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SCIENCE PROGRAM AT SCHOOL
"DISCOVERING MAGNETISM"
2018
CEIP "Nuestra Señora de los Ángeles"
El Esparragal (Murcia)

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 magnetism.

FIRST Session

We are studying magnetism. First, we will introduced magnetism by using a worksheet (annexed 1) that students will do in groups. After that we will write on the board the main ideas (Brainstorming activity)

Experiments:

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?

Conclusions:

- Magnets attract metals but not all metals.
- Magnets transmit their properties to other objects.
- Magnetism remains after the magnet has taken

Material

Worksheet (Annexed 1)
Magnets
Coins
Keys
Thread
Clip
Plastic cups

off. • What is in the key that changes in the presence of a magnet?	
SECOND Session We start the lesson by summarizing: • **Magnets attract metal but not all metal (cobalt, nickel and iron)** • **Magnets transmit their properties to other material (ferromagnetic)** *Induced Magnetism* • **Ferromagnetic material can behave like magnets (domains). Magnetism remains after the magnet has taken off.** • *Is Magnetism a contact force?* We continue experimenting with magnets and its behavior which each other. Today we are going to start by using magnets through different material to discover if magnets are able to move objects. Later we will use the thread and clip to see if magnets are able to attract the clip without touching it. Experiments: 1- Plastic cups with coins or keys inside. Using magnets, we try to move these objects. 2- Tie a clip with the thread and put close a magnet.The clip spins on the air. 3- Bottle of water, thread, magnet and nail. Tie the bottle to de nail and use the magnet to hold on the bottle. The weight of the water is the magnetic force. 4- If we have time, we can experience how the magnets behave to each other. Conclusions: • Magnetism is a non-contact force. Through different material, the magnet is still effective • Magnetism can go through non-magnetic materials. • Magnetism can be measured (Bottle water)	**Material** Thread Clip Plastic cups Internet Notebook Magnets Can of cola Bottle of water
THIRD Session **We start the lesson by summarizing what we know about Magnetism:** • **Magnetism is a non-contact force.** • **Magnets attract metal but not all metal (cobalt, nickel and iron)**	**Material** Clips Pins Magnets Clips Scissors

• **Magnets transmit their properties to other material (ferromagnetic)** *Induced Magnetism* • **Ferromagnetic material can behave like magnets (domains). Magnetism remains after the magnet has taken off.** **Experiments:** • **Labelling magnets' poles** • **Magnetized scissors, pins, clips. In this way, we can prove that temporary magnetism makes some material to behave like a magnet.** • **How to demagnetized a material (spin the magnet near the object)** **Conclusions:** • Conclusion: Laws of magnetism: the equals repel each other, the different attract • The domains are like groups of little magnets inside the material (iron, nickel, cobalt)	
FOURTH Session **We are going to start the lesson by summarizing what we learnt last day:** • Temporary or remaining magnetism is caused by domains. Inside the ferromagnetic material, there are tiny magnets that are disordered. When you put a magnet close to this material, it will put in order these little magnets and they behave like a magnet. Having said that, we are going to use compasses to experiment how a magnet has influenced on the compass. This way we can see the vectors of the magnetic field. Experiment: • Shoes box with needles to show domains • Magnets in the centre of the group, using a compass we will draw the lines • The lines are representing at the magnetic field of magnets. • We will put magnets on spoons to see if they point to the same direction. • We will prepare water compass with magnetized pins and we will check the next day to see if happens the same.	**Material** Compasses Magnets Notebook Digital board Pencil Spoons Shoes box Needles Compasses

Water compass **Conclusions:** • The field lines have arrows on them. They come out of North and go into South. These field lines are more concentrated at the poles.	
FIFTH Session 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. Magnets have different regions. Regions of the same color repel each other. Regions of different color attract each other. The field lines make magnets repel each other or attract each other. Experiment: • Acting out how magnets behave each other. • Experimenting with magnets • Spoon compasses (Where are they point to??) • Orange with a magnet inside. Representation (magnet will always look for the north) • Oersted Experiment Conclusion: • Laws of magnetism: the equals repel each other, the different attract. • Our planet is like a huge magnet • Magnetism and Electricity are the two sides of the same coin.	**Material** Digital board Pppt Compasses Magnetized needles Spoons Magnets Batteries Wire
As final task, students will prepare some experiment or experience related to magnetism. They will have a week to do it.	

(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 are magnets? _____ _____ _____	_____ _____ _____
Do you know about any scientist related to magnetism? _____ _____ _____	_____ _____ _____ _____ _____

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FUN FACTS

SIX things to know about magnets

Almost everyone knows these six basic facts about how magnets behave:

1. A magnet has two ends called **poles**, one of which is called a north pole or north-seeking pole, while the other is called a south pole or south-seeking pole.
2. The north pole of one magnet attracts the south pole of a second magnet, while the north pole of one magnet repels the other magnet's north pole. So we have the common saying: **like poles repel, unlike poles attract**.
3. A magnet creates an invisible area of magnetism all around it called a **magnetic field**.
4. The north pole of a magnet points roughly toward Earth's north pole and vice-versa. That's because Earth itself contains magnetic materials and behaves like a gigantic magnet.
5. If you cut a bar magnet in half, it's a bit like cutting an earthworm in half! You get two brand new, smaller magnets, each with its own north and south pole. (This is, of course, a joke. You don't get two worms if you cut a worm in half. But you do get two magnets.)
6. If you run a magnet a few times over an unmagnetized piece of a magnetic material (such as an iron nail), you can convert it into a magnet as well. This is called **magnetization**.