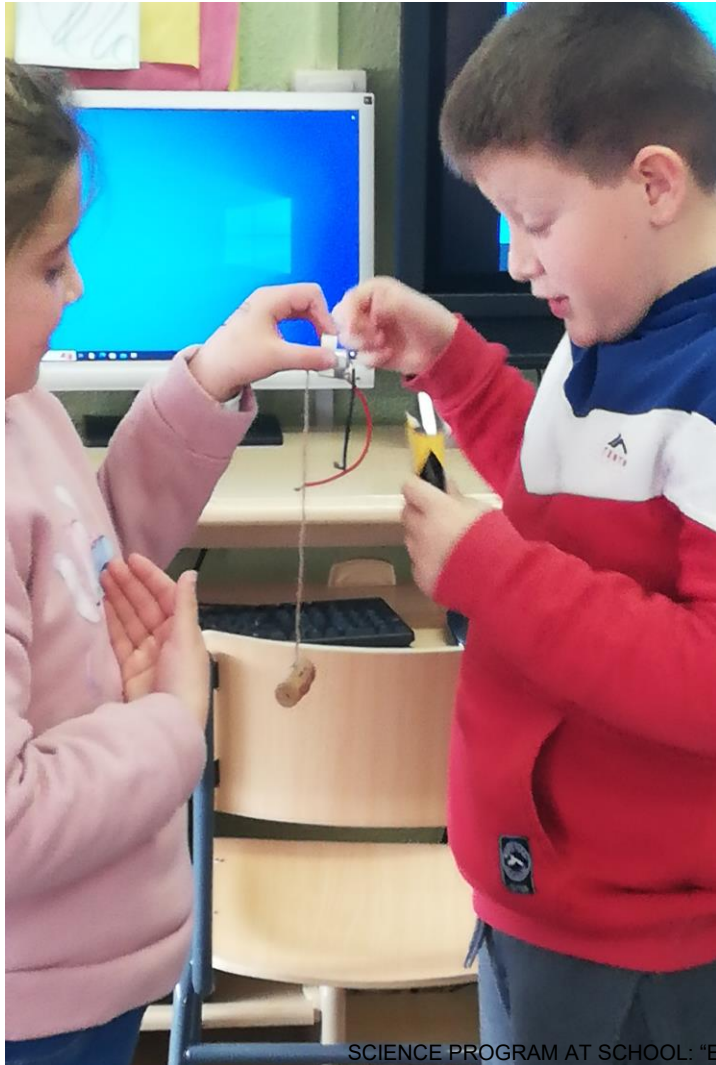
SECOND EXPERIMENT:

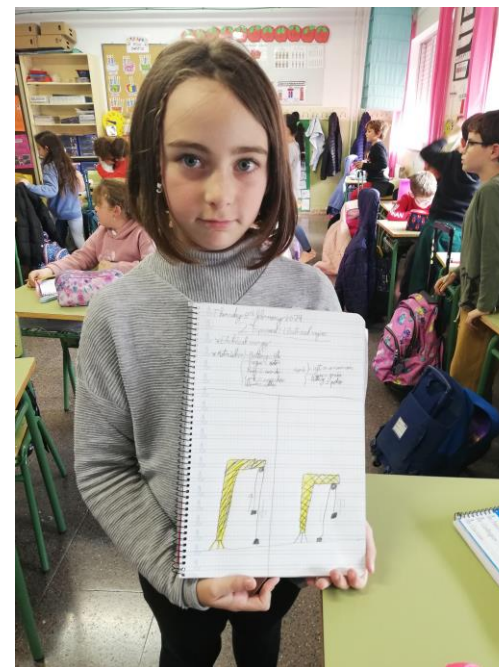


SECOND SESSION:

- We Will work different concepts:
Force, work, power and energy

FIRST EXPERIMENT: ELECTRICAL MOTOR





SECOND EXPERIMENT: HEAT AND COLD



THIRD EXPERIMENT: DRINKING BIRD



THIRD SESSION:

- Thermal motor. Stirling motor
- Vapour ship. Gases and pressure

FIRST EXPERIMENT: STIRLING MOTOR



SECOND EXPERIMENT: VAPOUR SHIP





SCIENCE PROGRAM AT SCHOOL: "ELECTROMAGNETIC, MECHANICAL AND THERMAL ENERGIES. Autora: SERAFINA FERNÁNDEZ SARABIA.
CIENCIA EN EL AULA - EL CSIC EN LA ESCUELA. Publicado 05/2024. <https://www.csicenlaescuela.csic.es/recursos/aplicaciones-de-ciencia-en-el-aula/>

FOURTH SESSION:

- Electromagnetism
- Swing and battery
- Let´s make a battery

FIRST EXPERIMENT: SWING AND BATTERY



SECOND EXPERIMENT: LET'S MAKE A BATTERY

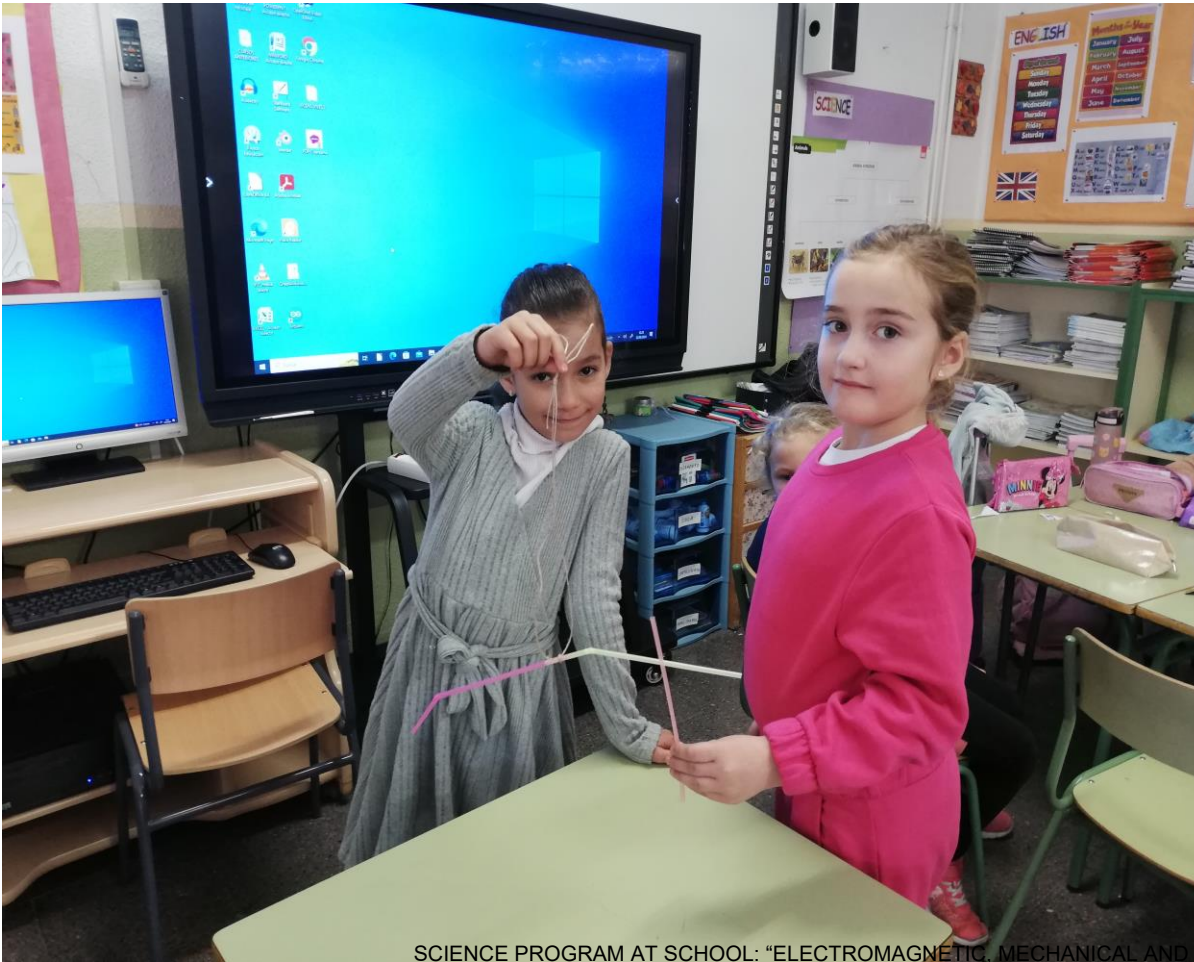




FIFTH SESSION: MAGNETISM

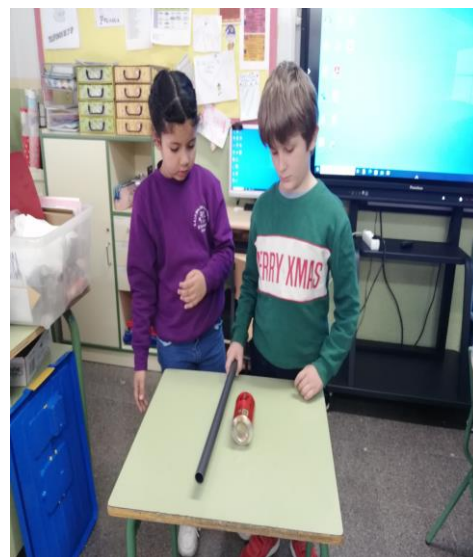
- **MAGNETISM**
- **POLARIZATION**

FIRST EXPERIMENT: POLARIZATION WITH STRAWS



SECOND EXPERIMENT: POLARIZATION WITH A BAR AND A CAN





THIRD EXPERIMENT: MAGNETISM



SCIENCE PROGRAM AT SCHOOL “ELECTROMAGNETIC, MECHANICAL AND THERMAL”

CEIP “NUESTRA SEÑORA DE LOS ÁNGELES” EL ESPARRAGAL (MURCIA)

THE EXPERIMENTS WERE CARRIED OUT IN SECOND AND FOURTH YEARS

TEACHER: Serafina Fernández Sarabia

FOURTH YEAR

FIRST SESSION

- Energy is neither created nor destroyed, it is transformed.

Brainstorming about different types of energies



FIRST EXPERIMENT: Rubber and cork



SECOND EXPERIMENT: RAMP



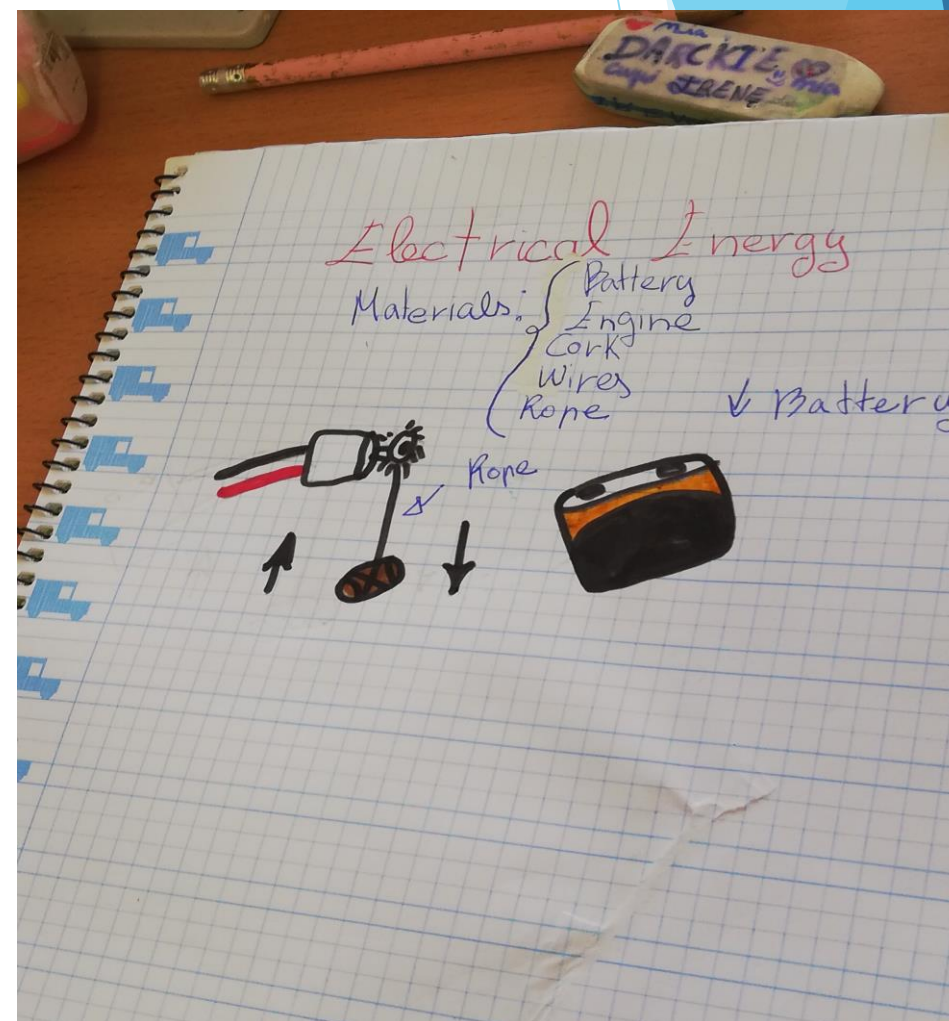
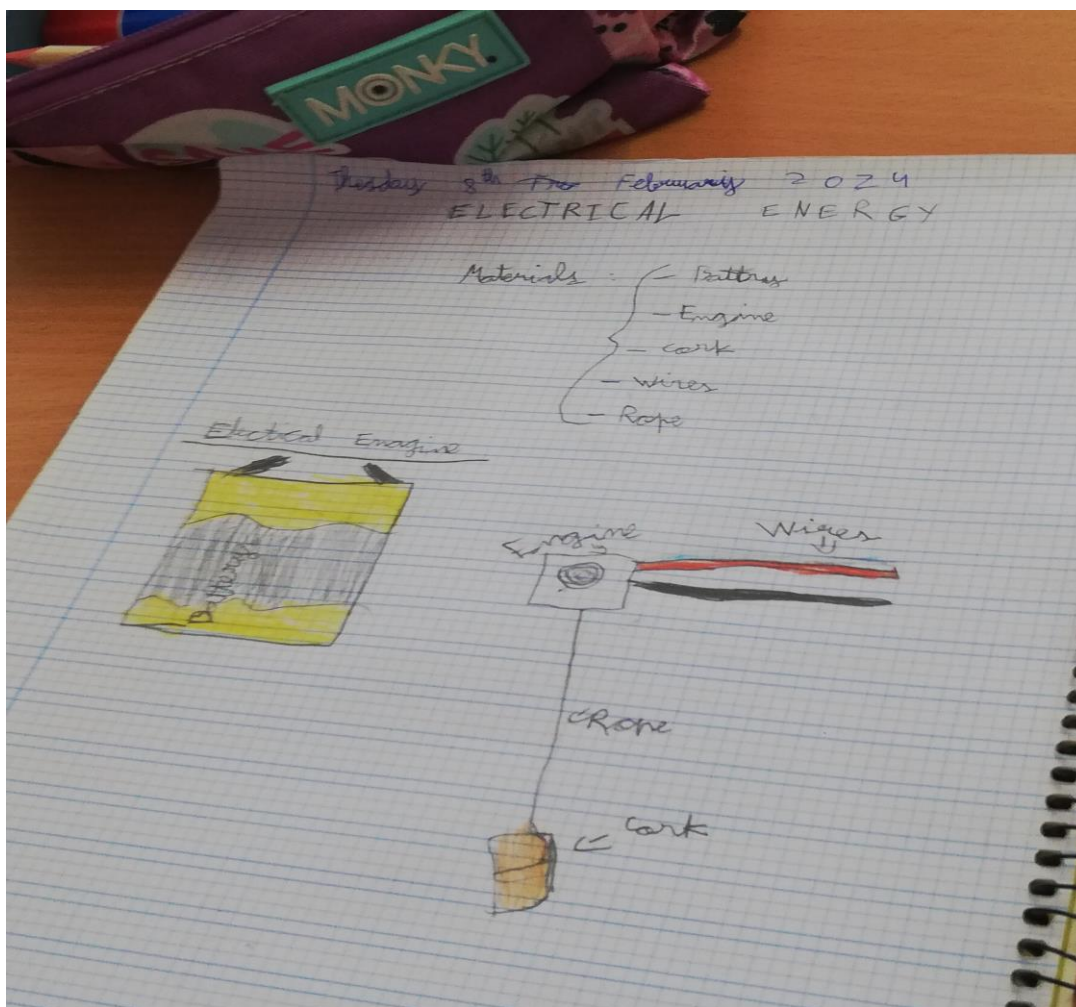


SECOND SESSION:

- We Will work different concepts:
Force, work, power and energy

FIRST EXPERIMENT: ELECTRICAL MOTOR





SECOND EXPERIMENT: HEAT AND COLD



THIRD EXPERIMENT: DRINKING BIRD



THIRD SESSION:

- Thermal motor. Stirling motor
- Vapour ship. Gases and pressure

FIRST EXPERIMENT: STIRLING MOTOR



SCIENCE PROGRAM AT SCHOOL: "ELECTROMAGNETIC, MECHANICAL AND THERMAL ENERGIES Autora: SERAFINA FERNÁNDEZ SARABIA.
CIENCIA EN EL AULA - EL CSIC EN LA ESCUELA. Publicado 05/2024. <https://www.csicenlaescuela.csic.es/recursos/aplicaciones-de-ciencia-en-el-aula/>

SECOND EXPERIMENT: VAPOUR SHIP



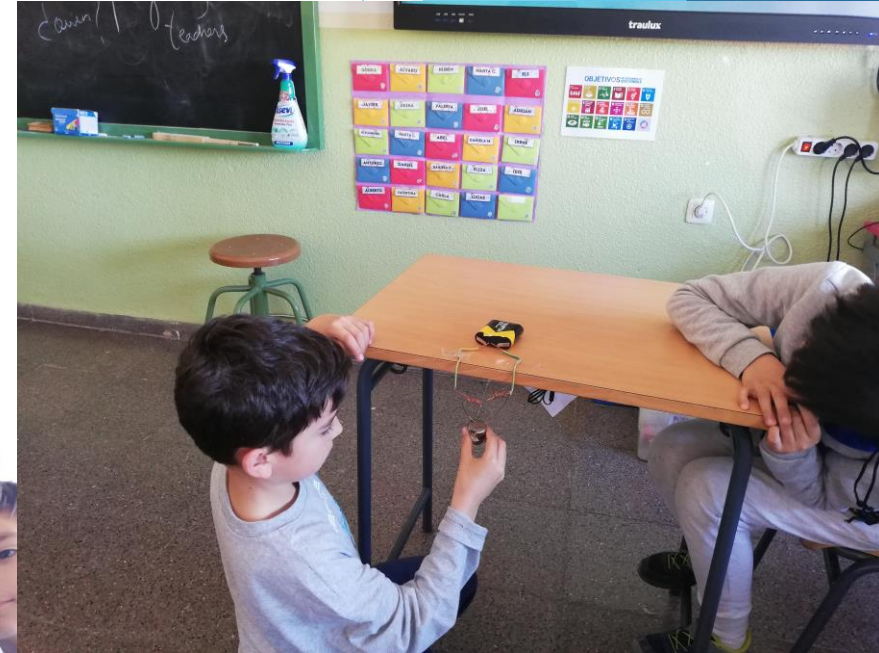


SCIENCE PROGRAM AT SCHOOL: "ELECTROMAGNETIC, MECHANICAL AND THERMAL ENERGIES" Autora: SERAFINA FERNÁNDEZ SARABIA.
CIENCIA EN EL AULA - EL CSIC EN LA ESCUELA. Publicado 05/2024. <https://www.csicnlaescuela.csic.es/recursos/aplicaciones-de-ciencia-en-el-aula/>

FOURTH SESSION:

- Electromagnetism
- Swing and battery
- Let's make a battery

FIRST EXPERIMENT: SWING AND BATTERY



SECOND EXPERIMENT: LET'S MAKE A BATTERY





FIFTH SESSION: MAGNETISM

- **MAGNETISM**
- **POLARIZATION**

FIRST EXPERIMENT: POLARIZATION WITH STRAWS



SECOND EXPERIMENT: POLARIZATION WITH A BAR AND A CAN



THIRD EXPERIMENT: MAGNETISM

