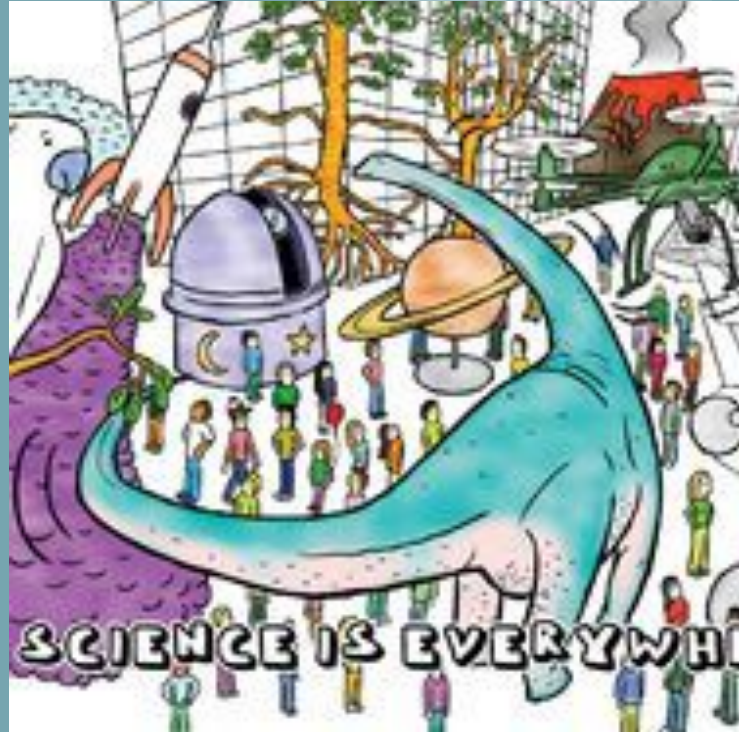


“Science is everywhere”

eTwinning project on
Experiments about
matter, forces and energy for
primary and secondary
education



Partners in the project:

Spain



Poland

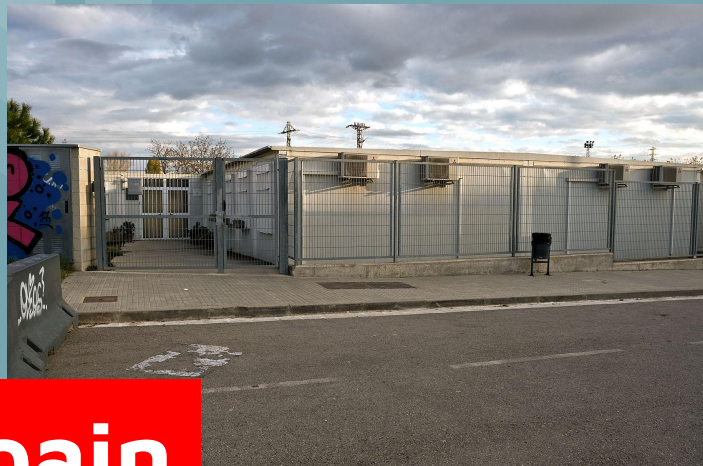


Croatia



Italy





Spain



Italy



Croatia



Poland

Introduction

The aim of this project is to interact between countries by launching a weekly challenge related on science experiments.

Our pupils have designed and done all the experiments.

Every week has been the turn of a different country to prepare an experiment challenge for the rest. The topics have been matter, forces and energy. The materials have been obtained from kitchen, garden, etc so the pupils can see science is everywhere.

This is a collaborative ebook made by google slides, we are making it with the help of all countries involved to show all the experiments we have done together.

We have had a very fluent communication during the project. We have also build a gigantic periodic table in each school with elements that have been sent to us by postal mail from all the countries involved in the project.

We have also been communicating by eTwinning chatroom and Skype (the pupils), and email and whatsapp (the teachers).

We hope our work is useful for other teenagers interested in science.

FIRST CHALLENGE

Magical ice tower (Spain)

Objective: to observe liquid to solid transformation

Materials: ice and very cool water

Steps: put a bottle of water in the freezer for 2 hours, then put some ice cubes on a dish and pour the bottle's water on them. An ice tower will appear

Conclusion: the water's solid temperature is just 0°C , so when the cool water touches the ice at 0°C it transforms from liquid to solid

Pictures



SECOND CHALLENGE

Density and the egg (Spain)

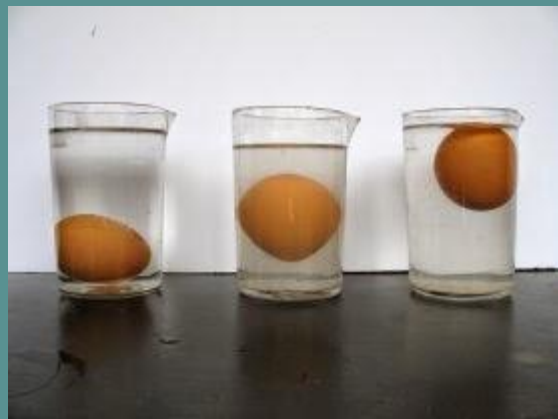


Objective: to observe the difference between densities

Materials: 3 glasses, 3 boiled eggs, water, salt, spoon

Steps: put water in the 3 glasses, add 4 spoonfuls of salt in the first glass, 2 spoonfuls in the second glass and none in the third.

Conclusions: the eggs float in different heights depending on the density of the water



THIRD CHALLENGE

The rainbow tower (Poland)



Objective: creating a rainbow with liquids of different densities

Materials: 4 glasses, sugar, dyes, water, syringe

Steps: Put sugar into 3 glasses. The first glass - one spoon of sugar, the second glass - two spoons of sugar etc. Leave one glass without sugar. To each of them pour the same amount of water and add dyes.

Conclusion: liquids with different densities do not mix to form a rainbow





FOURTH CHALLENGE

Coca-cola and mentos Ballon (Italy)



Objective: to observe the eruption of the Coca-Cola Light and Mentos is a phenomenon triggered by the immersion of Mentos candies.

Materials: bottle of Coca Cola light, a balloon and Mentos.

Steps: put one or more Mentos in Coca Cola bottle.

Conclusions: notice a very rapid formation of carbon dioxide bubbles expelled from the mouth of the bottle



Abbate Antonio,Carleo
Alessandra,D'abbrunzo Martina,Di cicco
Bruna,



FIFTH EXPERIMENT

The black mamba (Croatia)



Objective: to observe how substances from everyday life can serve to run the experiment

Materials: sugar, baking soda, 96% alcohol, tarp, metal container, ceramic tile, sand, spoon, matches

Steps:

1. In a tarp with a tuck, thoroughly slice 32.5 g of sugar
2. Mix the sugar well with 5 g of baking soda
3. Place the metal container on a ceramic tile. Put the sand in the metal container up to half. In the center of the sand, make a recess.
4. Pour into 50 ml of 96% alcohol.
5. Add the prepared mixture to the recess and shape the cone.
6. You can add a little bit of alcohol on the mixture. Carefully, with a long tread, light up the alcohol.

Conclusions:

When sugar ($C_{12}H_{22}O_{11}$) burns (combusts), it turns into water vapor and carbon dioxide. However, complete combustion requires a good oxygen supply. Other complex processes take place at high temperatures, because the flow of oxygen to the inner parts of the pile of sugar is hindered. These processes include the decomposition of sugar to give carbon and water vapor. It is this decomposition to give carbon that gives us a carbon "snake"





SIXTH EXPERIMENT

Invisible ink (Spain)



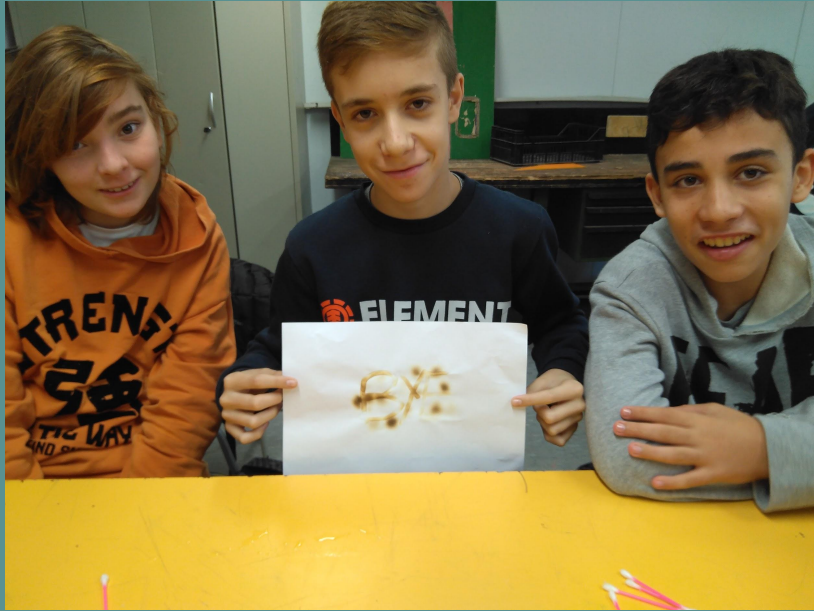
Objective: to produce oxide reaction

Materials: lemon juice, candle, paper and cotton stick, matches

Steps: write a secret message on the paper using the lemon juice and the cotton stick, approach the candle light to the paper without burning it, then the message appears

Conclusions: the lemon juice when heated creates a kind of oxide reaction that shows the message.

Pictures





SEVENTH EXPERIMENT

Carbon dioxide (Poland)



Objective: observation of extinguishing candles with carbon dioxide and production of carbon dioxide

Materials: some vinegar, baking soda, candles

Steps: Produce carbon dioxide in a jar (add baking soda to vinegar). Light the candles in glasses. Pour the gas onto the candles

Conclusion: observe the candles go out

Dwutlenek węgla jest niepalny i cięższy od powietrza, dlatego można zgasić świecę „wylewając” go z pojemnika na płomień.





8th EXPERIMENT

Static electricity Balloon (Italy)





9th EXPERIMENT

The Vulcano (Croatia)



Objective: to observe the reaction between vinegar and baking soda

Materials: vulcano model, vinegar, baking soda, food color, glass cup, spoon.

Steps:

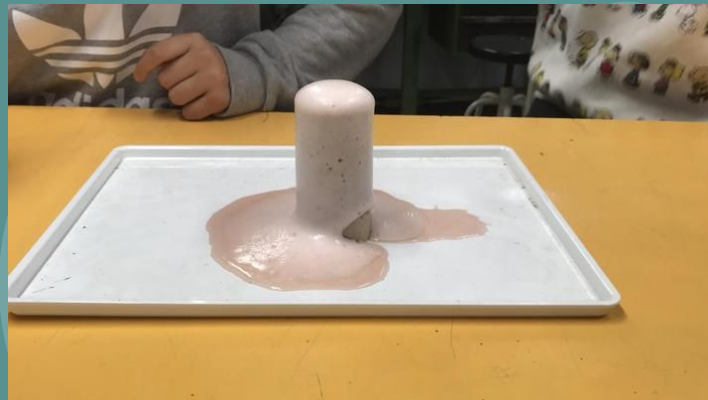
1. Into the volcano model (or in the glass) add two large spoons of baking soda

2. Mix the vinegar and food color in the glass

3. Add the mixture of vinegar and food color into the volcano

Conclusions:

A chemical reaction between vinegar and baking soda creates a gas called carbon dioxide. Carbon dioxide is the same type of gas used to make the carbonation in sodas. The gas gets very excited and tries to spread out. There is not enough room in the volcano model for the gas to spread out so it leaves through the opening very quickly, causing an eruption!





10th EXPERIMENT

Centripetal Force (Spain)



Objective: to watch the centripetal force effect

Materials: a piece of wood, twine, a glass, water

Steps: ty the twine in the piece of wood corners and make a lace, put the glass full of water in the centre, grap the wood by the twine lace and make it turn

Conclusion: the water doesn't fall from the glass thanks to the centripetal force





11th EXPERIMENT

Inertia Force (Croatia)



Objective: to observe the inertia force in action.

Materials: child's car and a figure.

Steps:

1. Pull the car with a figure on it. Suddenly stop the car. Describe what happened with a figure and try to explain why.
2. Suddenly move a car with a figure on it. Describe what happened with a figure on it and try to explain why.

Conclusions: Inertia is the resistance, of any physical **object**, to any change in its **velocity**. This includes changes to the object's **speed**, or **direction** of motion.



12th EXPERIMENT

Gravity Force (Italy)



objective : demonstration of gravity

materials : For this experiment, take two books, a pencil, an empty can and some plasticine.

Steps : You lean two books creating a sloping plane. Then you put the plasticine in the jar and you mark with an X, the ja

Conclusions : the jar instead of going down, goes up due to the barycenter of the bodies



13th EXPERIMENT

Human Table (Spain)



Objective: to reach balance in a system of forces

Materials: people, as many chairs as people

Steps: first put the chairs on a circle, then every person sits down on the chair, then every person lays the head on the lap of the student on their right, finally the teacher keeps the chairs and the students reach balance just with their bodies

Conclusions: to reach balance the sum of forces must be 0

Pictures



14th EXPERIMENT

Potato gun (Poland)



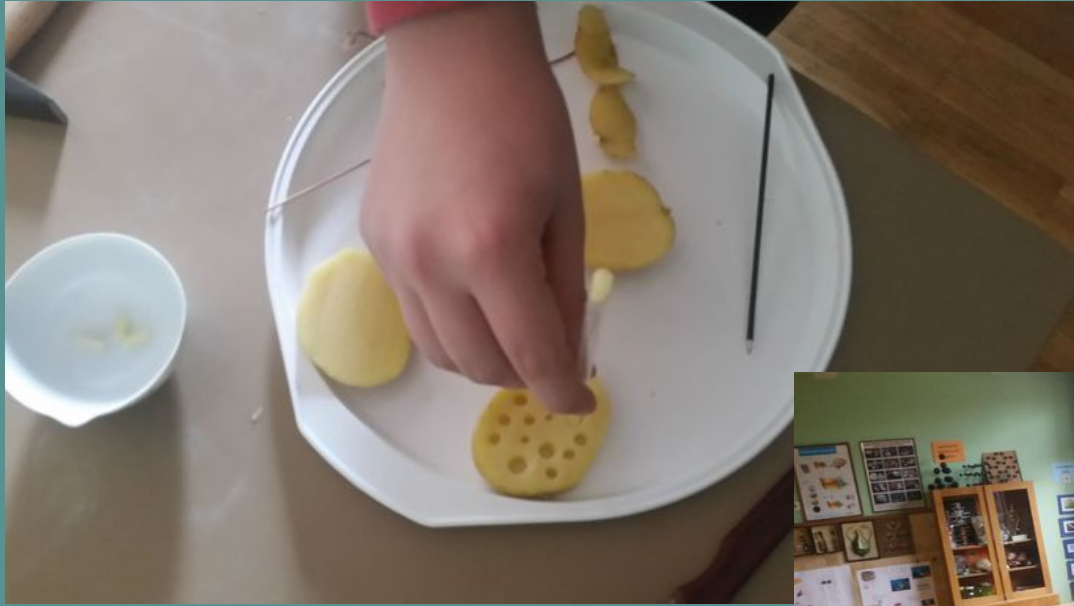
Objective: building a model of air rifle

Materials: potato, pen, knife

steps: Cut two corks from the potato slice with a ball pen, push one cork.

Conclusion: One cork is pressing air inside.

Compressed air is pushing the other cork out which is rushing out with the high speed.



15th EXPERIMENT

Lemon battery experiment (Croatia)

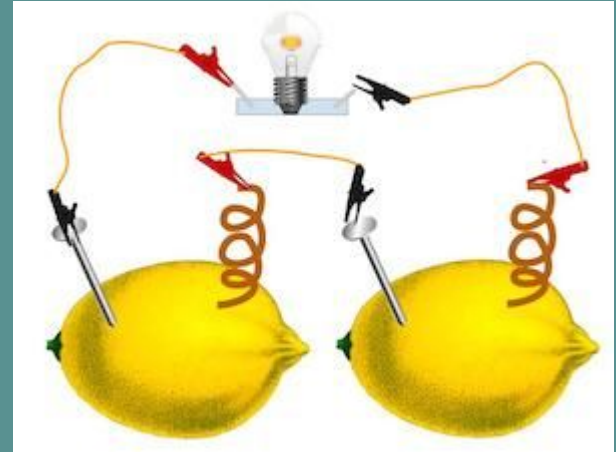
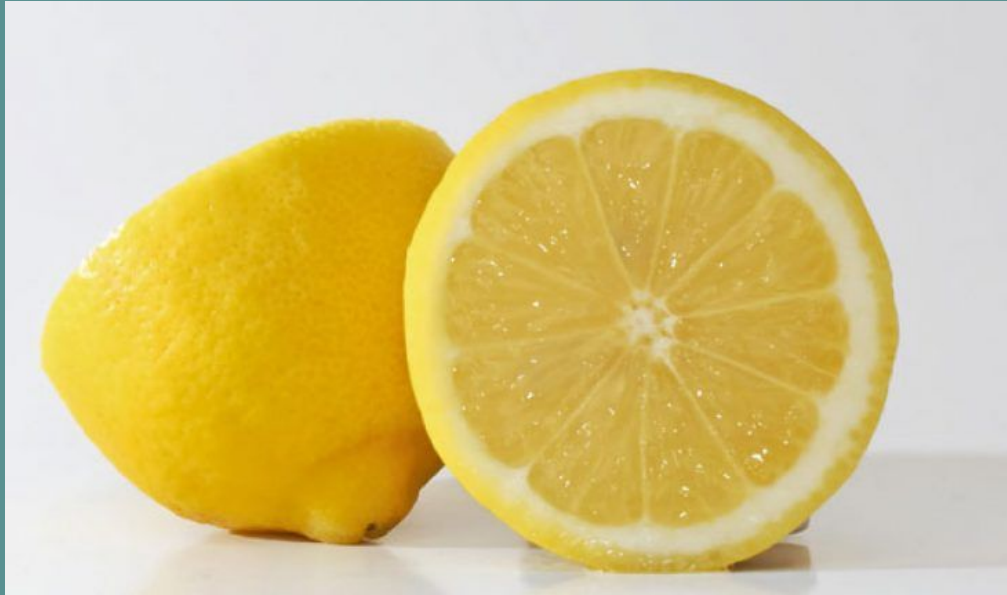


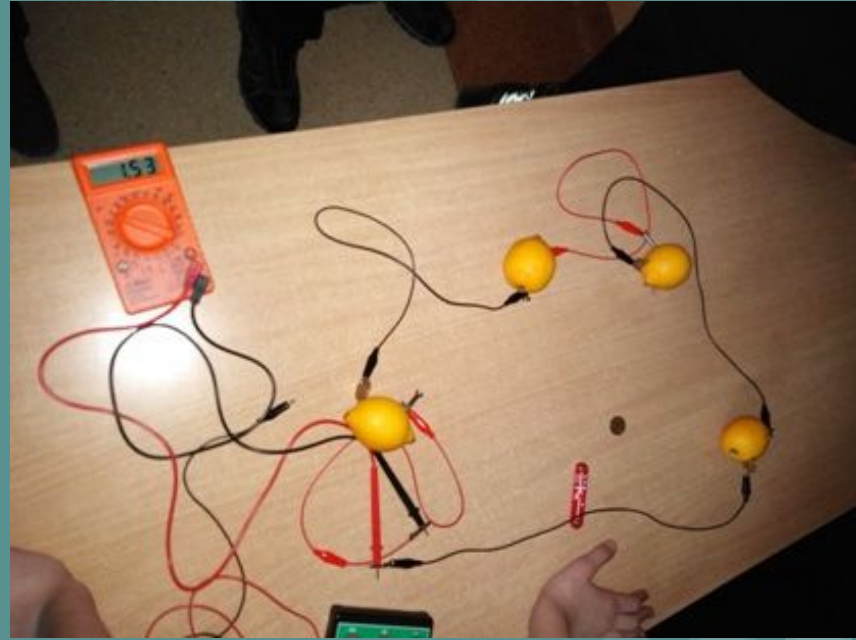
Objective: to discover how can we make the lemon battery

Materials and steps: <https://www.youtube.com/watch?v=0-mggyLNE5Q>

Conclusion:

A lemon battery is a simple battery often made for the purpose of education. Typically, a piece of zinc metal (such as a galvanized nail) and a piece of copper (such as a penny) are inserted into a lemon and connected by wires. Power generated by reaction of the metals is used to power a small device such as a light emitting diode (LED). The lemon battery is similar to the first electrical battery invented in 1800 by Alessandro Volta.





16th EXPERIMENT

Potential energy to Kinetic energy Converter
(Spain)



Objective: to convert potential energy into kinetic energy

Materials: 2 CDs, cardboard, elastic rubber, sticks rings

Steps: put the rings into the rubber, attach the rubber to the CDs using the sticks, separate the CDs using the cardboard, turn the sticks creating elastic potential energy and the CDs start running using kinetic energy

Conclusions: we can convert potential to kinetic energy

Pictures



17th EXPERIMENT

Action and reaction balloon (Italy)

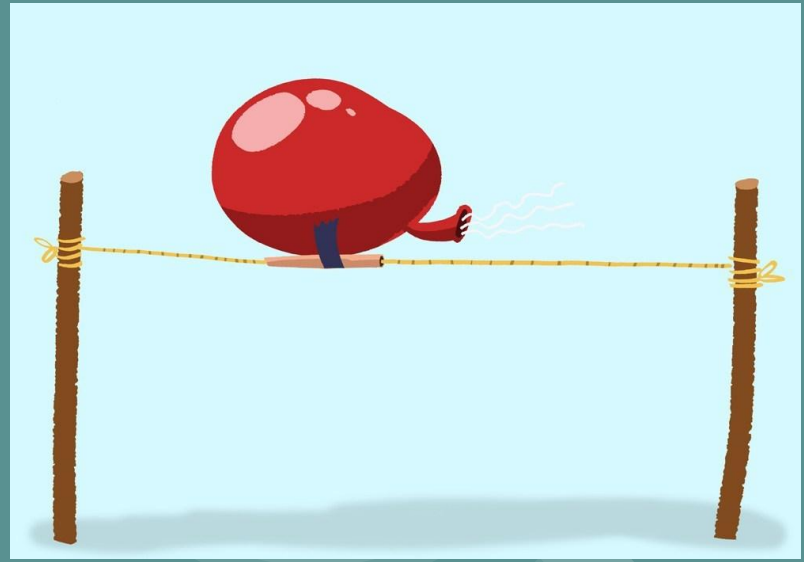


objective : principle of action and reaction

Materials : A balloon, 2 chairs, a straw, scotch tape, scissors.

Steps : Tie one end of the string to the back of a chair pass the string through the straw and tie the other end to the second chair stretch the string.

Conclusions : The balloon is pushed forward while the air goes backwards





OUR PERIODIC TABLES

Poland, Spain, Croatia and Italy



Croatian periodic table



Poland's periodic table





Spain's periodic table



In our classrooms

