Science for the Youngest

Ute Eckhof & Dr. Frank Walter | Christian-von-Dohm-Gymnasium | Goslar | Germany

Child Labour in Mining -

„… but we are allowed to go to school!“

For many kids around the world school is a privilege one has to earn by hard work first.
In an open, inquiry based set-up, students get a real feeling, how hard life was as a 10 year old stamping boy or working in a 30 cm high coal mine gallery. The project is a cooperation between primary schools, mining museums and extracurricular sites in Goslar and Bulgaria.


Stamping boy


In a gallery


Pikeman work

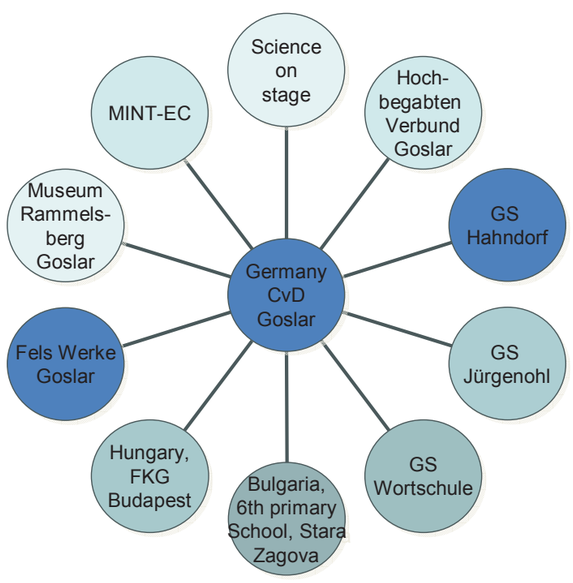
World of metals

In a holistic, interdisciplinary approach students learn in mixed teams of primary and secondary students to realize and solve problems following the footsteps of a miner from ore to metal.
Besides historical, social and ethical aspects students participate in practical stations. Pupil identify and sort different kind of metals and metal objects by simple chemical tests.


Stamping station


Students at work

Students also work as stamp boys with original tools from the museum to crush and grind ore before collecting bits of pure copper. During the visit of a historical mining site and museum they learn about the use of science in everyday life and look at their own presented exhibits.



Students train haptic working, learn scientific methods and practice first steps of systematic and propedeutic working by observation, experiments and multimedial information provided.

➢ Students final conclusion was:

“…, but we are allowed to go to school!”

Science for the Youngest

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Emma Crisell | Richard Taylor Church of England Primary School | North Yorkshire | England

What can we learn from Viking Poo?

This novel research project, supported by STEM professionals, enabled us to inspire our 8-9 year old students to ask enquiry based questions, at the same time as being involved in real scientific research. They had the opportunity to work on previously unprocessed samples and felt they were part of a purposeful team, supporting real archaeologists.

It also provided a platform for discussion around scientific careers with primary age children, opening up the ideas of research and innovation and a greater awareness of the impact of science.

Fig: Archaeologist, Andrew Bone, teaching children to use a microscope.

Fig: Cataloguing our samples.

In order to carry out their research the children learned to measure and observe accurately, disaggregate samples with water and acid, prepare and use microscope slides and question and interpret their findings. STEM professionals provided professional equipment, samples, guidance and efficacy to our research.

- What is poo?
- How is it made?
- What did The Vikings eat?
- What is soil?
- What can poo tell us?
- What is a micro parasite?

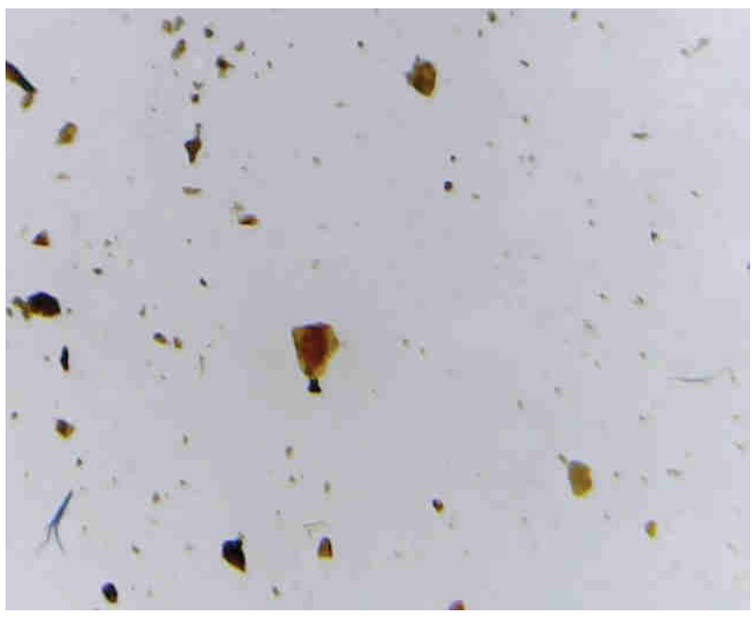

Fig 3: An 1000 year old micro parasite egg

Conclusion: Working with STEM professionals has inspired young children to see science as an exciting subject relevant to many careers. An inspiring topic led to exciting results.

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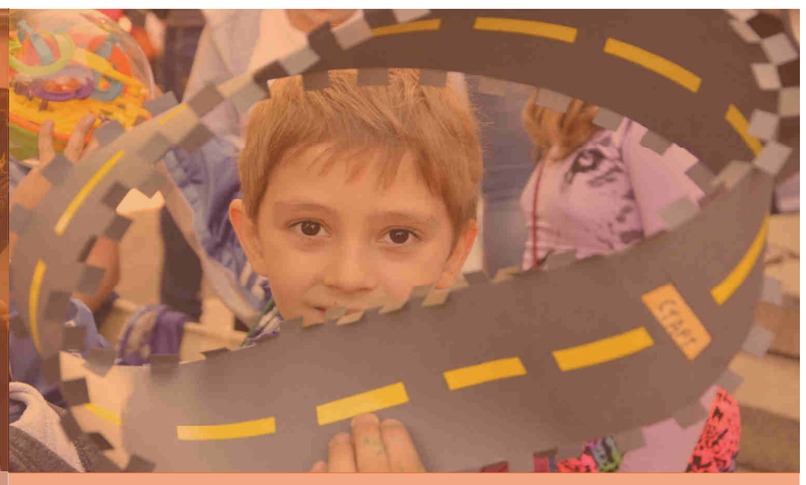
Halyna Hodovana | Kharkiv National University, Junior Karazin University | Center for Creative Activities of Children and Youth | 2X2 Science Club | Kharkiv, Ukraine

Fun Science: Step by Step guide

Development of Cognitive Skills in Elementary School Students through Extracurricular Activities.

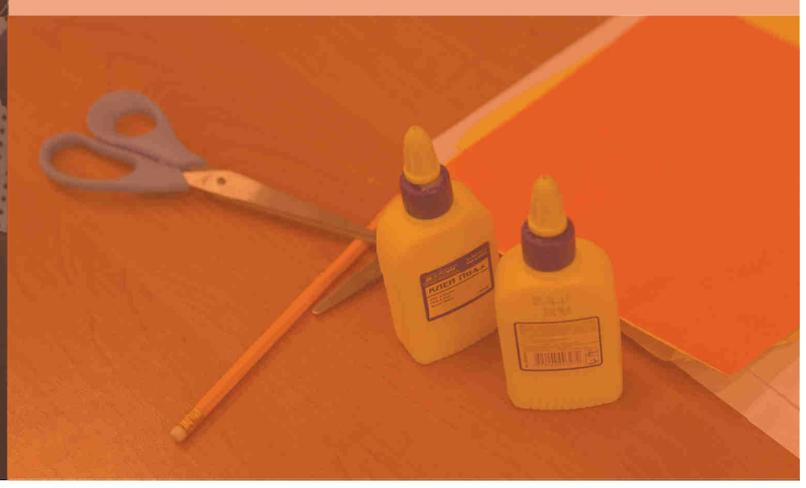
PLAYFUL MATH (4-6 years) → FUN MATH (6-8 years) → EXTRAORDINARY MATH (8-10 years) → USEFUL MATH (10-12 years)

Having **PARENTS** as direct **PARTICIPANTS** gives them a look at the child's progress and a chance to better **UNDERSTAND** their needs.



Using **MODELS** crafted from everyday materials to tactilly illustrate scientific phenomena **INCREASES INTEREST** toward science among children.

Hosting different **ACTIVITIES** combining **LEARNING** and **FUN:** math quizzez, scientific picnics, summer camps, trips to the Landau Center.



The educational method of 2x2 Science Club is built around supplementing regular school curriculum, yet making dissemination of scientific knowledge fun while helping children develop flexible and critical mode of thinking when dealing with real-life scenarios later in life.

2X2.org.ua

"There is no such thing as children. There are people with another scale of concepts, other sources of experience, other ambitions, different game of feelings." – ***Janusz Korczak***

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Evelyn Clawson | Brambleside Primary School | Kettering | England | UK

The Little Red Hen

A story themed pathway to introduce food and farming

The overarching aim of this project is to teach engaging, enjoyable outdoor scientific inquiry through growing cereals in the school garden.

Through story telling, drama and activities delivered by farmers, bakers and a food technologist, this project offers open ended outdoors investigations which inspire an enthusiasm and interest in; nature, farming and food technology. It encourages collaboration with other schools and helps develop pupils‘ computing skills - including blogging, coding and stop motion animation through Red Hen themed activites.

Every child who took part gained a greater understanding of the theory and application of science, ICT and handling data linked to thier project to grow and make healthy and nutritious food. Working towards a purposeful outcome like this meant that the project was truly meaningful, thereby inspiring hard work and independent thought.

Popular activities include: Growing wheat indoors and outdoors to monitor and observe crop development, studying and measuring the weather and recording the temperature of the soil.

Future Careers

Conclusion: Encouraging an early enjoyment and respect for nature through learning outdoors is key to developing a greater understanding of environmental science. Storytelling and visits from professionals helps to engage young children and highlight essential STEM professions. This leads to a better understanding of both farming and the food industry, and inspires future careers.

Science for the Youngest

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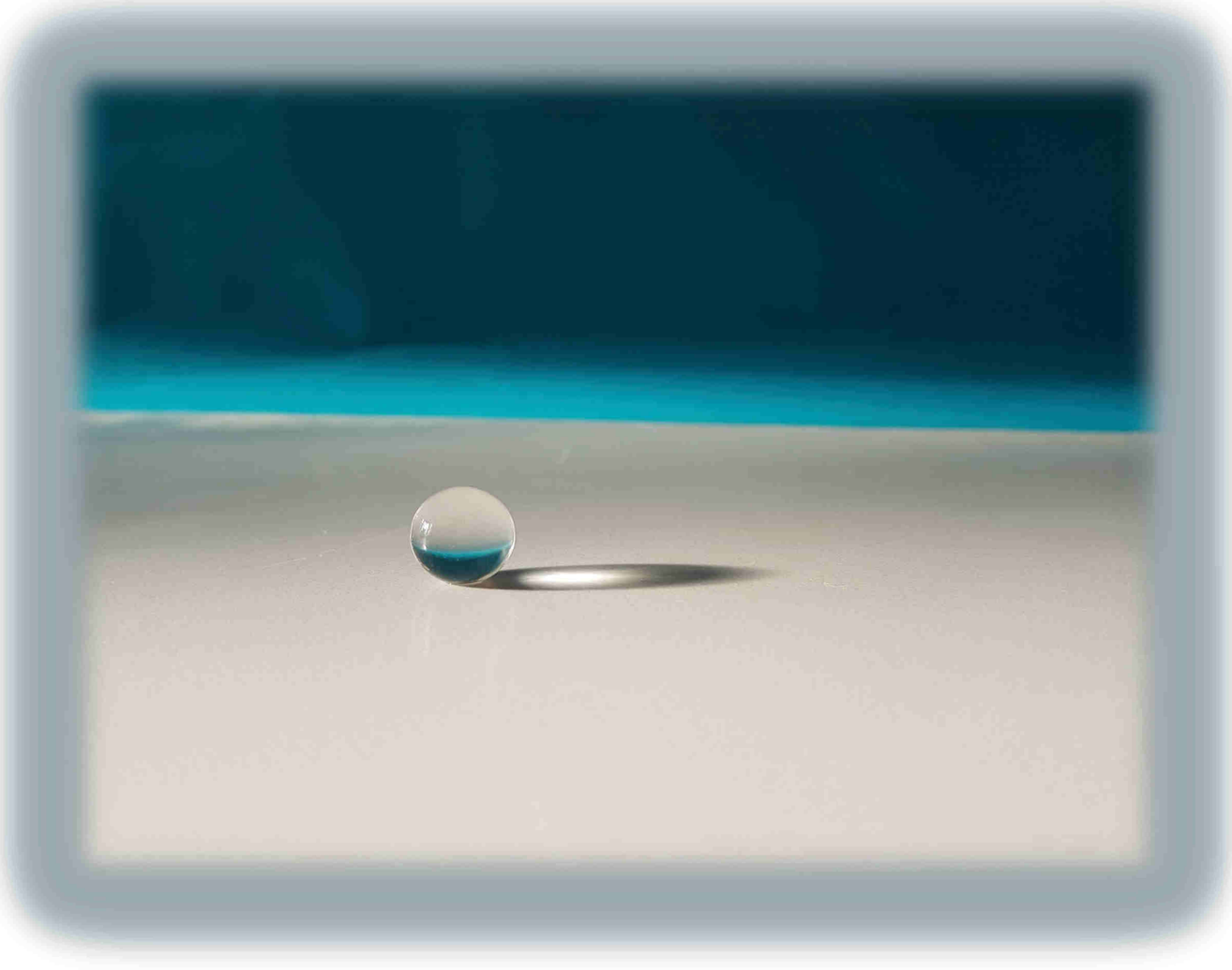
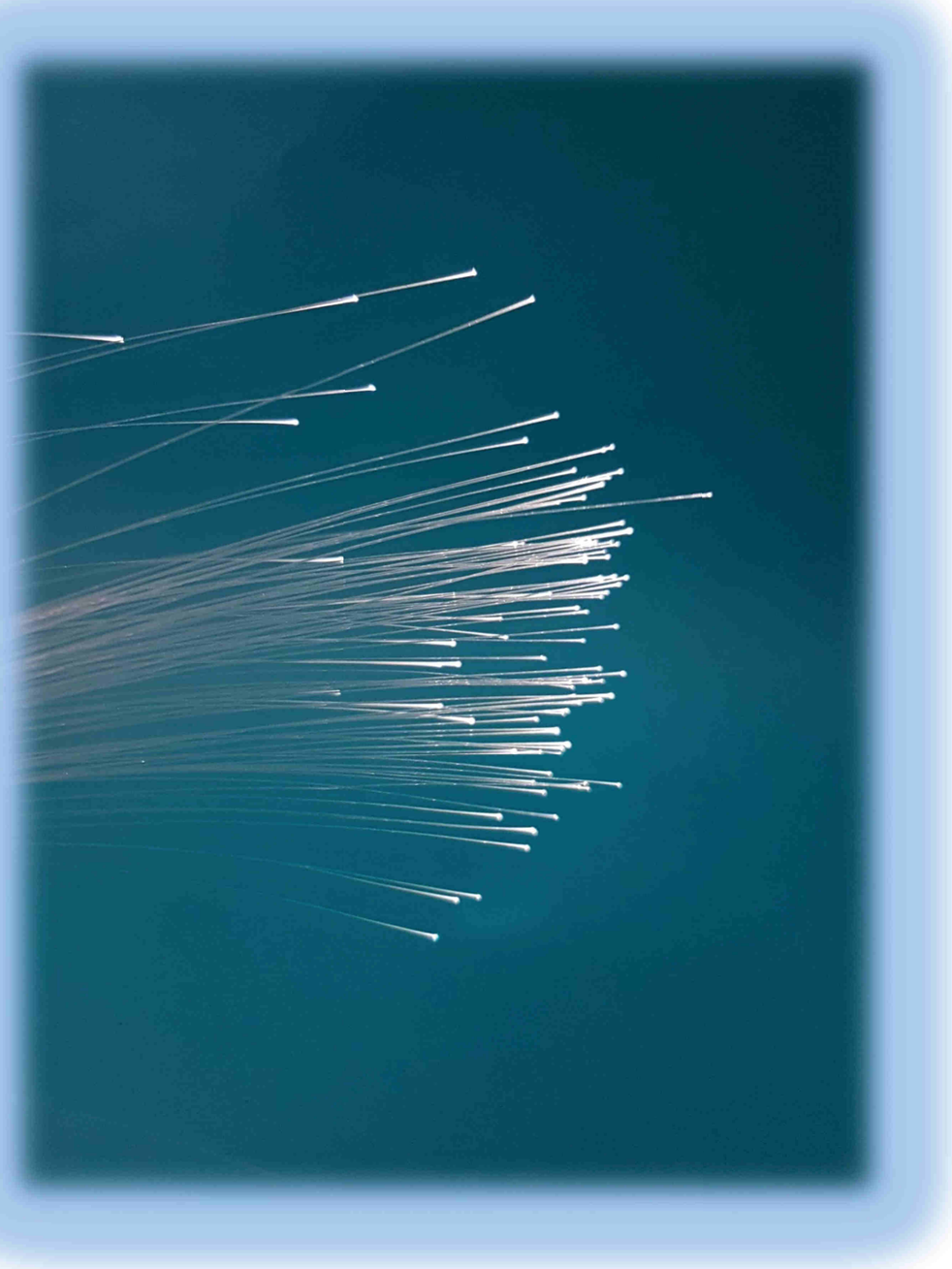
Federico Andreoletti| Istituto “Don Bosco“ | Brescia | Italy

Materials and technologies

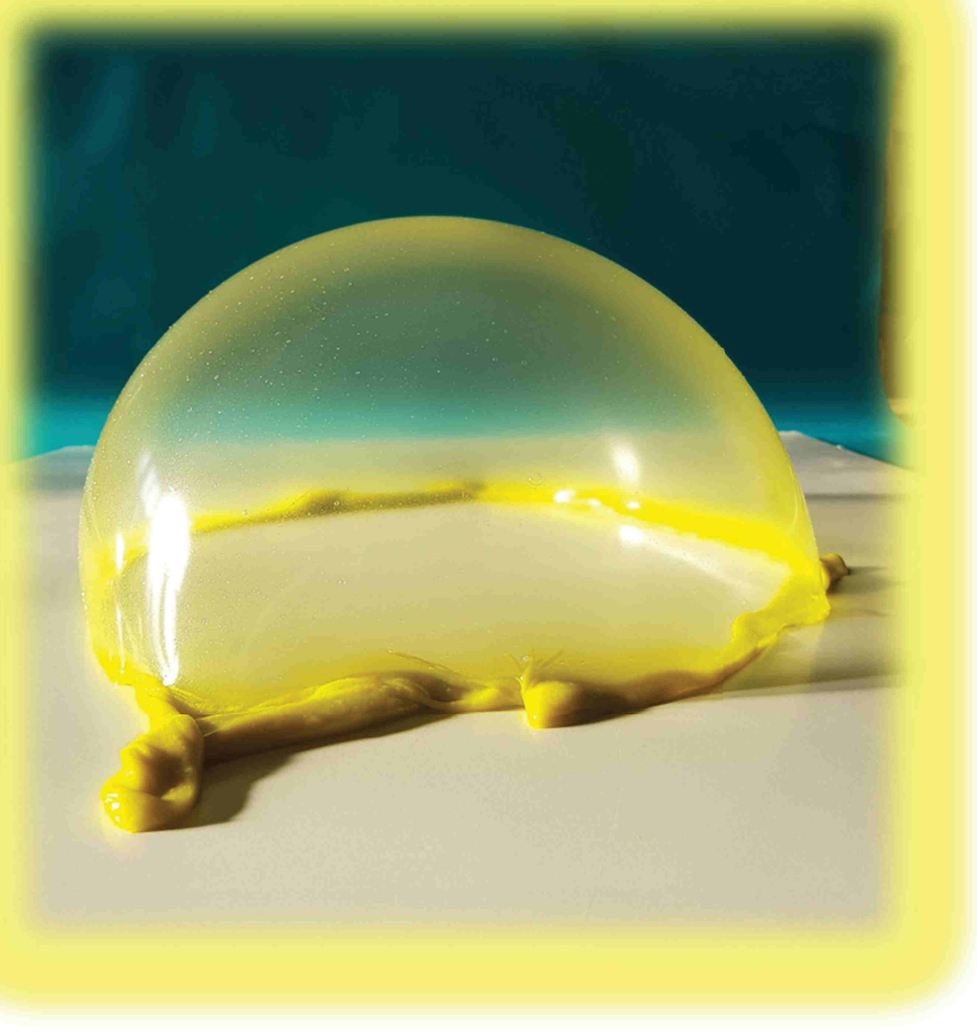
Low-cost science with new materials

- ✓ Discover and analyze the features of recently developed materials, besides the ones traditionally studied at school
- ✓ Understand and experiment technology as ability to manipulate and transform materials
- ✓ Develop hands-on abilities through practice on some materials (cutting, bending, ...)





- ✓ Polymers
- ✓ Non-Newtonian fluids
- ✓ Optic fibres



- ✓ Use recycled or easily available materials to build objects with brand new functions
- ✓ Build a complete scientific activity with everyday and low-cost materials

THE BOUNDARIES OF THE RESEARCH: THE NEW MATERIALS

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SimpleScience.nl

Education challenging children to think, act and improve!

Helping children to develop an inquiring mind and a scientific approach(1) to problems (2)

(1) Just a tool out of very many others are physics, biology, chemistry and maths, the tool has to fit to solve the problem
(2) Every verb and noun is subject to scientific inquiry !

To reach children (3) as many as possible to attract them as long as possible (4) to do it as cheap as possible (5)

(3) independant of gender, age, school results, nationality, financial and social situation at home
(4) at home and in school
(5) just low cost science as sound starting level

Giving children a fertile ground for the seed of what they can and like.
What you like is guiding for your live !

Trust children, see them as equal and they can always more than you think

Changing closed questions/receipts in challenging open questions (6)

(6) use the concept of entropy to come up with possibilities more than one, just as reality shows

SimpleScience.nl
Boeier 317 8242CJ Lelystad Netherlands
bertnagel123@hotmail.com

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Nataliia Boiko | Lemeshivkas School | Yagotin | Ukraine

Research Competences Formation at Biology Lessons and Beyond

The main goal of my project is a cooperation between secondary school teachers and students which has defined three mail directions of pupils' research activities:

✓Wide-ranging – the investigation of the local ecosystems;

✓Local – detecting of the physiological properties of different plants and bio indication of the nearest streets;

✓Practical –investigation of the school yard plants and determination of the students' health level as so as an influence of computer games at the young children constitution.

100% Great!

The purpose of my work as Biology teacher is motivate secondary school students to learn Biology and develop their cognitive interest to learn that subject, stimulate the feelings of success and create favourable conditions (together with parents) for students' self-fulfilment in future and the correct choice of their future carrier.

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„Feel the leverage power!“

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Heidrun Boll, Schülerforschungszentrum Südwürttemberg (SFZ®), (Student Research Center), Bad Saulgau, Germany

Strong as a bear through leverage

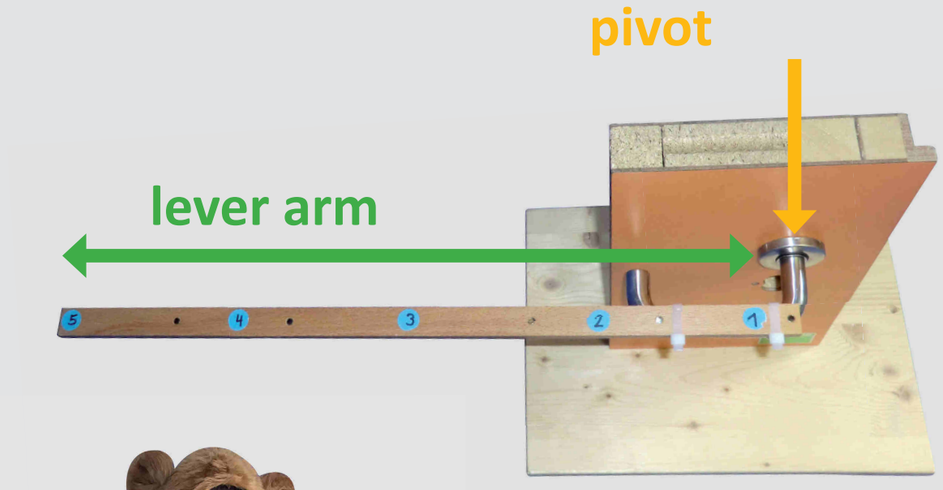
General science, physics, mathematics

Task: Open the door!

1. Get a feel for the problem!

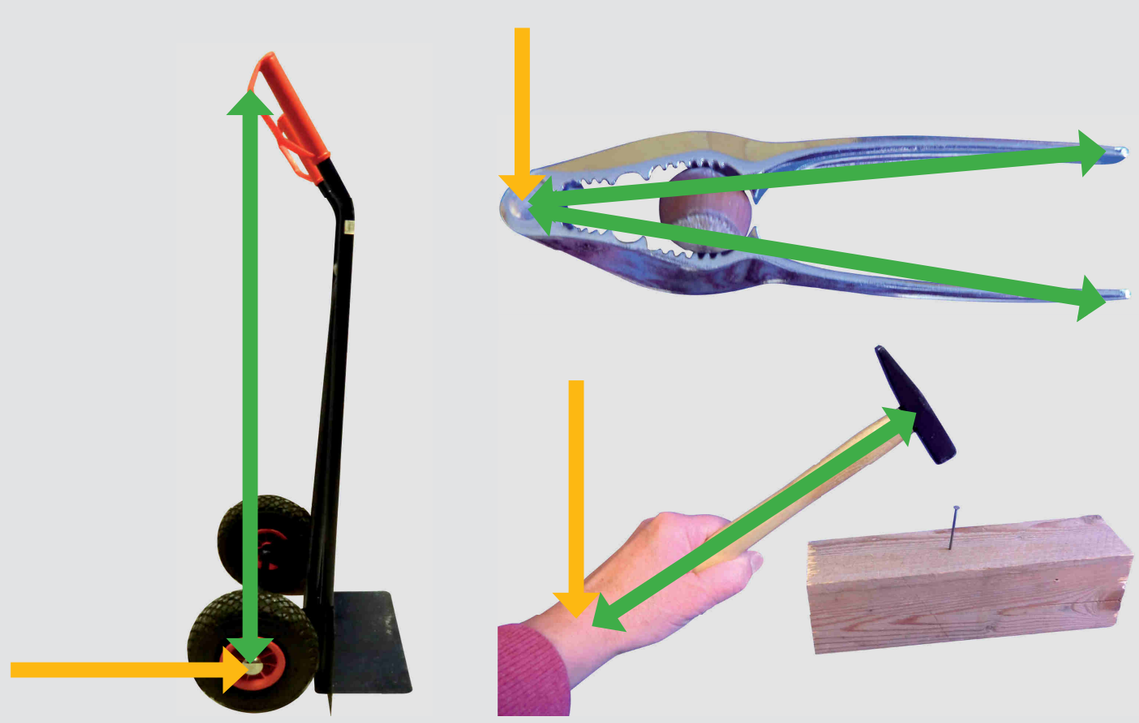
2. Look for a solution, designate, implement!

3. Grasp the lever principle!



The longer the lever arm is, **the less** strength I need!

4. Find the lever arm and the pivot in the various tools!



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Carlos Rodrigo Quirós | Colegio Ábaco | Madrid | Spain

Robotics, programming & 3D design.

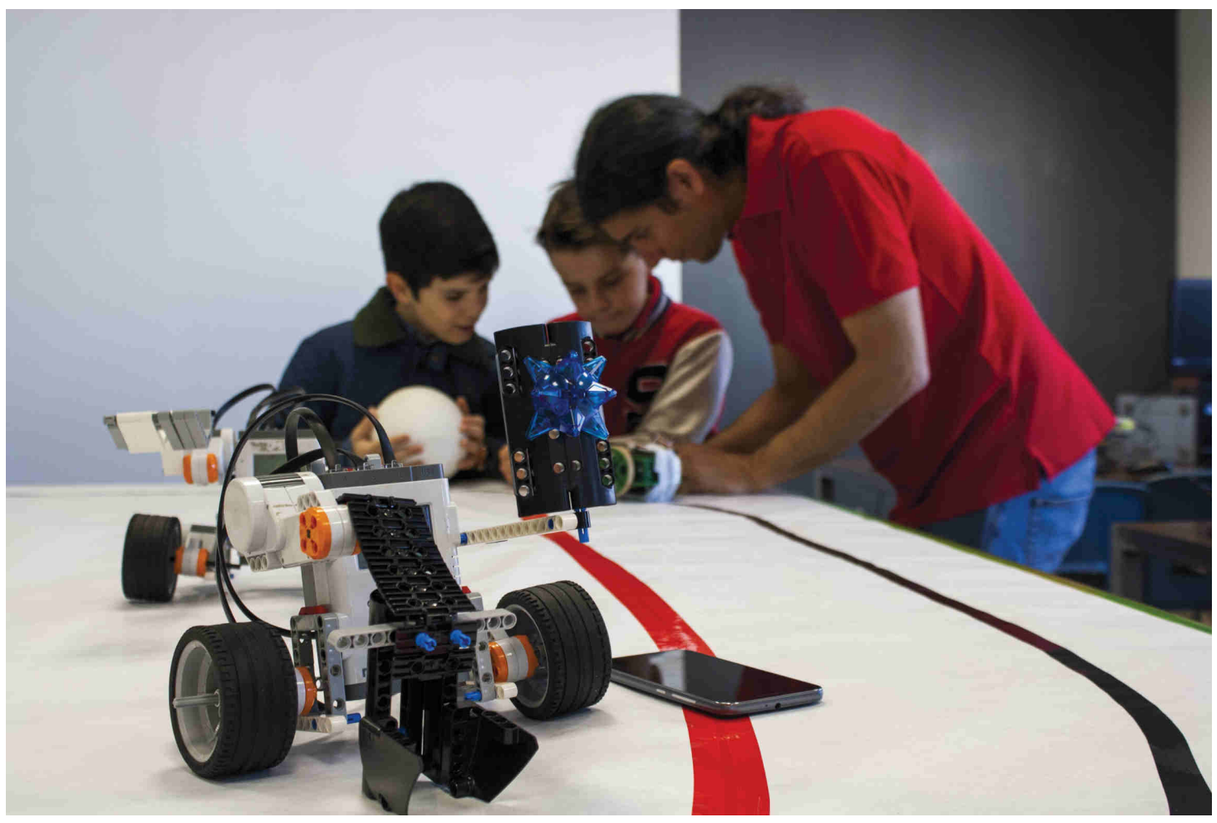
Our new subject for Primary Education

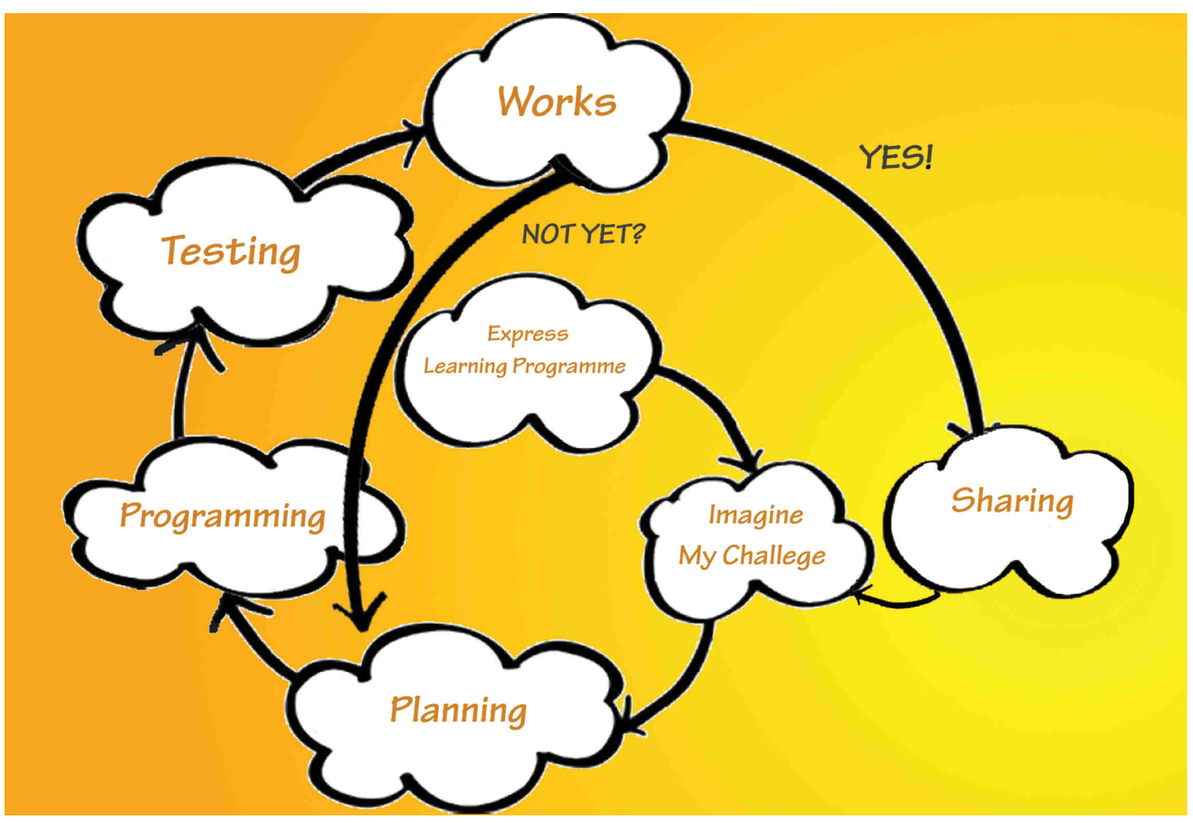
This is our own subject for students from 4th to 6th Primary grades (9-12 years old).

The main aim is not just learning how to program but using programs, robots and 3D objects as tools to develope their own projects.

This means connecting technology with many different knowledge areas: maths, music, language, science,…

We use a “challenge learning system” so that students receive an express learning program the first term and then they decide and accomplish their own projects planning, programming as well as testing the projects while working in groups.





100% Great!

Learning robotics, programming and 3D design as tools to solve students’ project development many of the basic skills and competences they will need for 21st century.

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Carole Kenrick | Gillespie Primary School | London | United Kingdom

The Manuka Honey Project

A double-blind controlled trial led by children aged 7 - 11

As the Scientist in Residence at Gillespie Primary School, my role is to teach the children about science and its processes - how scientists "do" science. I usually take children's own questions as a starting point, guiding and structuring their investigations and inquiry.

When a parent asked a seemingly simple question about honey, I was surprised to find that even Google couldn't answer it! The parent wanted to know whether eating Manuka honey (a type of honey produced by bees that forage from the Manuka plant in New Zealand) could prevent or cure colds, but no-one had ever tested this before.

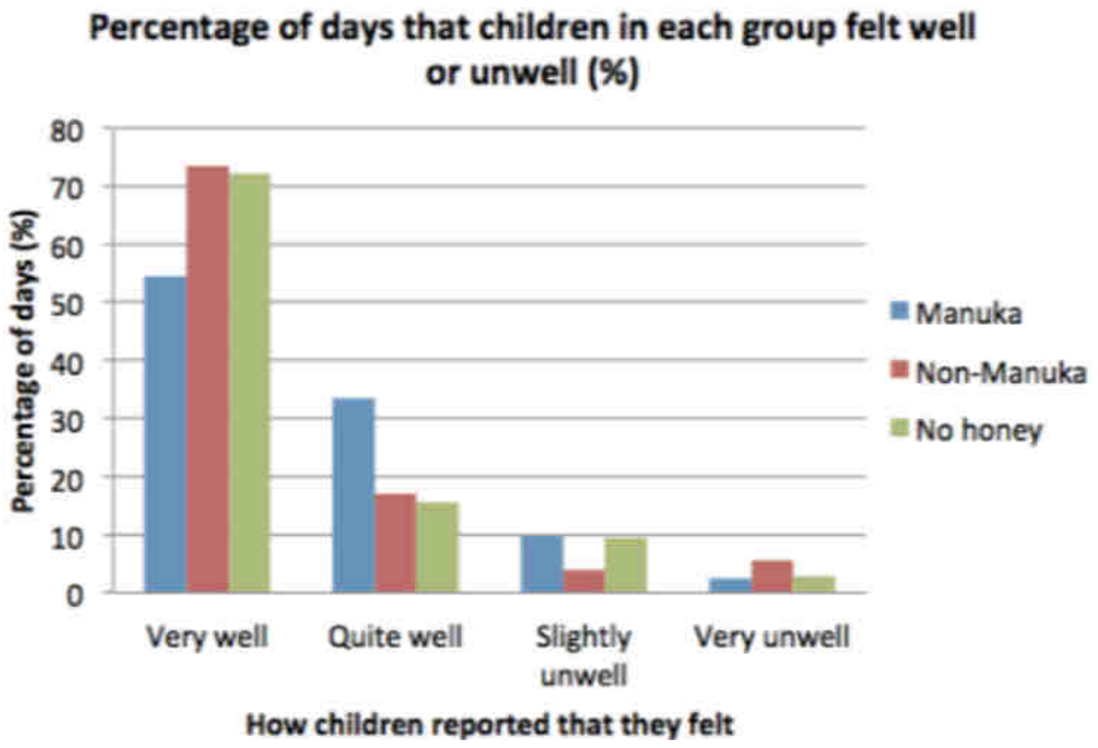

Fig. 1 The children's data, comparing how often the participants felt well or not according to whether they ate Manuka honey, non-Manuka honey or no honey for ten weeks.

So began a year-long journey, during which a team of children aged seven to eleven - nicknamed the "Beesearchers" - devised and carried out a double-blind controlled trial to answer a hitherto unanswered question.

Along the way they learnt a great deal that was subject-specific: about medical ethics, protocols, the placebo effect, and peer review. But they also developed a range of transferable skills: team work, leadership, project management, data analysis and communication. In short, they learnt through experience what it is like to be a scientist.

When communicating their findings with the rest of the school, family members, visitors and even the media, the Beesearchers talked of themselves as scientists. They still do even now – they have developed a science identity.

Children can be scientists too!

Giving children ownership over authentic scientific research projects makes them think of themselves as scientists.