



SCIENCE PROGRAM AT SCHOOL “THE NATURE OF ELECTRICITY”

CEIP “Nuestra Señora de los Ángeles” El Esparragal (Murcia) THE NATURE OF ELECTRICITY

The main objective of this project is to bring students to scientific knowledge, understanding that process as the result of activities in which children directly discover, know and approach scientific aspects that shape their reality.

For the development of the research that we carry out, a common working scheme is proposed for all the sessions with which it is intended to promote scientific knowledge in all students. There are four fundamental moments in this scheme:

- 1st What do we know?(Previous knowledge) **What do we want to know?**
- 2nd Positioning hypotheses to a problem or question
- 3rd Test of the hypothesis through experimentation
- 4th Observation of results and comparison with the initial hypothesis to generate a new knowledge scheme.

This year we are going to investigate about electricity and magnetism.

First Session

We start the lesson by questioning our students about what they know about magnetism and electricity (annexed 1)

- 1) First experiment:
We are going to rub a pvc tube with kitchen paper and we will put a can of cola on a surface. Then, we will put close the tube to the can. We will see what happen.
- 2) Second experiment:
We will use de pieces of plastic to do the same experiment but with plastic.
- 3) Third experiment:
On a surface, we will put some water. Then we will make bubbles and we will put close to the bubbles the tube.

All this experiments show us that something happens when you rub a rubber tube and has influence in different materials. The rubber tube acquires a property that does not have before...

Conclusion: Certain materials attract others (metal, plastic, water) when they are rubbed with paper or

Material:

Internet
Notebooks
For the experiment:
Kitchen paper
Rubber tube
Pieces of plastic
Soap Bubbles
Foil strips



wool. Static electricity	
<p>Second Session</p> <p>As we said in the last sesión, since ancient times, the electricity has been investigated. We are already experimented static electricity. We are going to try to show what are electrical charge and electrical force.</p> <ol style="list-style-type: none"> 1) First experiment: We will use the rubber tube with aluminum and we will see that the tube attracts the aluminum. We will use cans of cola, too. Then, we will use a magnet. We will see that the magnet does not attract aluminum. WHY? (Gilbert was a scientist who said that magnetism and electricity have nothing to do). 2) Second experiment: Tie a string of cord to a clip and we will put close the rubber tube after rubbing it with kitchen paper. We will see how firstly it attracts it and then, when the clip touches the tube, it repels it. 3) We carry out other experiments with balloons. We rubbed the balloons and try to put together. 4) Then we put a straw with a pin attached to a ball of cork. If we rub the rubber tube and the straw, they repel each other <p>Conclusion: There are two different forces: Attraction and Repulsion. Polarization phenomenon.</p>	<p><u>Material</u></p> <p>Internet Notebook Magnets Rubber tube Clips Balloons Straws Pins Can of cola</p>
<p>Third Session</p> <p>We are studying magnetism and electricity. We are going to start the lesson with a PPT about scientists who studied electricity and their contributions were very important to discover laws and properties of electricity. As we already know normally all bodies have neutral charge, this means that there is a balance between positive charges and negative charges. We are going to measure the electricity of a body or material with the electroscope (it measures and detects electrical charges). We will build the electroscope and with it we will measure the electricity of different materials and objects. The more the foil strips open, the more electric charges the object has. Volta discovered how to store static electricity. Battery. Experiment.</p>	<p><u>Material</u></p> <p>Plastic cups Foil strips Clips Different material /objects Rubber tube Zinc and cooper plates Battery charging tongs Vinegar</p>



Electrical charges /Induction	
<p>Fourth Session</p> <p>We are studying electricity and magnetism. We are going to start with the definition of magnet: a magnet is a material that has the property of attracting the iron, nickel and cobalt.</p> <p>Experiments:</p> <ol style="list-style-type: none"> 1- With magnets we are looking for magnetic objects in the classroom 2- We use magnets with coins and we make a chain 3- We use keys with magnets and make a chain What is the power of magnets that can influence the behavior of a non-magnetic object? 4- Plastic cup with coins or keys inside. Using magnets, we try to move these objects. 5- Tie a clip with the cord and put close a magnet. The clip spin on the air 6- If we have time, we can experience how the magnets behave to each other. <p>Through different material, the magnet is still effective.</p>	<p><u>Material</u></p> <p>Magnets Coins Keys Cord Clip</p>
<p>Fifth Session</p> <p>We continue experimenting with magnets and its behavior which each other. Magnets have different regions. Regions of the same color repel each other. Regions of different color attract each other.</p> <p>Having said this we are going to use compasses to experiment if electricity and magnetism are related or not.</p> <p>Oersted experiment. Law: a steady electric current creates a magnetic field around it</p> <p>Water compass</p> <p>Conclusion: Laws of magnetism: the equals repel each other, the different attract.</p>	<p><u>Material</u></p> <p>Batteries Wires Light bulbs Compasses Cork Containers Magnetized needles Water</p>
<p>Sixth Session</p> <p>In this last session, we are going to build a magnetic train. I will start in class but they have to finish at home. We will prepare an exhibition with the models. We will give out a summary of the unit and we will take a MULTIPLE CHOICE test.</p>	<p><u>Material</u></p> <p>Magnetic Train: battery, copper (unglazed) wire, led, neodymium magnets.</p>



Conclusion: magnets and batteries are influenced by pull and push forces thanks to the poles of the magnets. Inside the cooper tube, these forces are limited and the energy flows through this field in one direction.

(Annexed 1*)

What do we know?	What do we want to know?
What forces do you know? _____ _____ _____	_____ _____ _____ _____
What is magnetism? ____ _____ _____	_____ _____ _____ _____
Can you feel it? ____ _____ _____	_____ _____ _____ _____
What is electricity? ____ _____ _____	_____ _____ _____ _____
What are magnets? ____ _____ _____	_____ _____ _____ _____
Do you know about any scientist related to magnetism? ____ _____ _____	_____ _____ _____ _____ _____



Electricity B.C.

The word electricity came from the ancient Greek word "electron" which meant amber or amber like.

Many ancient cultures have interact with electricity but it is unclear as to whether or not they had any real understanding of it. Thales of Miletus (600 b.C.) was a pre Socratic Philosopher, one of the seven sages of ancient Greek. Thales studied that would occur between fur and another object once the fur has been rubbed with amber. He felt that the amber was causing some form of magnetism but his mistake was that it was causing static electricity (rubbing a balloon)

William Gilbert (1544-1603)

English physician, physicist and natural philosopher.

One of his largest contributions was to fix the mistake of Thales of Miletus

He made the difference between static electricity and magnetism clear. He coined the New Latin word "electricus" which would become the modern word electricity.

Stephen Gray (1666-1736)

English dyer and amateur astronomer.

He began experimenting with conducting electricity

When he was exploring how glass tubes that were rubbed to gain static charge could produce light effects, he stumbled upon the idea of conduction.

He noticed that not only did the tubes attract objects like feathers (which was known) but the cork he used to close the tube also did (new discovery)

He hypothesized that the tube must have passed on its electrical properties to the cork.

He then experimented to see if other material could gain and conduct the electrical properties. This led to the discovery that electricity could be conducted through some materials. This also



Región de Murcia
Consejería de Educación,
Formación y Empleo



CE INF-PRI Ntra. Sra. de los Ángeles
C/Limonar s/n 30163
El Esparragal (Murcia)
Tlf. y fax. 968850084
e-mail: 30005193@murciaeduca.es
www.ceip-nsangeles.com



means that some materials are insulators; do not conduct electricity.

Charles François du Fay (1698-1739)

French Chemist

He discovered two types/properties of electricity that he named vitreous and resinous. These are now called positive and negative.