ICT in Science Education

SCIENCE ON STAGE 2017 DEBRECEN

THE EUROPEAN NETWORK FOR SCIENCE TEACHERS

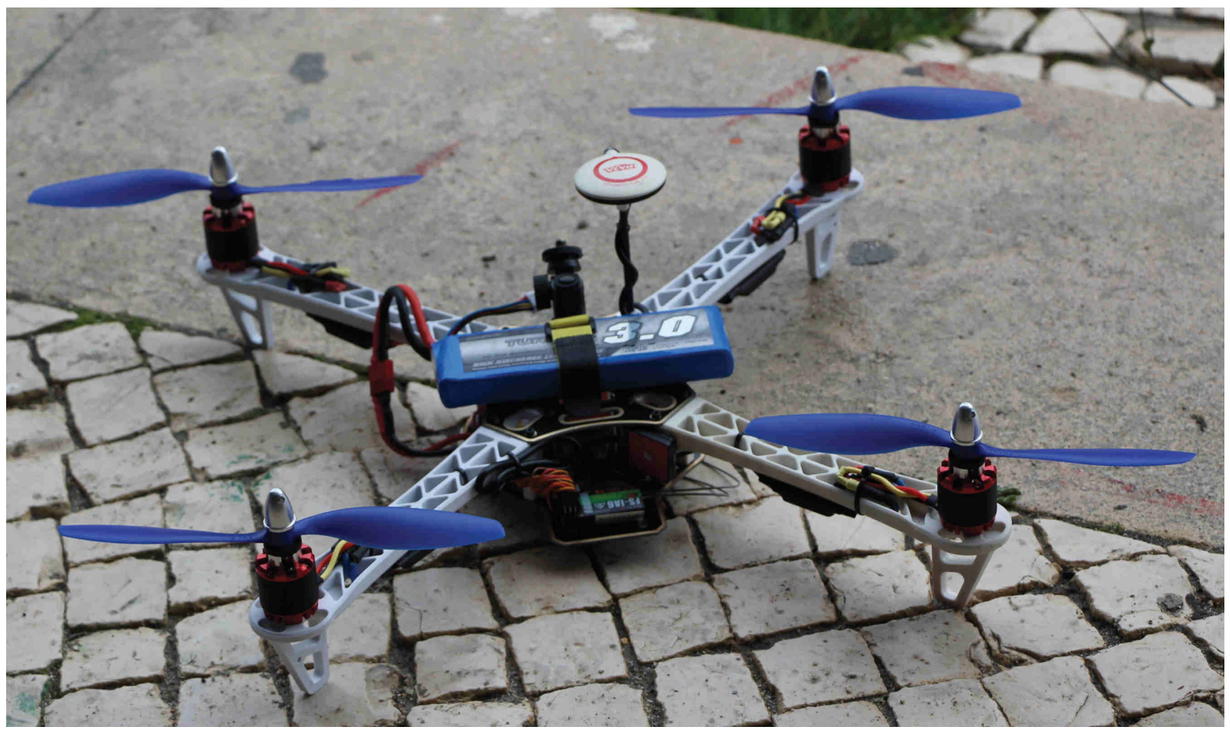
Nelson Correia | A.E. Gil Paes | Torres Novas | Portugal

DroneSensor

NUCLIO

Núcleo Interactivo de Astronomia

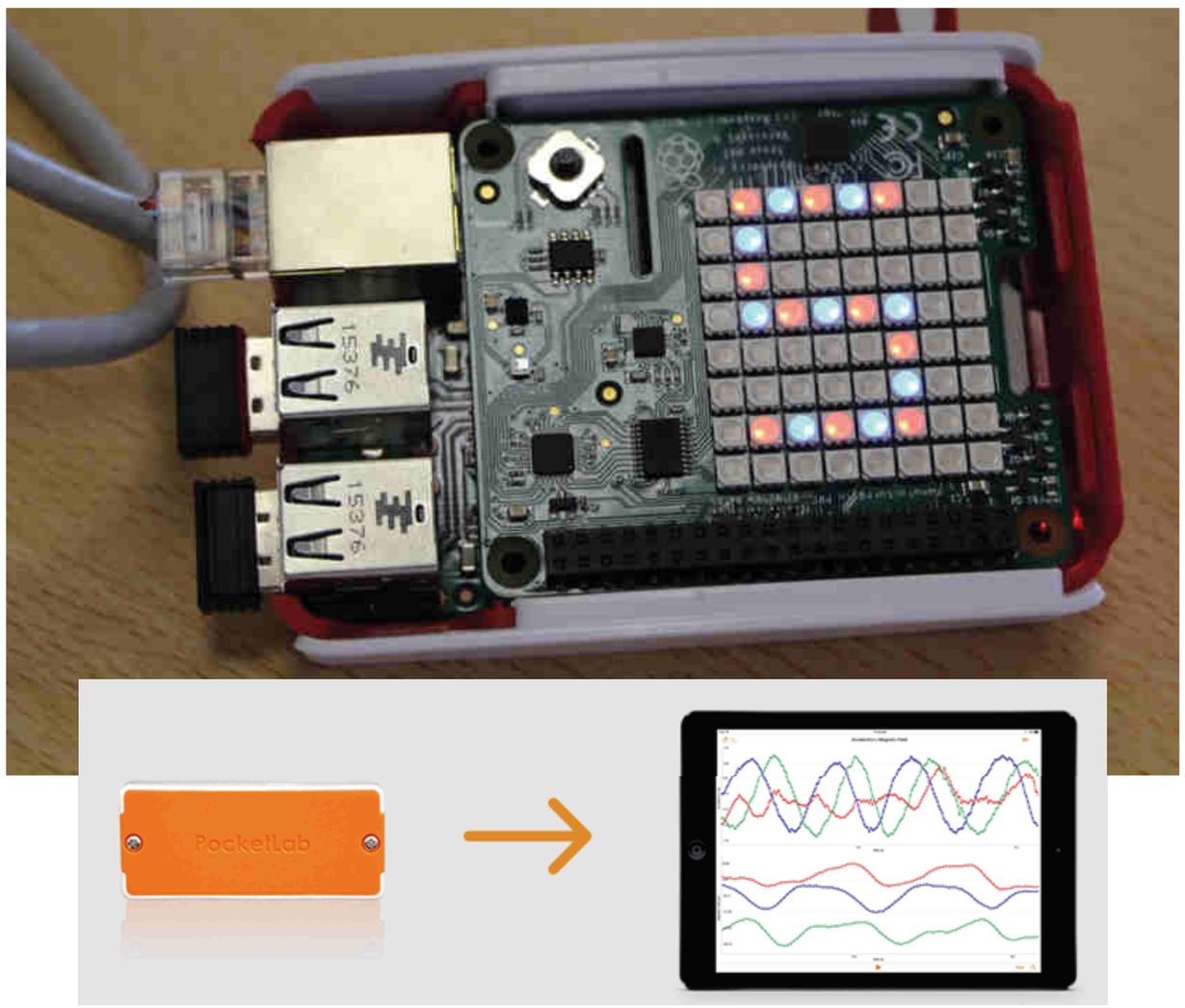
Build and control a drone F450



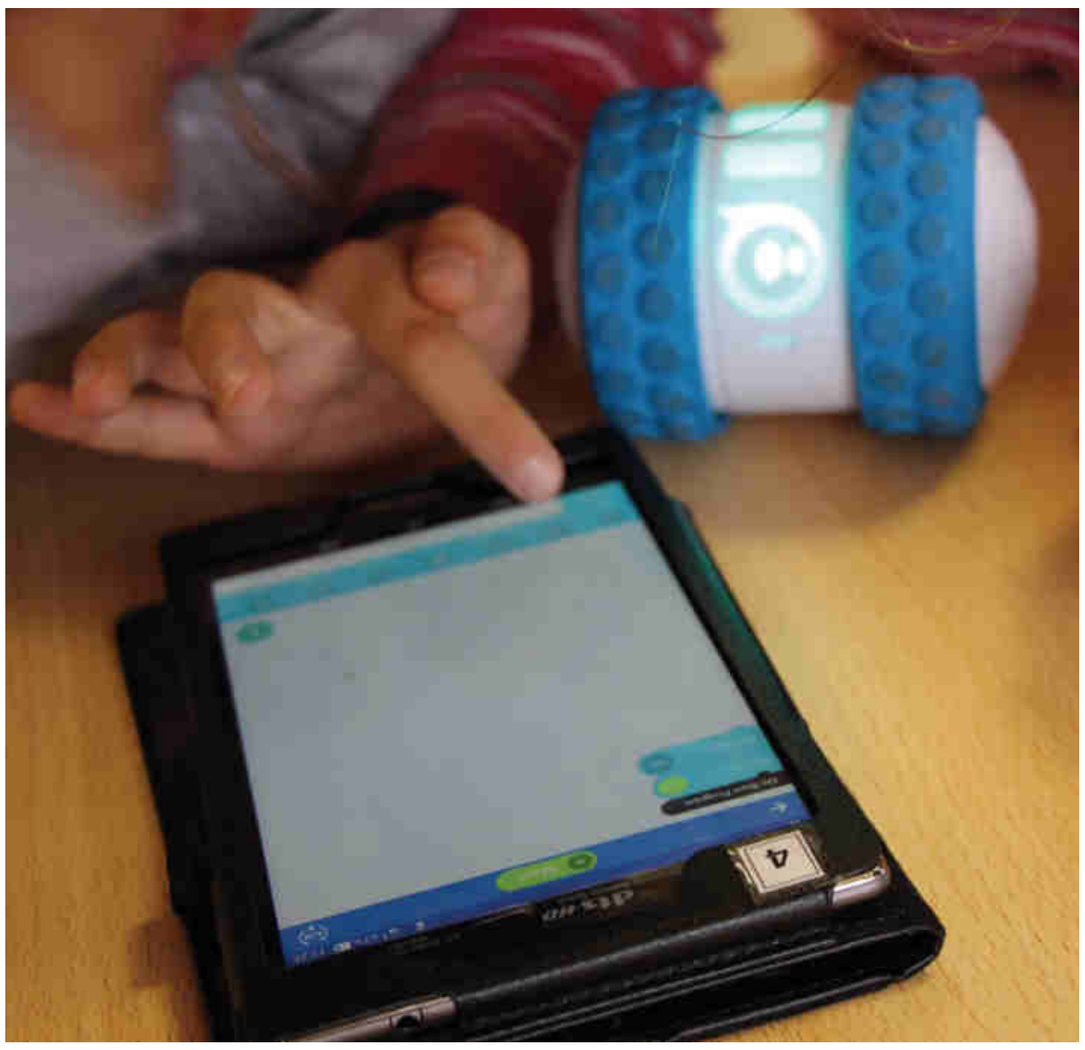
Program the Parrot minidrone with Tynker

Program the Raspberry Astro Pi with Python

Measure data with Astro Pi and PocketLab sensors



Program Ollie with Sphero Edu



Code & measure!

Learn physics, coding and robotics with fun!
Code, fly, drive and measure data!

ICT in Science Education

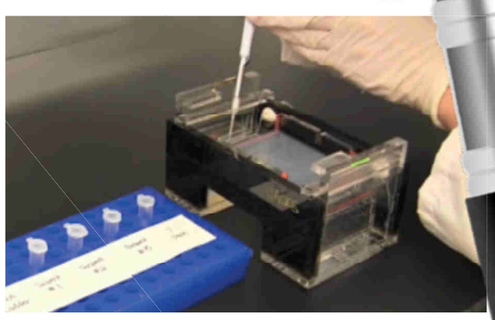
Sabina Maraffi | Immacolata Ercolino| University of Camerino | Italy

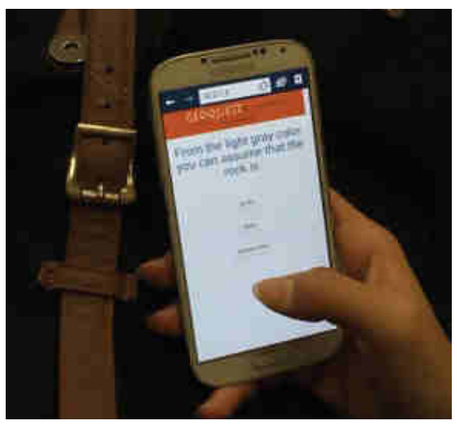
Who killed Maya Foster? A CLIL CrimeQuest

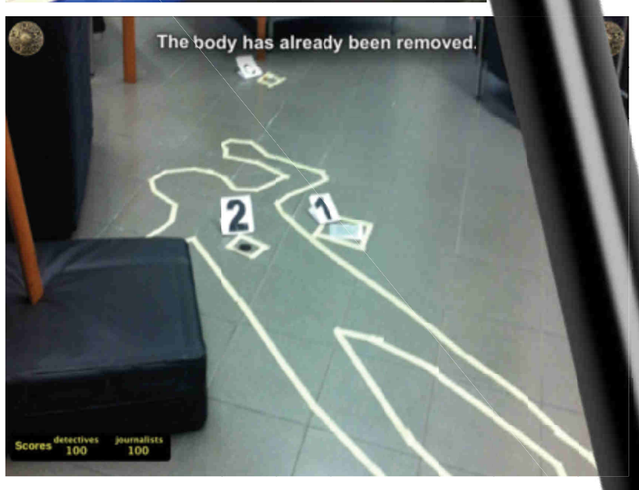
Interactive Computer Class Role Playing Game.

We'll bring all the participants on a virtual crime scene in a lab.
The students must solve forensic logic problems and they will be involved in many hands-on activities with poor materials: DNA profiling, digital finger printing, hair comparison, analysis of sticky soil on killer's shoes and Luminol test on the crime scene.

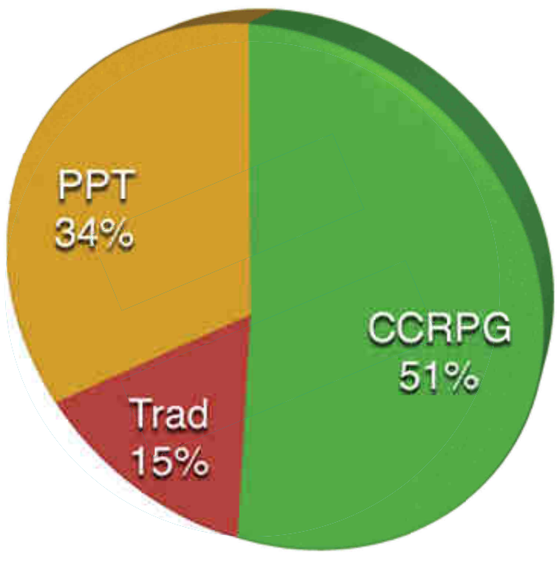
CrimeQuest is a digital role playing game (CCRPG) designed for *Learning on Gaming*, "learn while you play".







In pie diagram: students' approval of three different teaching methodologies: Computer Class Role Playing Game (CCRPG), PowerPoint supported lesson and traditional (frontal) lesson.



Players interact with game software through their own smartphones, tablets, or laptops. CrimeQuest improves students' learning and skills, motivates teachers and renews teaching methodologies.

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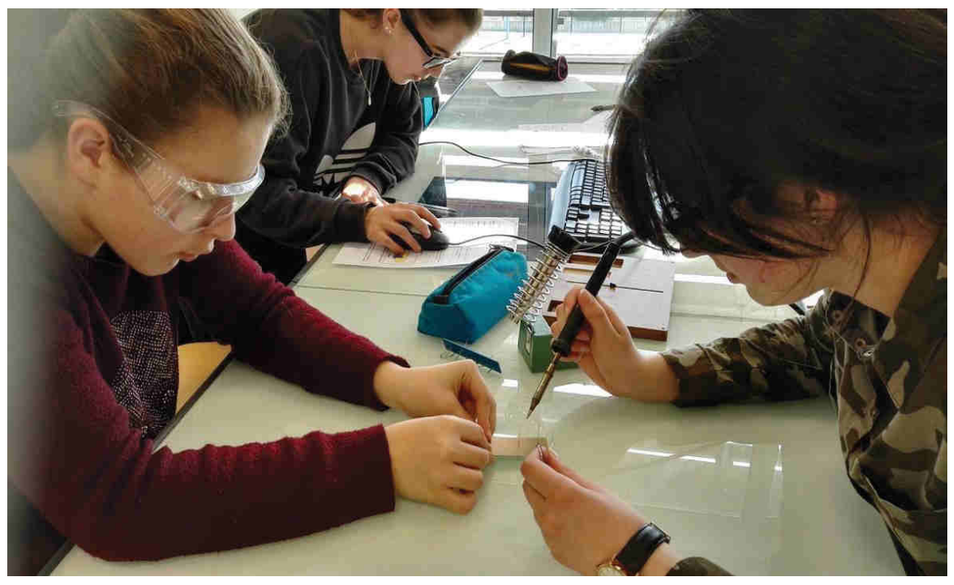
Anne-Laure BALAC; Nelly FARE; Carine VINSOT | LycéeLucie Aubrac | Bollène | FRANCE

Let's avoid food deficiencies by using the invention : « Test and Taste »

The pupils, guided by three teachers, created a model to avoid dietary deficiency thanks to electronics, infrared rays, and removable perforated cards. Those cards correspond to recipes and are divided into three categories: starters, main courses, and desserts...
Come and meet us, we'll show you the steps of our invention and beside we'll show you various activities to do at school with pupils from different ages.

⇨With younger pupils you'll be able to:
- make experiments on milk
- work on the food pyramid
- understand the link between dietary deficiency and diseases
- and create perforated cards (=recipes)

⇨With older pupils you'll be able to:
-study the spectra of the visible light including the infrared wave…
-code information in binary
- and make a little of combinatorial logic.



Imagine your pupils manipulating test tubes, making experiments and drawing conclusions. Imagine them welding electronic circuits, creating punch cards, and understanding how the electronic world works.

TEST and TASTE

What about pressing a button and discovering what is lacking in your menu for dinner?

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T. Balogh, A. Mikulan| Mathematics Connects Association| Debrecen| Hungary

Smart Trails in Education

Enjoy Science Outdoors!

Nature trails with explanatory boards are very popular in several countries. As ICT develops rapidly, it has become possible to introduce a new generation of nature trails: besides the info-boards, a smart phone application is built that provides not only steady information for the users (i.e. students, school groups etc.), but also problems to be solved and to be evaluated rapidly.

The trails could be set up even in school yards or buildings, serving as a new practice field for all kinds of school material. With this new idea, students‘ cooperative skills could develop, while being encouraged to do physical activity and use their smart phones in a useful and joyful activity.

Cooperation + Physical activity + Smart devices

Joyful learning out of the classroom

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César Marques| Escola Profissional de Almada | Almada | Portugal

Atmospheric Pressure with Arduino

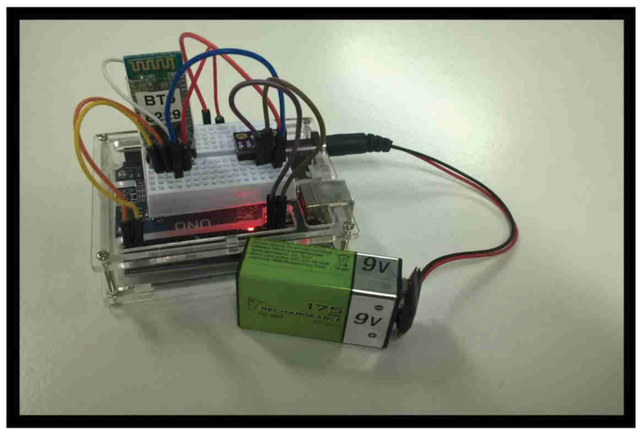
NUCLIO Núcleo Interactivo de Astronomia

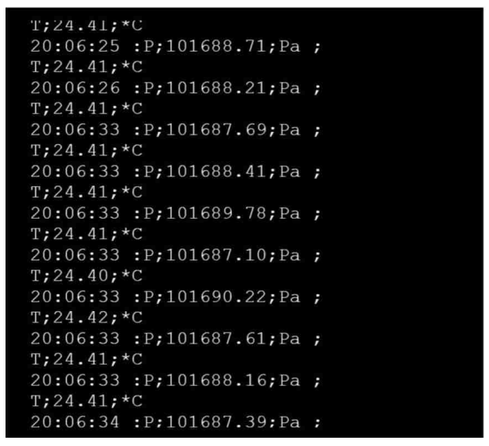
GO-LAB GLOBAL ONLINE SCIENCE LABS INQUIRY LEARNING AT SCHOOL

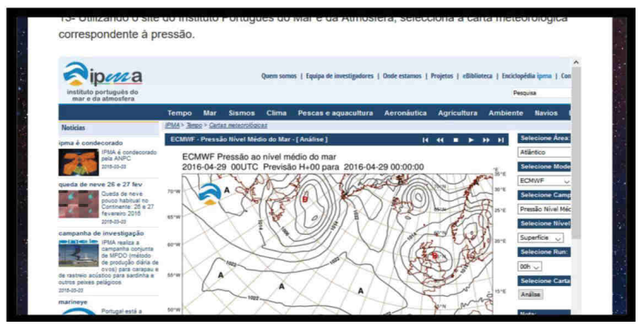
epa Escola Profissional de Almada

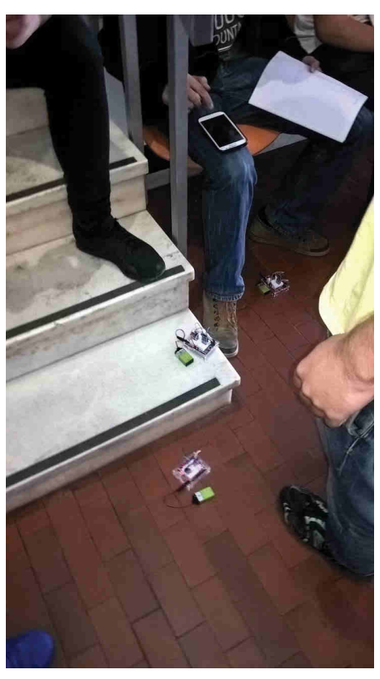
25 ANOS

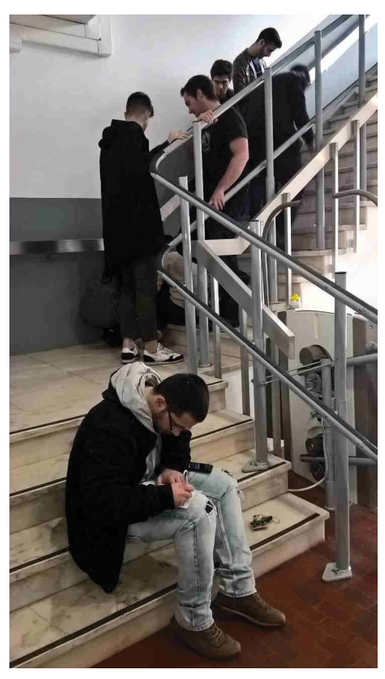
Using an Arduino and an air pressure sensor, students can discover the Fundamental Law of Hydrostatics. Using an Inquiry Learning Scenario on Go-Lab, they begin with the discovery of the constant “ρxg”, on the school stairs. After that, they use that discovery to measure height on the streets of Almada. They compare that measurement with the information on Google Maps about that place height. At the end, students examine local meteorological maps to discover the meaning of the letters “H” and “L”.

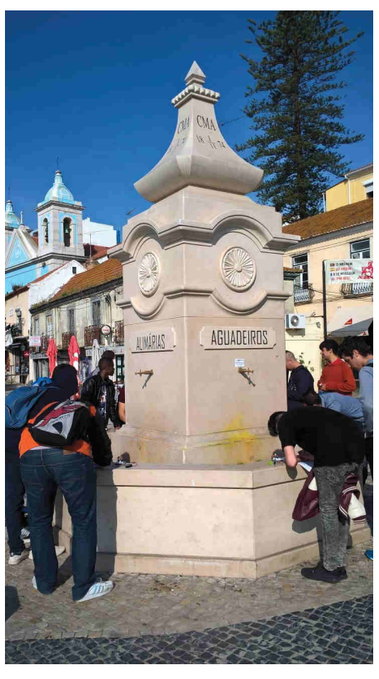












100% REAL!

Conclusion: we use non-expensive technology to discover the variation of pressure with height and the Fundamental Law of Hydrostatics, in the REAL world!

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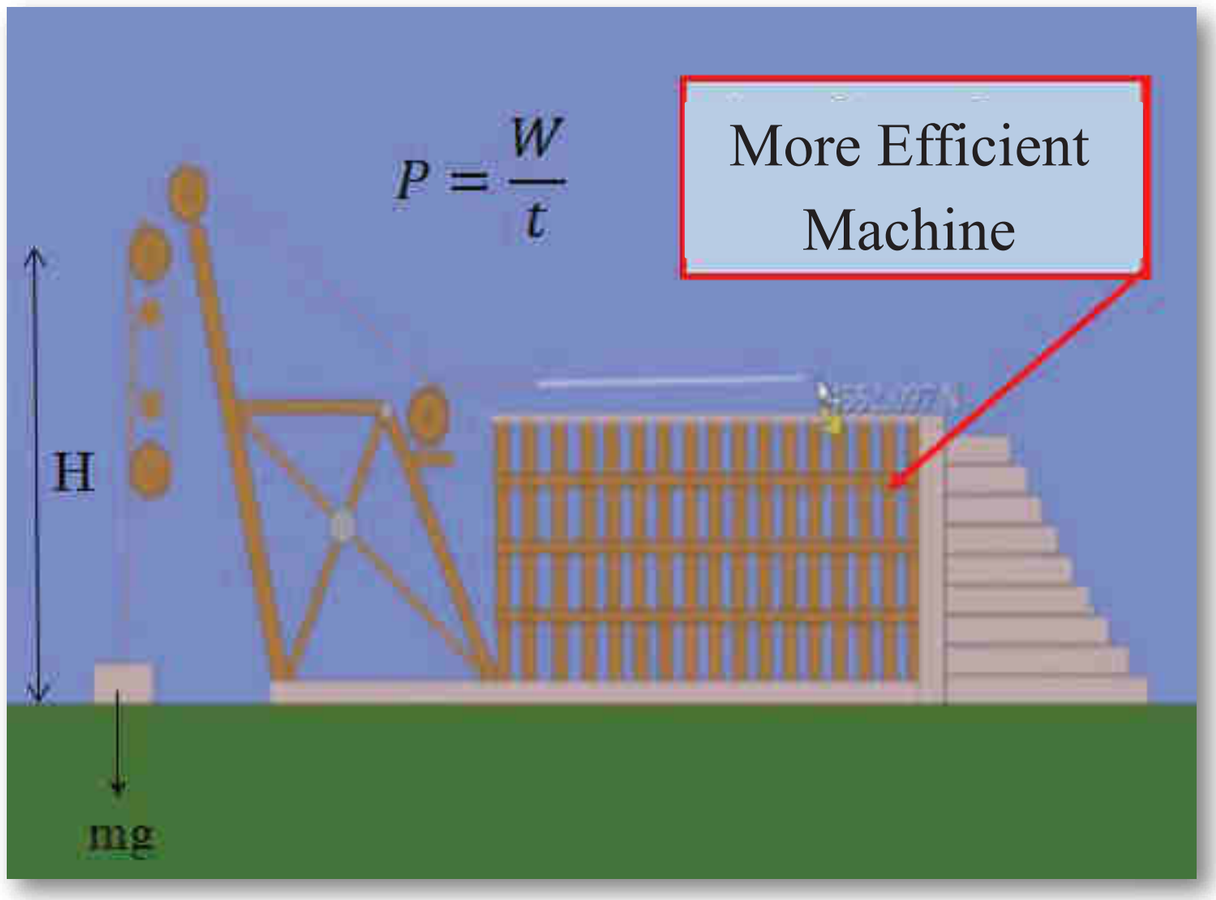
Christina Aristodimou | High School of Saint Peter and Paul | Limassol | CYPRUS

Technology meets Science in ancient Greece

Use of Electronic Games

Algodoo ➡ Understanding and creating a machine to lift stones for the construction of the Cyclopean Walls.

Minecraft ➡ Construction of the Mycenaean Palace which is surrounded by the Cyclopean Walls

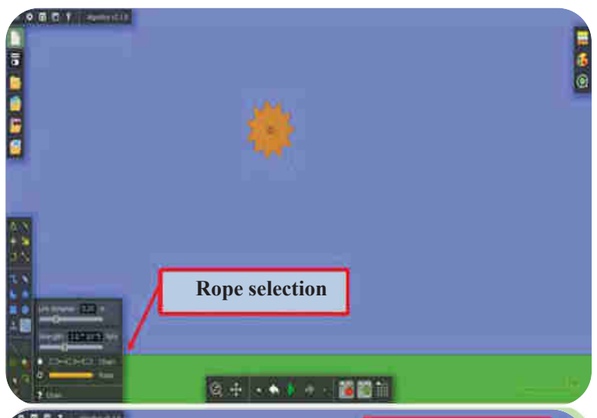


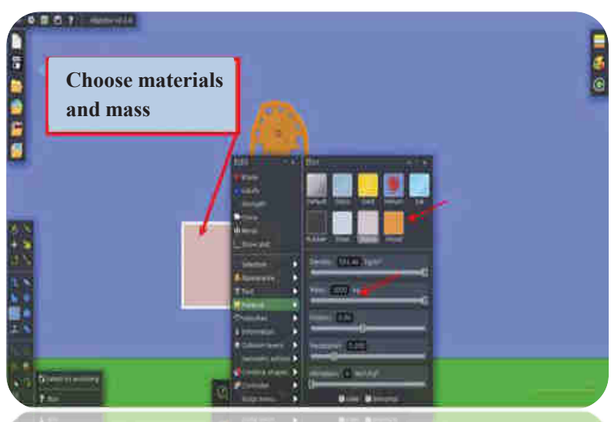
Activities

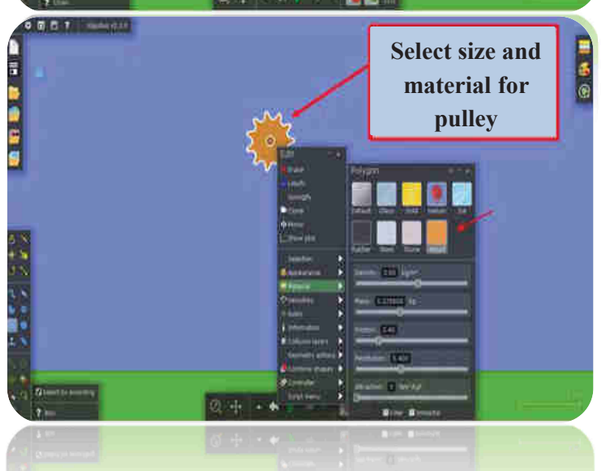
Technology Use ➡ Use Algodoo Electronic Game

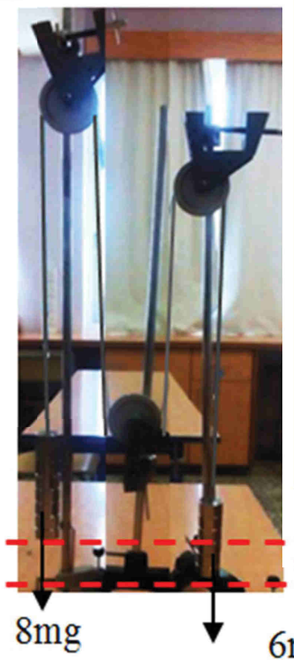
Building Knowledge ➡ Use of knowledge and online gaming to complete their goals

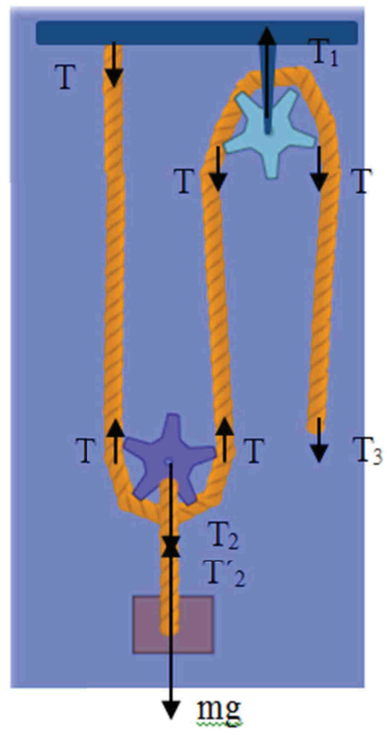
Collaboration ➡ 5 groups of 3 students each











Learning results

Cooperation ➡ Discussion ➡ Organizing ➡ Interaction and feedback ➡ Strategy review ➡ Exploiting knowledge to build an efficient machine

100% Great!

- ✓ Cooperation between students
- ✓ Healthy competition between teams
- ✓ Non-traditional way of teaching
- ✓ Developing creative learning

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Christina Astin | The King's School | Canterbury | UK

Young Scientists Journal

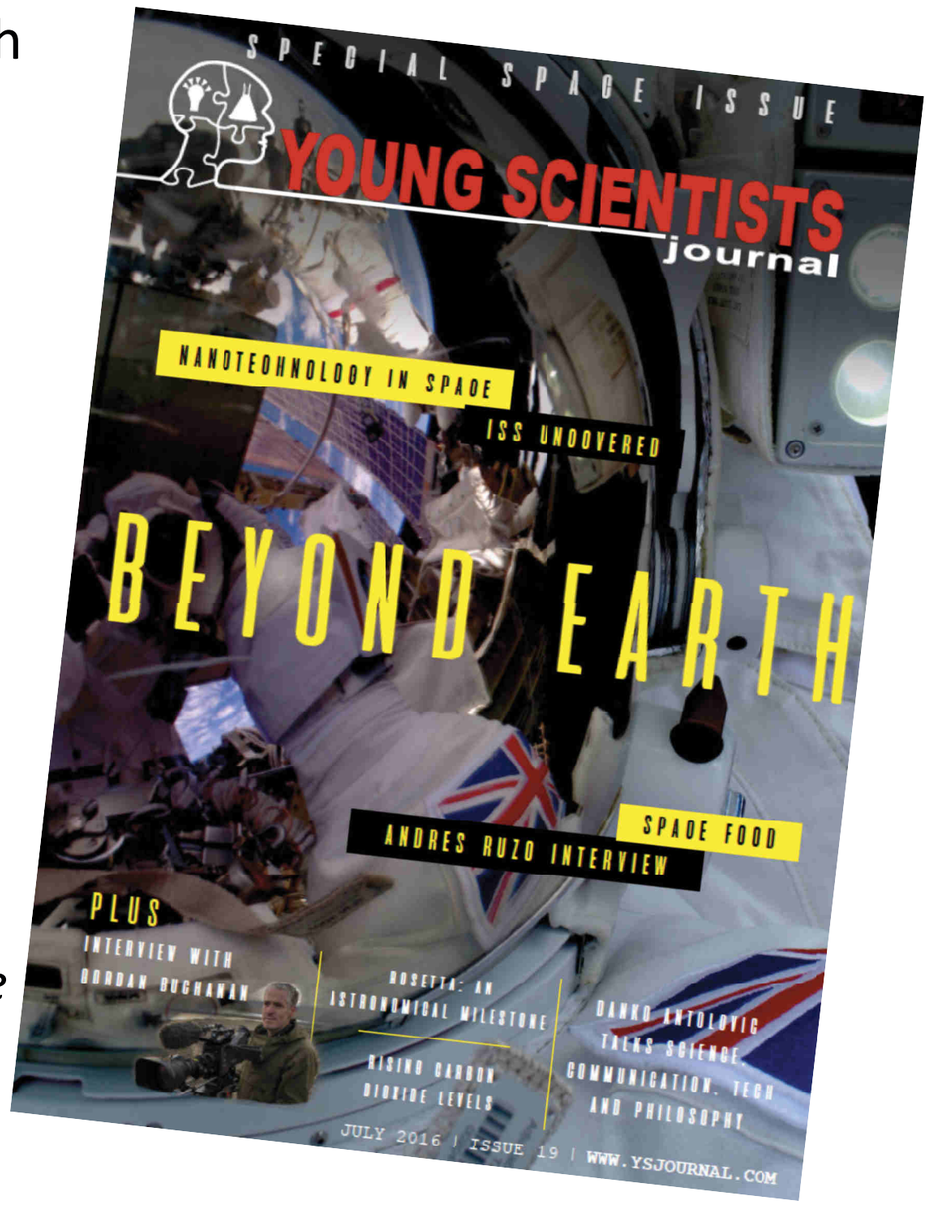
A global student-led online science journal: ysjournal.com

School students are carrying out ground-breaking research in schools and colleges across the world.
- But where can they publish their work?

Young Scientists Journal gives students aged 12 to 20 a unique opportunity to write, edit and produce an authentic science journal.

Students' science research deserves a wider audience, and writing for publication develops valuable skills.
Being part of the YSJ team helps students learn about peer review, editing, referencing, web design, marketing and publishing.

Student team members say: *"YSJ gave me a fantastic opportunity to get involved in science outside the classroom. The confidence I gained has given me a real boost now I am at university."*
"I love being part of an international team, talking to authors in different time zones, working to deadlines."
"My school science project has been read by over 25,000 people – how cool is that?!"



Young Scientists Journal in numbers

- **19 issues since 2006**
- **1000s of authors & editors from > 45 countries launched into STEM degrees & careers**
- **30,000 online visitors each year**
- **3 international conferences**
- **50 adult ambassadors & mentors**

@ysjournal

Conclusion: Give your students the opportunity to **publish** their science research, carry out **peer review** of others' work and run a **real** science journal – to develop unique sci-comm skills before university.

Why not set up a Young Scientists Journal hub in your school? Your students can join our Production, Marketing, Outreach & Editorial teams locally, but feel part of our global team!

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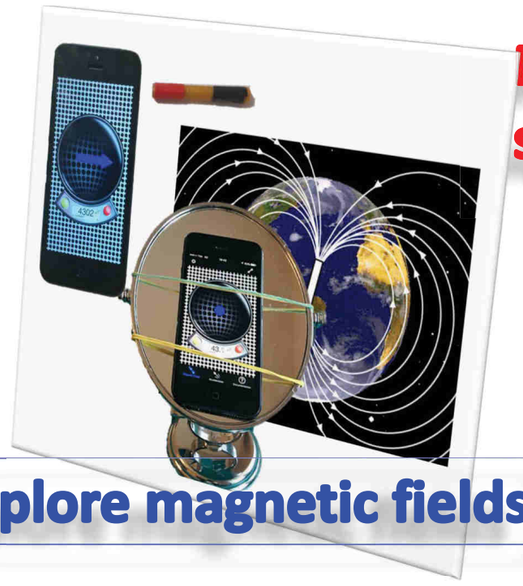
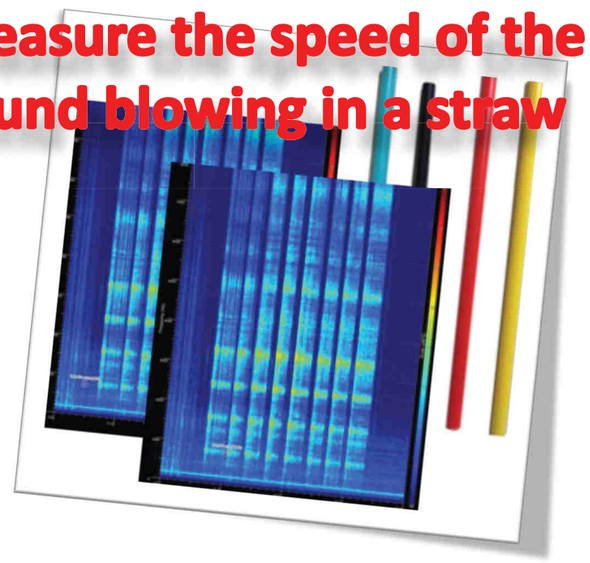
Alessandro Foschi | High school „Fulcieri Paulucci di Calboli“ | Forlì | Italy
Contact information: alessandrofoschi161@gmail.com

Science Smart Kit Project

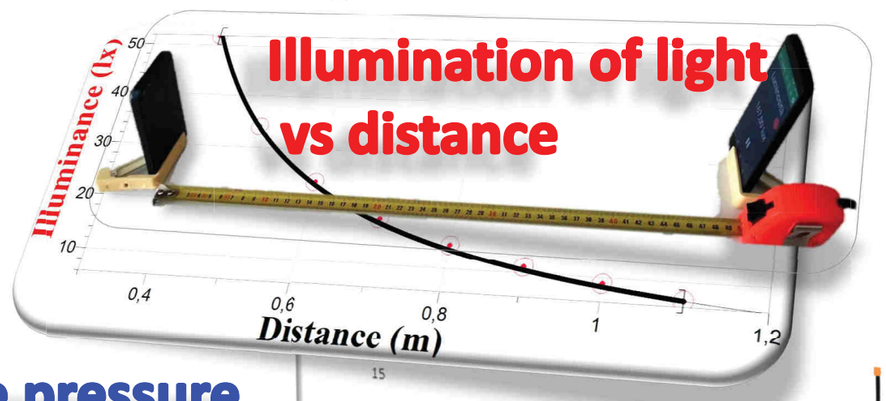
A set of laboratory activities for physics, mathematics, science and chemistry to be used with tablets and smartphones

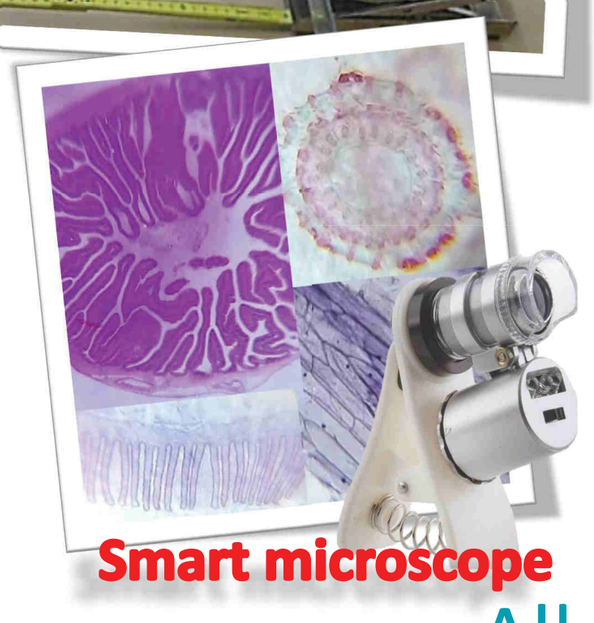
The project consists of the construction of a "poor" laboratory with "rich" means: these are smartphones or tablets that now all the students have, while the "poor" laboratory is made up of the kit tools that allow you to transform devices purposes into scientific research tools.

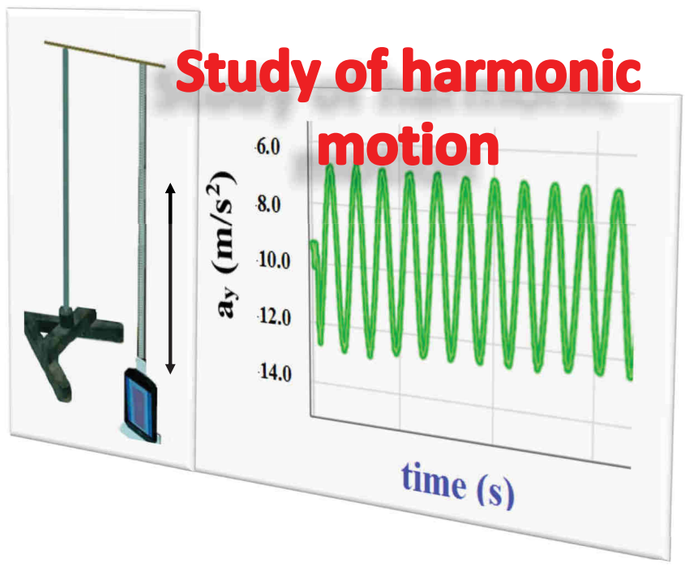


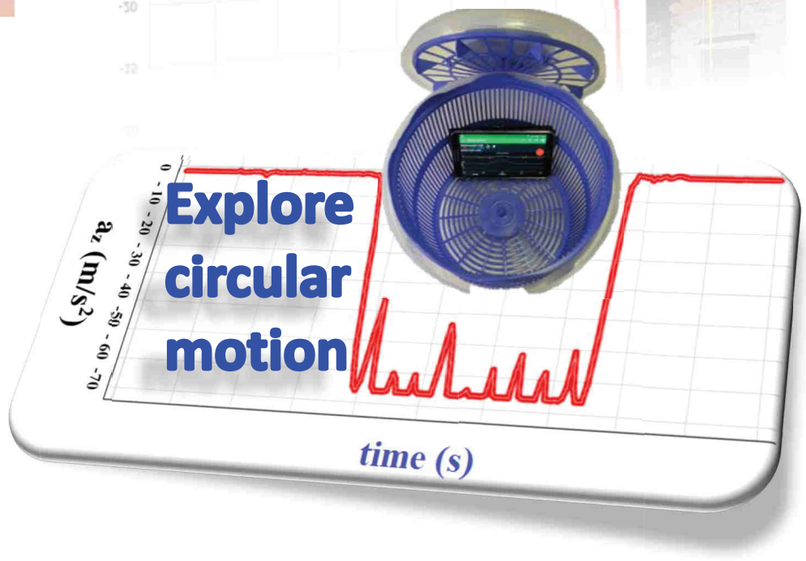


With **"Science Smart Kit"** students perform experiments in mechanics, acoustics, optics, chemistry, etc. They carry out measurements, analysis, modeling, and make charts using these devices which become "personal instruments", or "pocket laboratories".









All this can encourage greater active involvement of students in the Physics, Science, Mathematics laboratories, and thus a development of critical and analytical skills, discovering new ways of using mobile devices.

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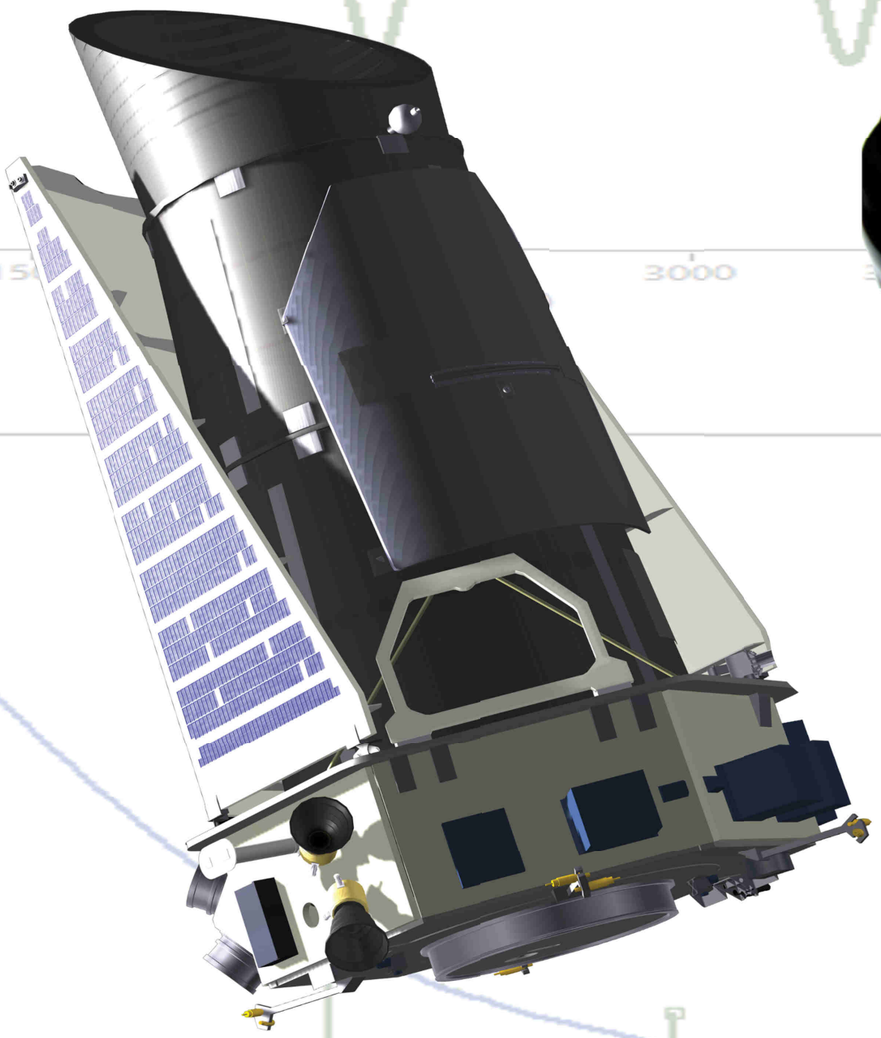
Csaba Fraller | Bibó Grammar School | Hévíz | Hungary

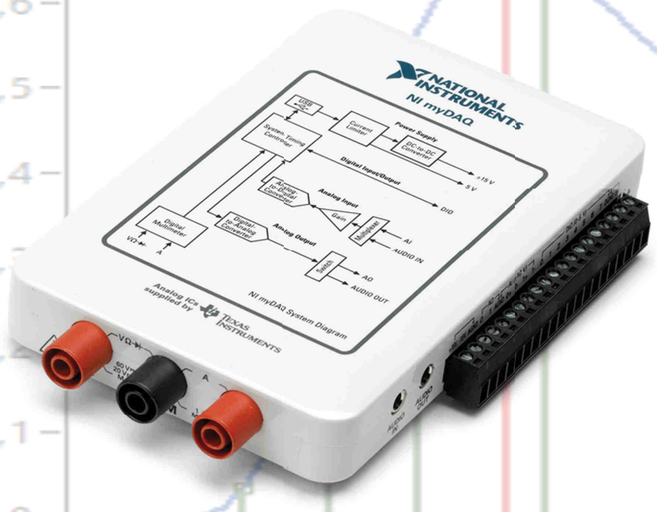
Cosmos on Stage

Measurements Inspired by the Kepler Project

"The exploration of the Cosmos is a voyage of self-discovery." /Carl Sagan/

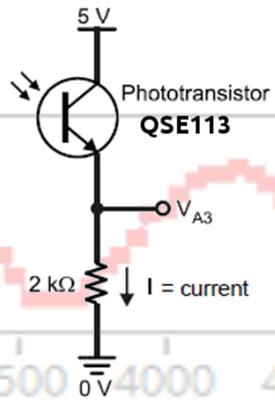
Children are interested in modern science. My primary purpose with this participation is to demonstrate that it is possible to study the recent results of the natural sciences in an interactive way (especially physics and astronomy) in our classes.





These years the Kepler space telescope is the most effective device to discover planets out of our solar system. It uses such methods, which are understandable for an average high school student.

I have tried to model three of these current methods to bring science closer to them, to place stars and planets onto the stage.



- **Studying exoplanet transit method, measuring orbital period**
- **Measuring stellar temperature by analyzing spectrum and using Planck's law /acoustical model/**
- **Measuring orbital period of exoplanet by the radial velocity method /acoustical model based on Doppler effect/**

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Csilla Képes|BGSZC Pestszentlőrinc Secondary School of Economics and Informatics | Budapest | Hungary

Bring Your Own Device (BYOD)

The aim of the project is to motivate students to *use* their **devices as educational tools**. I am going to show you a large number of possibilities to work with electronic devices and apps. By expanding our learning methods, we can provide an opportunity to use devices, which is a basic need for this generation. **I would like to present:**

- what kind of possibilities can be found in different applications, websites,
- how these devices can facilitate learning,
- what is the hidden opportunity of the AR during the educational process.

These programs can be personalised for any subject. They increase student participation, facilitate cooperation and communication between students.

100% Great!

Conclusion: These creative online activities increase interactivity, and help us CLOSE THE DIGITAL GAP.

Don’t BAN them, USE them well!