



Nino Saakashvili - Napareuli State School, Telavi /Georgia

Tamar Doborjginidze - Buckswood International School - Tbilisi /Georgia

COLORFUL SCIENCE

Let's make the learning process colorful!

Science is around us, we just need to perceive and love it.



Musical Instruments



Telephone



Funny Sound

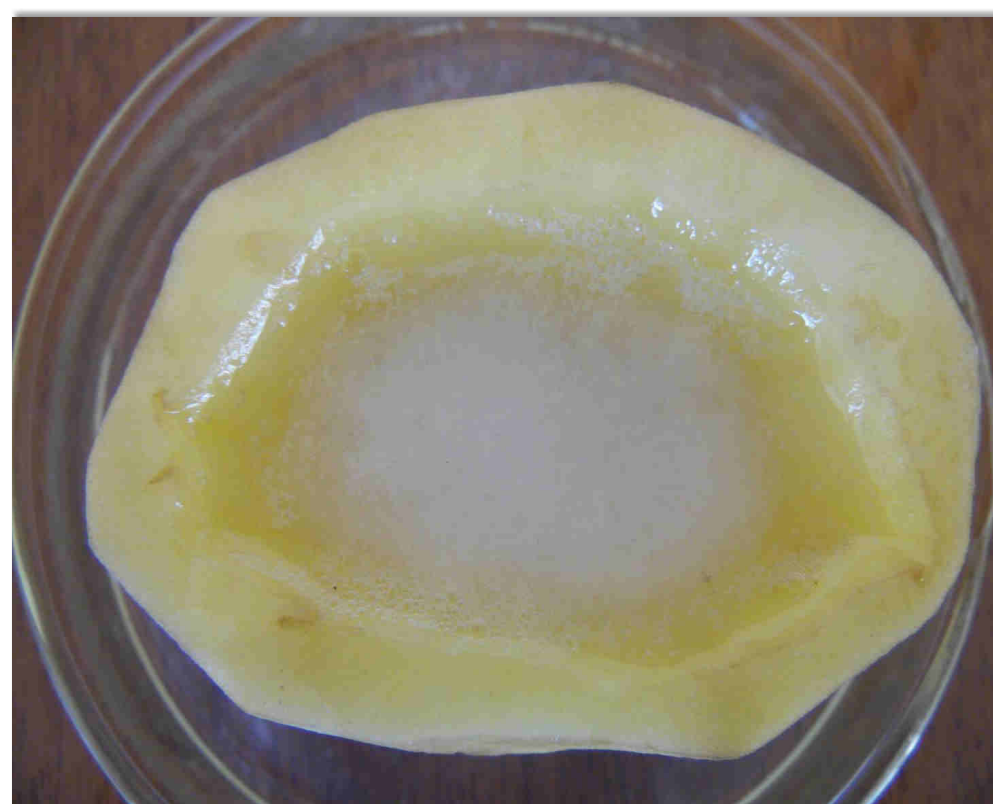
Our goal is to help primary and elementary school students to learn these topics through interesting and funny activities like:

- Telephone – observing the transmission of sound waves
- Generation of sound
- Diffusion and selective intrusion of membrane
- Osmosis in living organisms

Color Palette



Potato Drinks



Membrane



The project is based on developing research-based approach.
Conducting safe experiments is possible using low cost materials.

Sam Croston | Shrubland Street Primary School | Royal Leamington Spa | United Kingdom

Space Camp UK

Space Camp is a programme of residential experiences, run in school, immersing pupils into the amazing world of space science. They require no travel or accommodation costs. The inspirational theme is easily accessible by pupils and teachers alike, and provides a large number of cross curricular learning opportunities.

Activities included:

- Practical Astronomy using telescopes, binoculars, Ipad apps
- Science Workshops such as Rocketry, Astronaut Urine Filtration, Martian Soil tests and light labs
- Creative workshops such as Space inspired printing, Nebula art, Pixel art
- Mission X Astronaut Training

Teachers and pupils work with academics, STEM ambassadors and astronomy enthusiasts who were delighted to share their love and knowledge of the subject.



We have developed the project by working with school partnerships, to create a sustainable model where schools share equipment, resources, learning and best practice.



Children learn about the wonders of the Solar System and the Universe beyond as well as the amazing world of Space Exploration. They also develop better skills in working scientifically by learning to use a variety of instruments to make detailed observations. We also utilise the huge wealth of free resources available for Space Education from ESERO-UK. These experiences and skills help to inspire the next generation of Space Scientists.

Conclusion: The investigative, hands on nature of the activities undertaken at Space Camp helps raise the profile of science in the school, and creates positive memories around STEM learning.

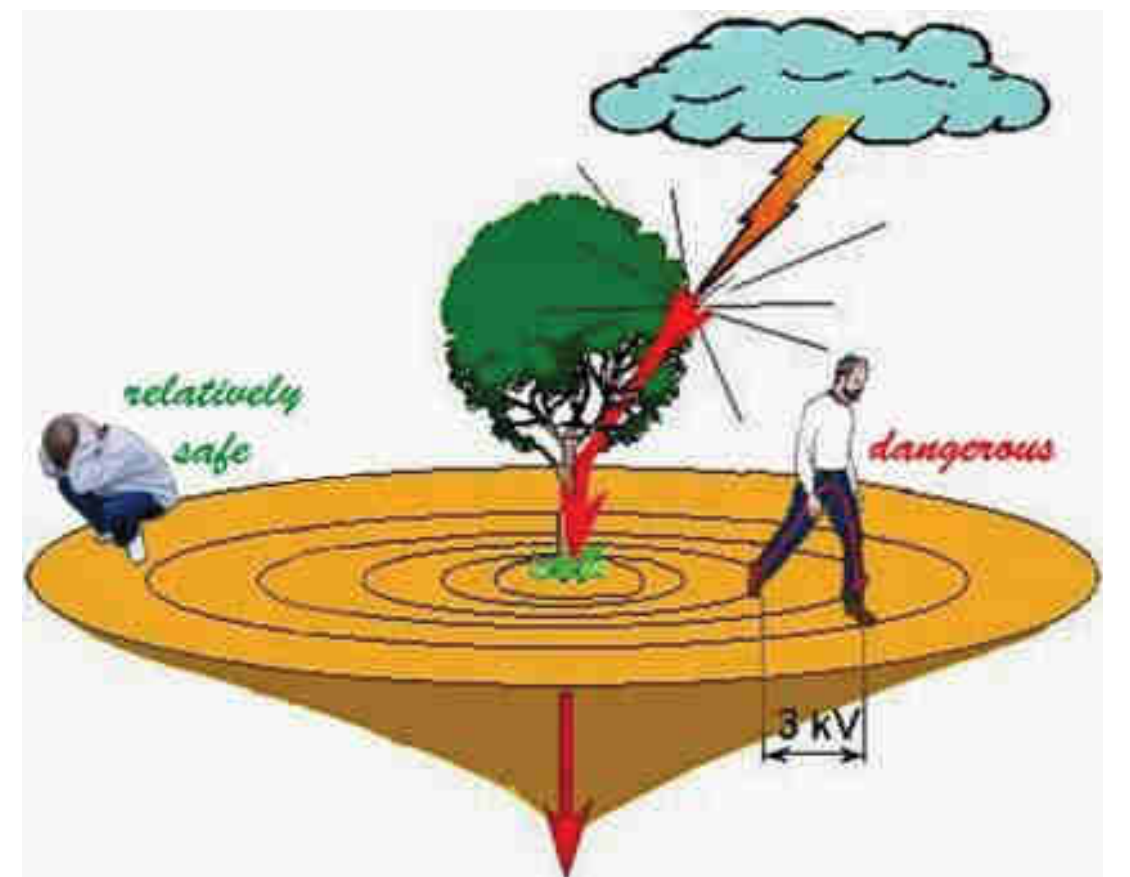
Zoltán SEBESTYÉN, Imre SÁNTA | Pallace of Miracles | Pécs, Hungary

Shockings Experiments

Step Voltage Model with LED



Ignoring the step voltage, the torn power lines, and thunderbolts causes every year a lot of electric accidents and death. During storm it is not allowed to play football in soccer field, to be in shallow water, to stand under a single tree, to go next to a torn power line, or step away from it's nearby.



We want to call the student's and teacher's attention on these things, with Our step voltage model.



The LED sings in the small wireman's hand, when we would get electric shock.



Conclusion:

Through the model you can see, how to avoid an electric shock. We rely on that with this **we can save people's lives!**

<http://netmag.hu/villamcsapas-rekordok/>

<http://www.vilaglex.hu/Lexikon/Html/Lepesfes.htm>

<http://www.esgroundingsolutions.com>

<http://energyzee.blogspot.hu/2015/03/lightning-misery-causing-mystery.html>

Alžbeta Slavkovská, Basic school, Vagonárska, Spišská Sobota | Poprad | Slovakia

Project MILK

Let's go to investigate milk and its properties

The Milk Project involves a series of easy to use experimental and theoretical problems connected with **milk and milk products** and their role in nutrition with focus on lower secondary students. The experiments use milk and milk products and other commonly available materials.

Each experiment starts with a **driving question/problem** for students to solve. Students working in groups are guided by teacher following the instructions in their worksheets.



Yogurt:

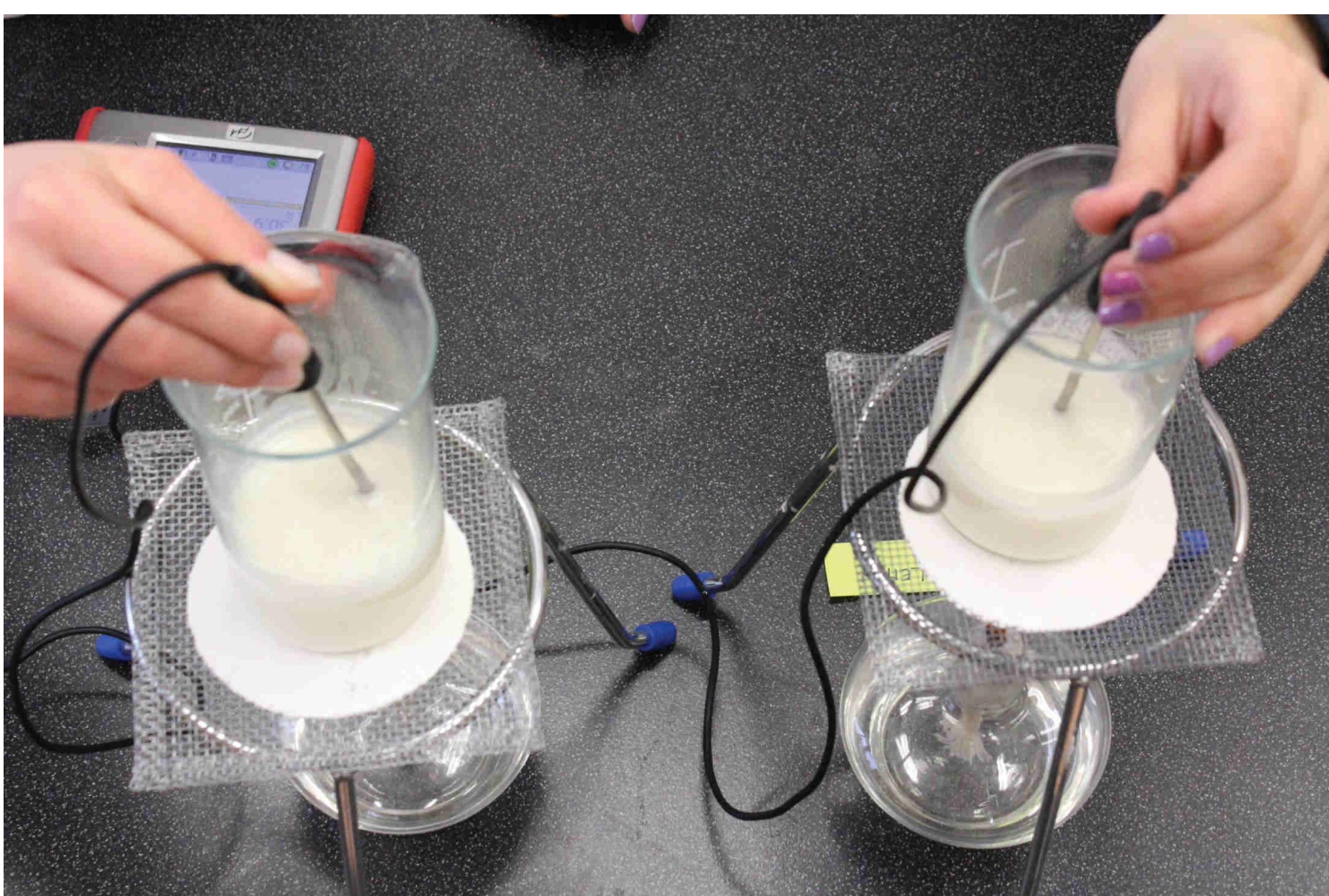
Do you think that yogurt is something alive?

Curd:

How is curd produced and why it is sometimes soft and sometimes lumpy?

Cream:

What is the amount of fat in cream?



Important terms:

Milk, protein, lactose, fats, vitamins, minerals

100%
Great!

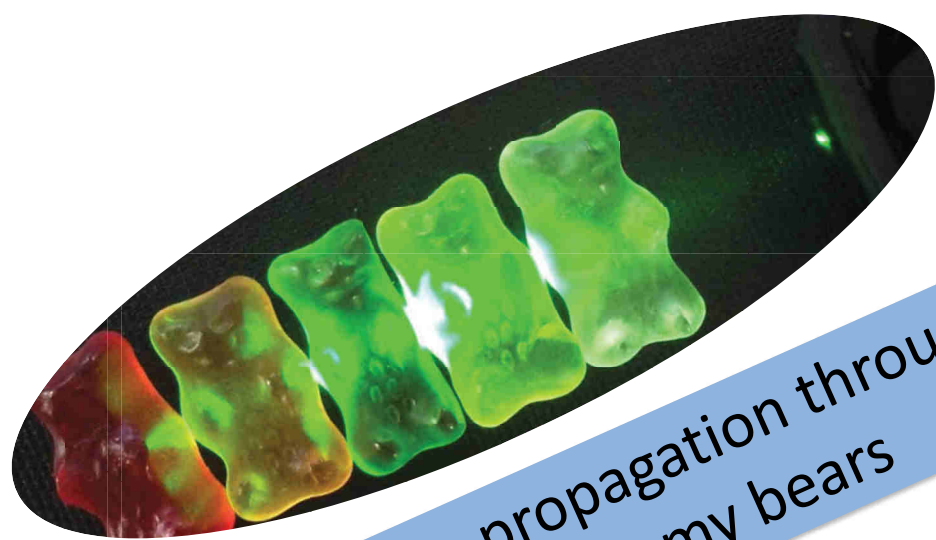
Students experimenting with everyday food products learn to design and conduct experiments and interpret their results and so that they get knowledge about the nutritional value of milk and dairy products.

Iveta Štefančínová | Grammar school of J.A. Rayman | Prešov | Slovakia

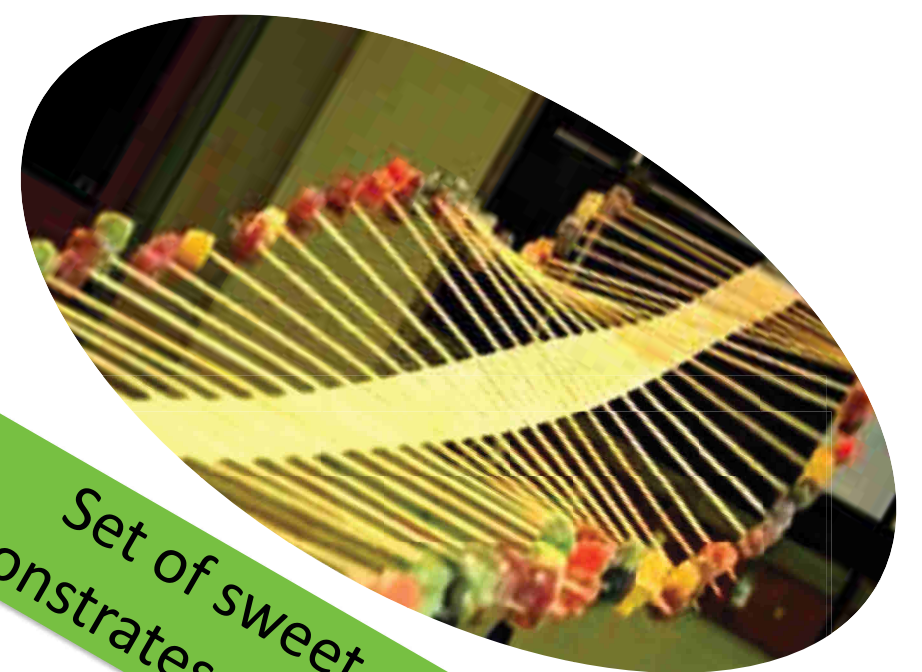
Basket full of sweets

The project deals with the experiments using sweets. This popular pupils' „food“ can be easily used for experiments to observe physical phenomena and confirm or discover physical laws.

Since sweets are available in different shapes, colours and consistencies, their properties can be utilized for demonstration of various phenomena in the field of mechanics, oscillations and waves, electric circuits or optics.

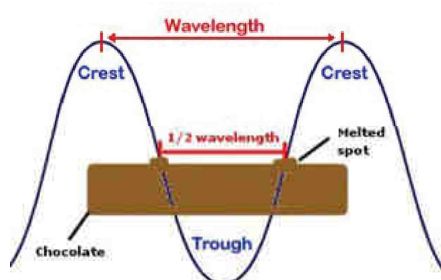


Laser beam propagation through a set of gummy bears

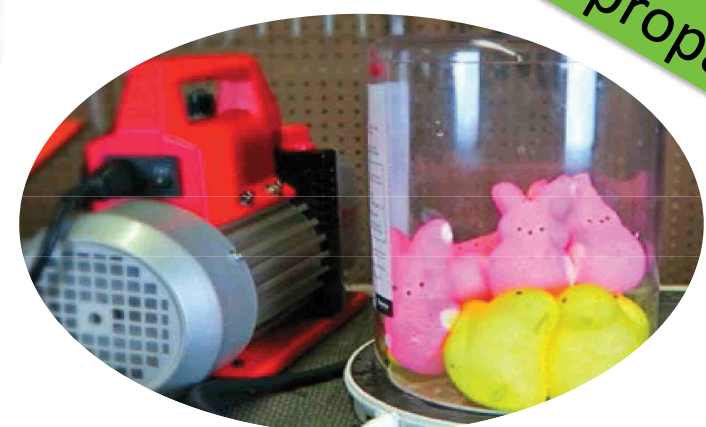


Set of sweet pendulums demonstrates the wave propagation

Chocolate placed into a microwave oven. The melted spots can be used to determine the speed of light.

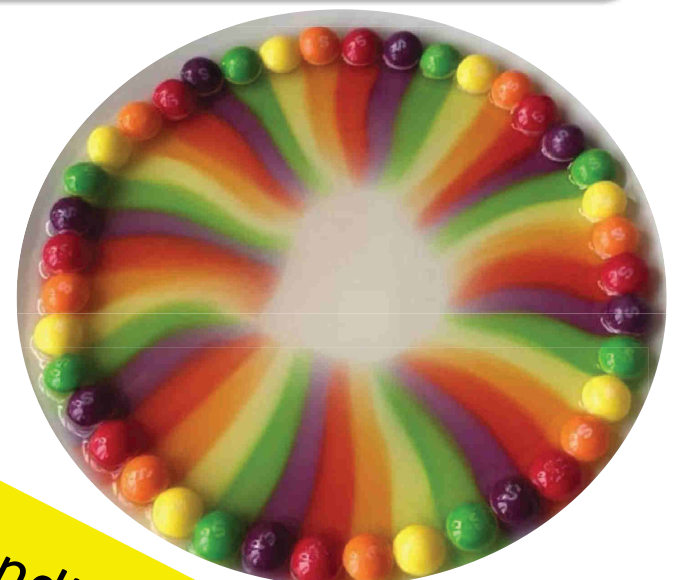


Sugar crystals

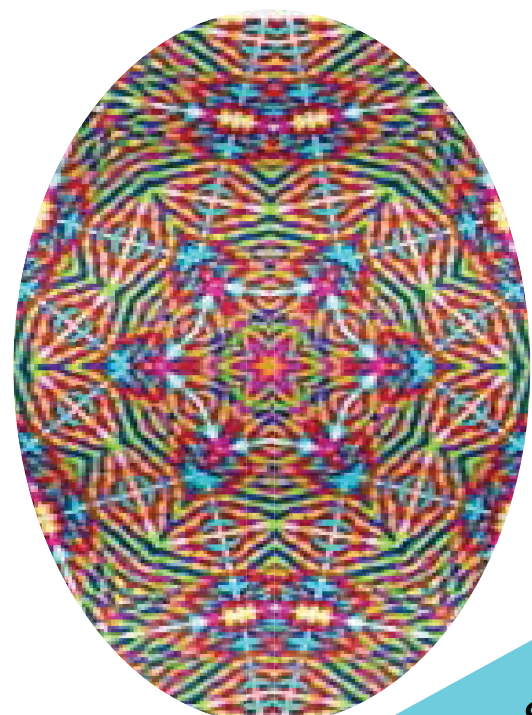


Inflated marshmallows in the bottle where air is sucked out.

Stretch and strain and length measurement of gummy worms



Diffused candies in a dish of water



Kaleidoscope made of sprinkles

Sour gummy worms move up and down in the baking soda solution



Pupils can formulate a problem or question, plan investigation, collect and interpret data and draw conclusions. Sweets' properties can be also studied at chemistry or biology lesson, so that interdisciplinary approach can be applied when experimenting with them.

Stijn Lichtert | KA Ekeren | Ekeren (Antwerp) | Belgium

Making electricity labs accessible & affordable

Intelligently replace sensors & voltage sources by ICT

Student labs about electricity are typically perceived as stressful and inefficient by science teachers. The teacher should have access to a dedicated lab with enough student equipment. Students must get trained using this equipment prior to the actual experiment. Furthermore, these apparatuses are quite expensive.

In this project, we perform several classic labs about electromagnetism in a quick & easy USB setup.

Suggested topics

Ohm's law

magnetic field by a solenoid

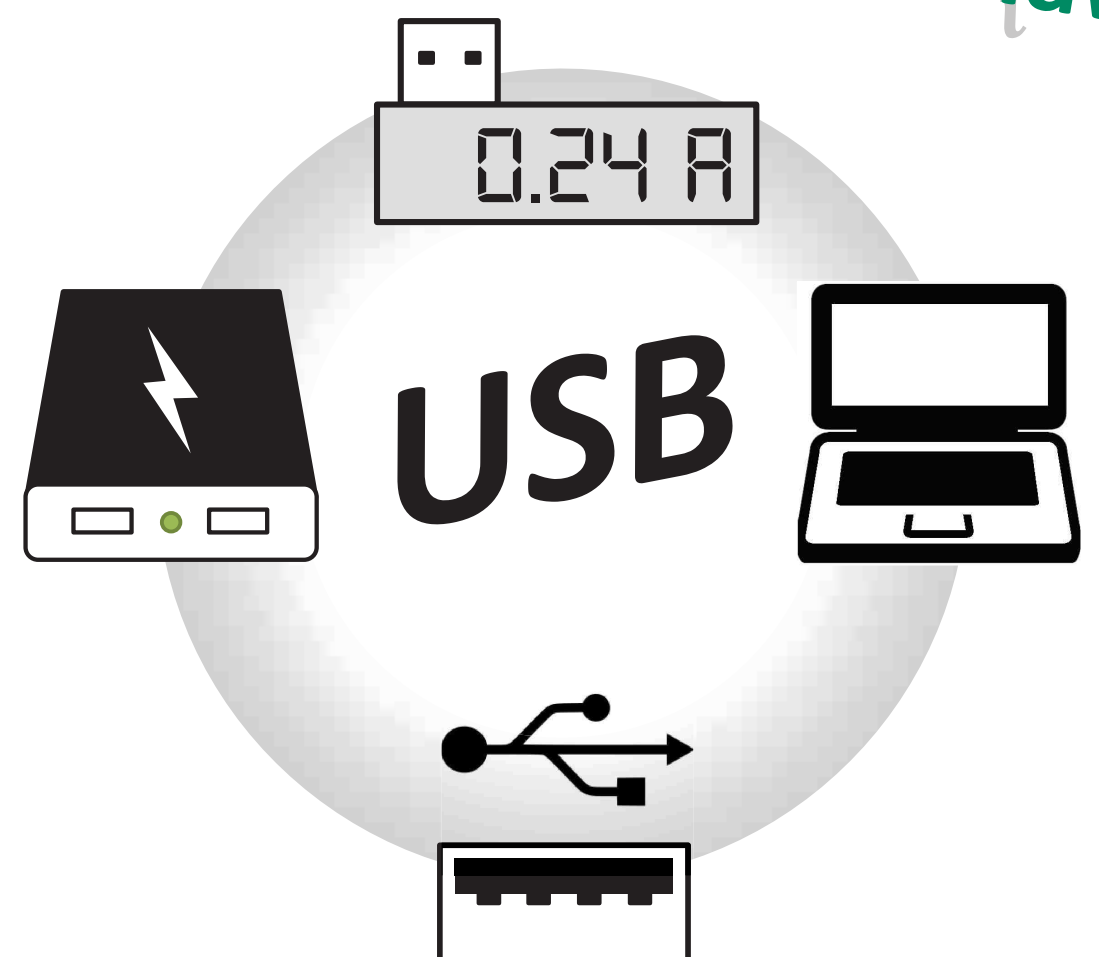
conductivity of liquids

circuits of resistors

Kirchoff's circuit laws



traditional



USB

Advantages of a USB setup:

- ⚡ NO external voltage sources
- ⚡ NO dedicated lab required
- ⚡ NO cumbersome multimeters
- ⚡ quantitative results
- ⚡ plug & play

Conclusion

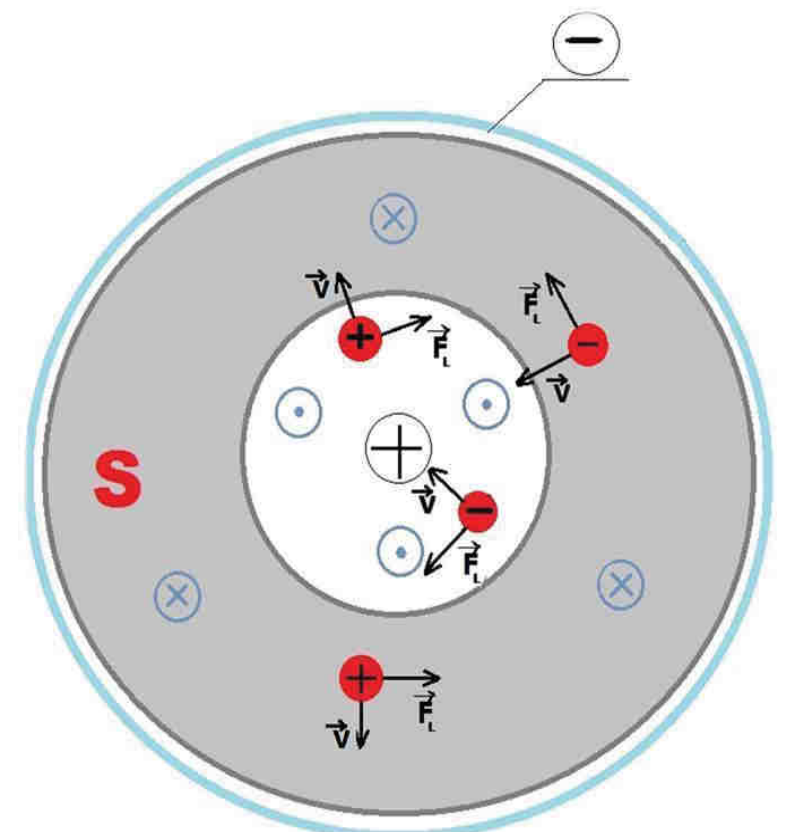
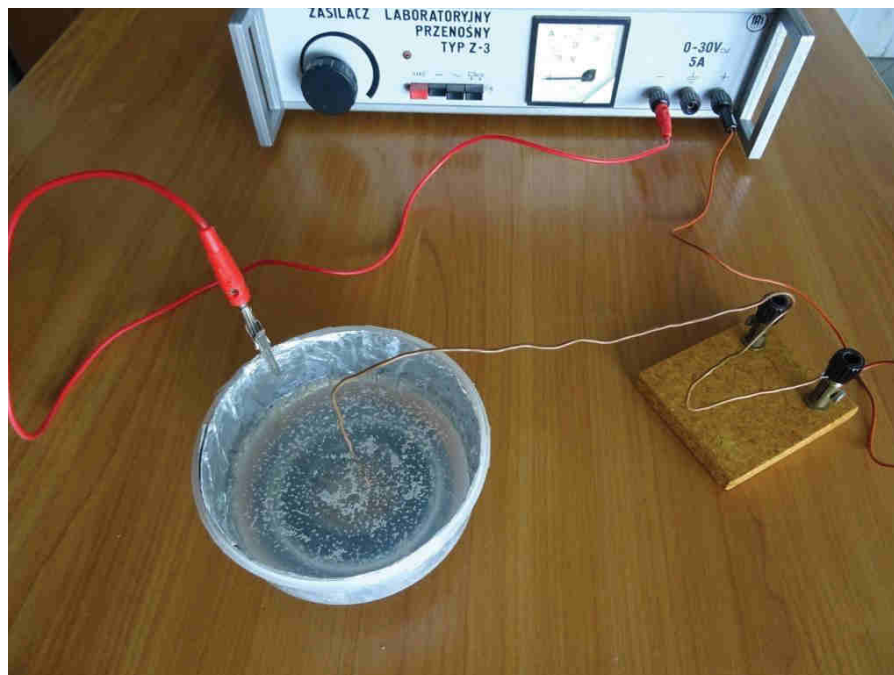
Switching your electricity labs to a low-cost USB setup will shift the focus from practical details to the actual experiment. It is an excellent solution for inexperienced students and / or teachers.

Zenona Stojcka | Tadeusz Kościuszko High School | Wieluń | Poland

Magnetic forces

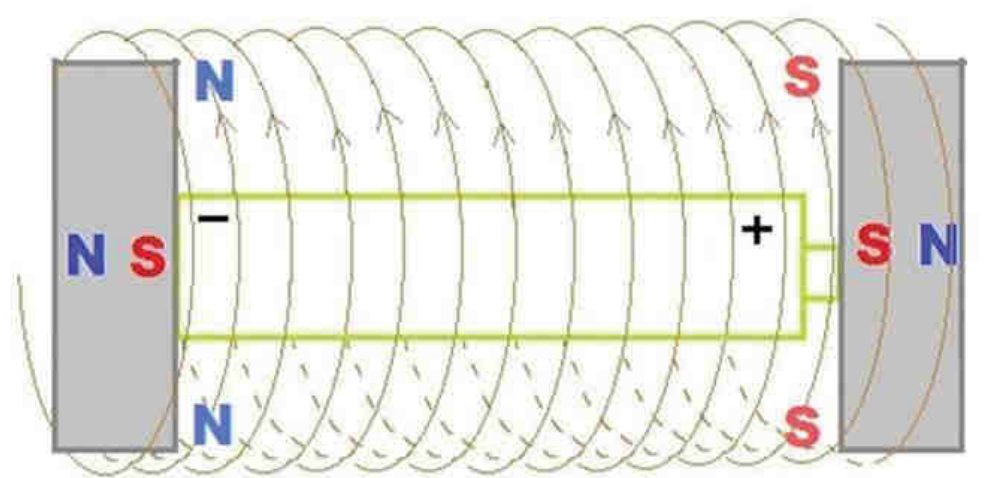
Magnetohydrodynamic effect

The liquid - water solution of sodium chloride - moves into two ways simultaneously!



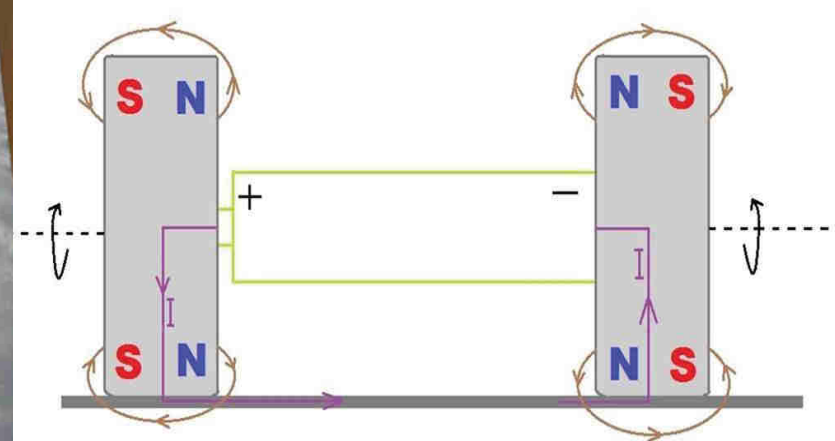
Magnetic train

A battery with 2 neodymium magnets moves like a train in a coiled cooper wire.



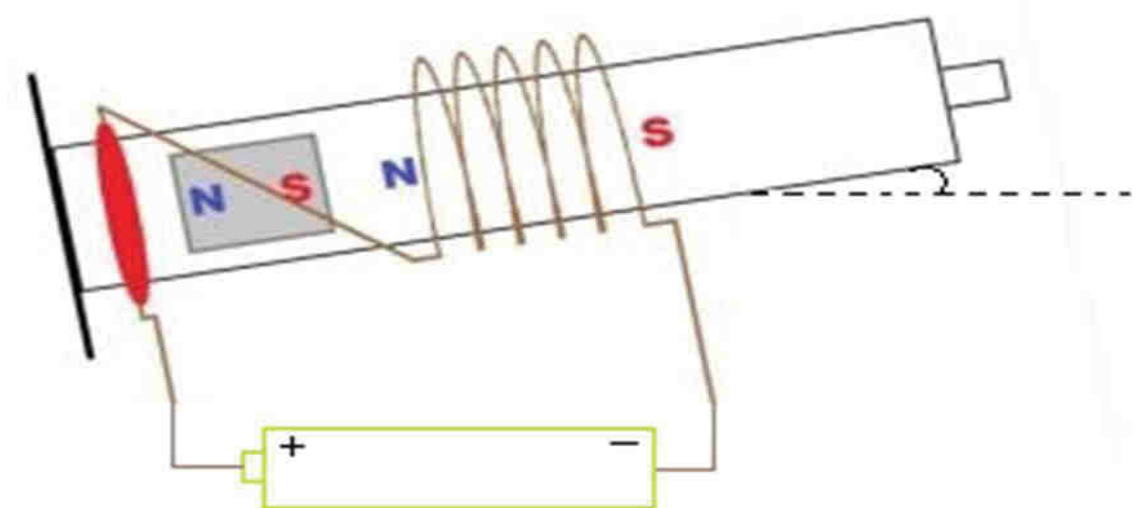
Magnetic vehicles

The vehicles move on aluminium foil with some acceleration.



Magnetic piston engine

A neodymium magnet moves in a syringe due to gravity and a reed relay, which alternately opens or closes an electric circuit.



Surprising applications of magnetic forces stimulate students to understand electromagnetism in great depth using enquiry-based learning.

Erzsébet Szakács | Szentendrei Református Gimnázium | Szentendre | Hungary

A Tool from a Drug Store for Student Experiments



I have found a plastic tool with small dents. It is used for displaying and testing nail polishes.
I started using it as a special test plate in my chemistry lessons.
It is very useful for chemical reactions.

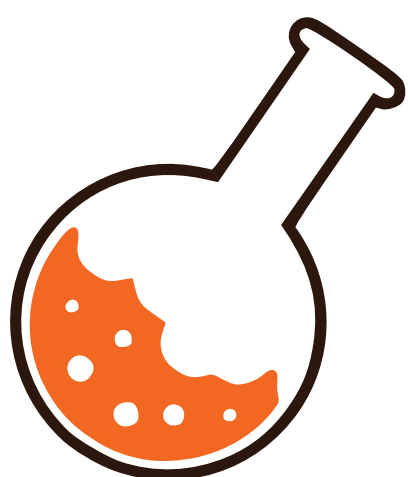
- in aqueous solutions
- with colour changes
- without heating
- forming gas



Originally it is not for experiments...



...but it is used as a tool now!



The test plates are especially suitable for making comparisons and they can be used in Inquiry Based Science Education (IBSE).

Szilvia Toth | Gyorgy Bessenyei Grammar School | Kisvarda | Hungary

Natural Clear

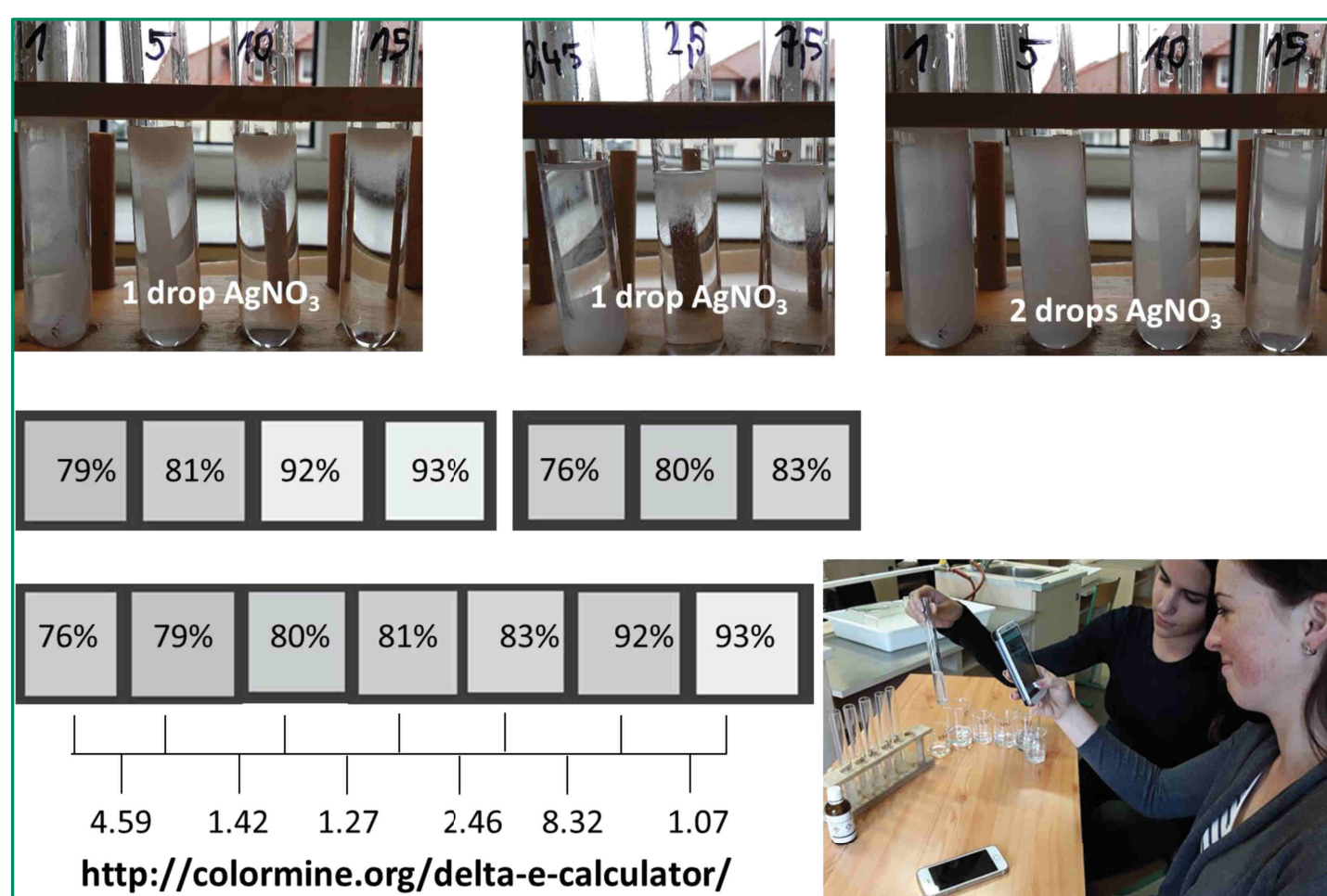
How can the salt sweeten the learning of natural sciences?

Our hypothesis is that using tales in teaching natural sciences makes easier for students to understand the basic principles of the world surrounding them. Based on a self-written framework the students' task is to plan experiments connected to salt in Biology, in Chemistry and in Geography lessons using everyday materials, common and ICT tools. Our project shows that natural sciences could also be not only funny but interesting and easily understandable. What's more, we hid the salt (sodium chloride) in the title of the project. Let's find it!

The story of the king's youngest daughter and the boy in yellowish-green coat

11 gold coins = proton number 11 silver coins = electron number
11 proton number = electron number
Na
23 bronze coins = mass number
alloy of copper & stannum
17 siblings = proton number 17 silver coins = electron number
17 proton number = electron number
Cl
35 bronze coins = mass number
17 protons + 18 neutrons
37 bronze coins = mass number
17 protons + 20 neutrons
twin = isotope
 $\text{Na}^+ + \text{Cl}^- \rightarrow \text{NaCl}$
changed princess changed boy smile
changed boy took hold of the changed girl's hand = ionic bonds
white crop = sodium-chloride

Wonderful country
Glass-mount = boron-polonium line
others were hot-tempered = alkali metals
very populous community lived in the central part = transition metals
who did not fall into conversation with anybody = noble gases
Southern regions = lanthanides & actinides



We use materials and tools from everyday life (i.e. salt, eggs, smartphone, dishwasher salt, food dyes), thus the project has been easy to implement and it is low-cost. Our project represents how you can do experiments even in the classroom.



The interdisciplinary approach of the project helps the students to link the knowledge of diverse fields of science, to discover and understand the complexity of science.

Vas. Noussis | Laboratory Center of Physical Sciences | Igoumenitsa | Greece

Did Ritchie Blackmore know Physics?



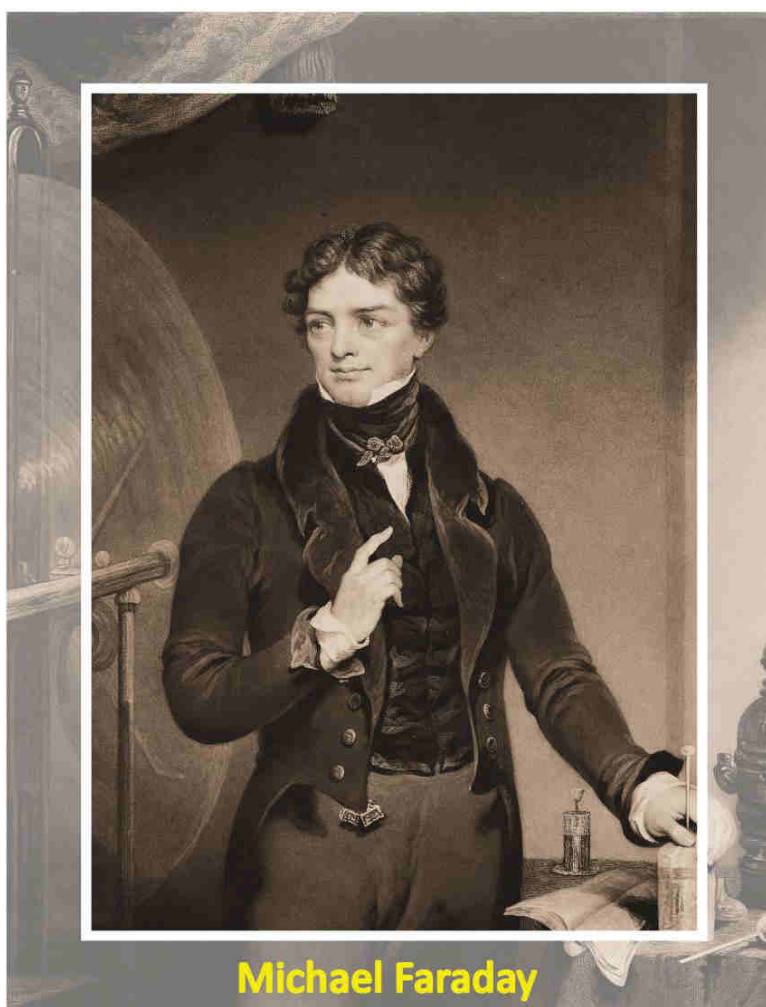
Ritchie Blackmore surely had
a lot of talent and passion
and it took him
lots of study and practice
to become a great guitarist.

But, he only had the opportunity
to become the kind of guitarist he is,
with a little help
from some great scientists,
who had explored the basic principles
underlying the production of sound
in the electric guitar.



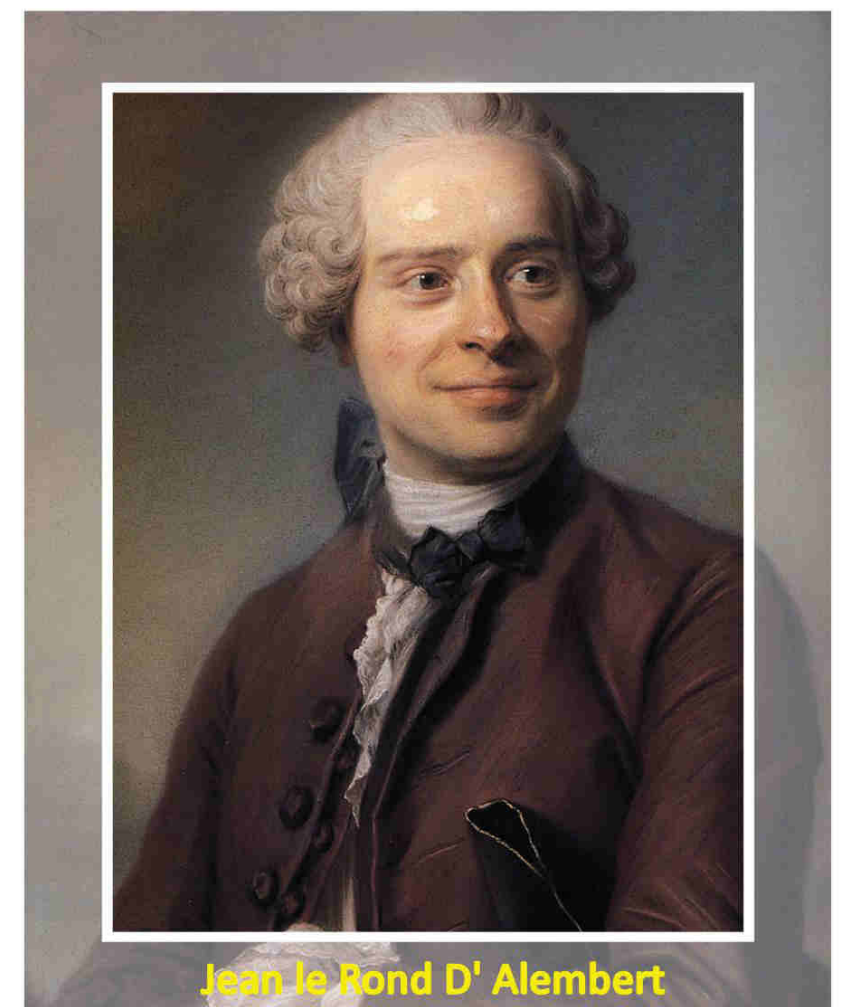
Hans Christian Oersted

electric current
creates
magnetic field



Michael Faraday

changing magnetic field
can generate
electric current



Jean le Rond D'Alembert

wave equation



Exploring the basic principles of operation of the electric guitar
by using new technologies and low cost materials,
such as a plastic dish loudspeaker and a homemade electrical monochord