ICT in Science Education

SCIENCE ON STAGE 2017 DEBRECEN

THE EUROPEAN NETWORK FOR SCIENCE TEACHERS

Zsolt Béla Bárány | Endre Hőgyes Grammar School | Hajdúszoboszló | Hungary

Using Mobile Technology to Balance Chemical Reaction Equations

Quizlet

- creating flashcards and sets
- login as a teacher/student
- free (Pro version avaible for a fee)
- platform-independent
- any browser can be used
- mobile app is also avaible

App Store | Google Play

https://quizlet.com/_3gk6bj

Password: **sons**

Suggested period of time for students: 7-8 minutes

socrative

- online and offline tests
- login as a teacher/student
- free (Pro version avaible for a fee)
- platform-independent
- any browser can be used
- mobile app is also avaible

App Store | Google Play

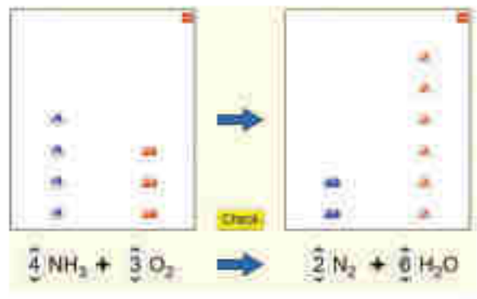
https://api.socrative.com/rc/hu88vm

Suggested period of time for students: 5 minutes

PhET INTERACTIVE SIMULATIONS

- free interactive science-related simulations
- HTML5-, flash- and Java-based
- no registration needed
- platform-independent
- HTML5 simulations works on any browser

http://bit.ly/1rwNCq4



Suggested period of time for students: 5-7 minutes

"I hear and I forget. I see and I remember. I do and I understand." (Confucius)

email:

website: www.bzsb.hu/rolam-en.html

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Petr Desenský, Pavel Saal | iQLANDIA Science Center | Liberec | Czech Republic

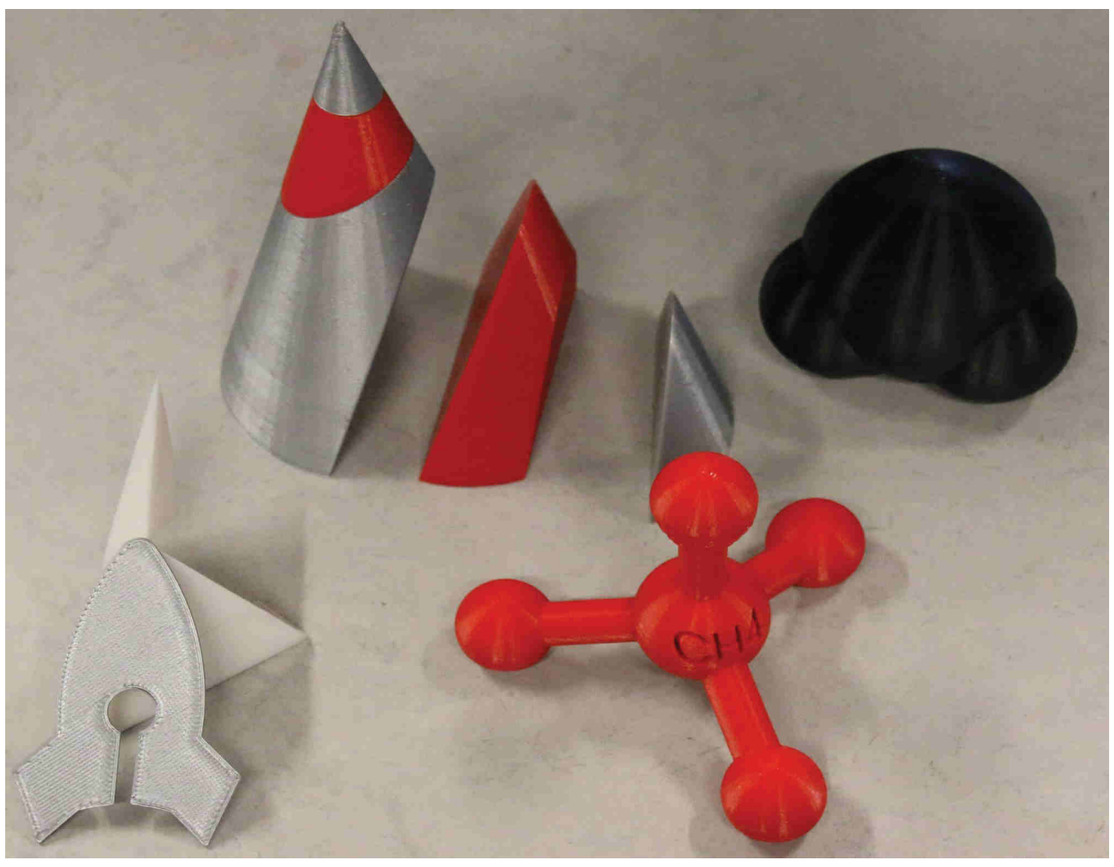
Using 3D printers and cellphones for science education

3D printers are usefull in school science education for making easily accessible, cheap and good quality learning aids.

- free models for biology, chemistry, physics, mathematics, engineering principles, etc.,
- sets of aids for the whole class for minimal cost.

You can design your own model with students!

3D objects modelling cultivates spatial intelligence and proficiency in geometry.



Smartphones can be used to construct a simple, but usefull physics devices.

- microscope - for studying the principles behind optical microscope, surface of various materials, and biological samples.
- hologram projection from smartphones display
- film projector – basic principles of a convex lens image display

iQLANDIA has:
- interactive exhibits and planetarium
- modern LABs for educational programs
- 100,000 school students in our programs.
- everything in English, German and Polish

iQLANDIA
SCIENCE CENTER LIBEREC

iQLANDIA science center focuses on modern trends in STEM education! www.iQlandia.cz

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Lars Pelz, Michael Abend | iMINT Akademie | Berlin | Germany

How to Get Your Pulse on Your Smartphone

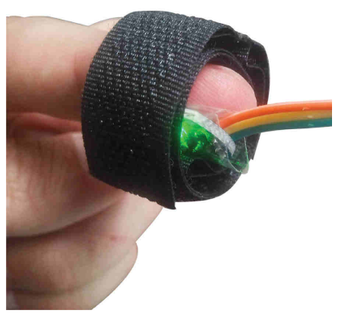
This teaching project contains materials that enable students to build a heart rate monitor.

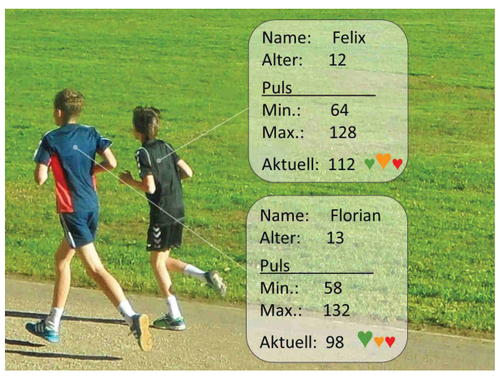
Hardware used:
- Arduino microcontroller
- optical analogue pulse sensor

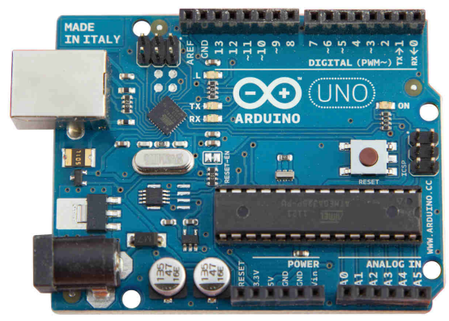
Materials were created with these goals in mind:
- encourage self-organised learning
- facilitate language learning in engineering
- include students with special edcuational needs
- create open educational resources (Creative Commons)

Common computer science principles are covered:
- IPO principle (input, processing, output)
- digitisation of an analogue sensor signal
- real time peak detection in a sample stream
- frequency estimate calculation

Didactic principles used:
- building instructions using pictures for each step
- source code puzzle
- observation tasks for each experiment
- personal learning diary to record progress







reference subject: biology
interdisciplinary knowledge

- How does the human blood circulation work?
- What determines the pulse frequency?
- How is the heart rate related to health and fitness?

physiology

reference subject: physics
interdisciplinary knowledge

- How does the pulse sensor work?
- Which physical parameter is measured?
- What creates the voltage variation?
- What parts make up the circuit?

technology

information technology
integration of engineering knowledge

- How to convert the analogue signal to a digital value?
- How to estimate the heart rate?
- How to display the heart rate to the user?
- How to compile a fitness report from the data?

possible applications
integration of engineering knowledge

competitive sports
- training supervision and evaluation
- need precise measurement

free time activities
- training feedback
- privacy and personal data

health support
- therapy enhancement
- emergency detection

The biologic context „blood circulation“ can be covered in-depth by materials created by the Fachset Biologie (only available in German).
All materials are published as open educational resources (Creative Commons license). The hardware and software used are fully open-source (Arduino, pulse sensor, etc.)

Senatsverwaltung für Bildung, Jugend und Familie
be Berlin

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teaching materials created by:
Michael Abend, Matthias Gauger, Peter Dederer, Lars Pelz

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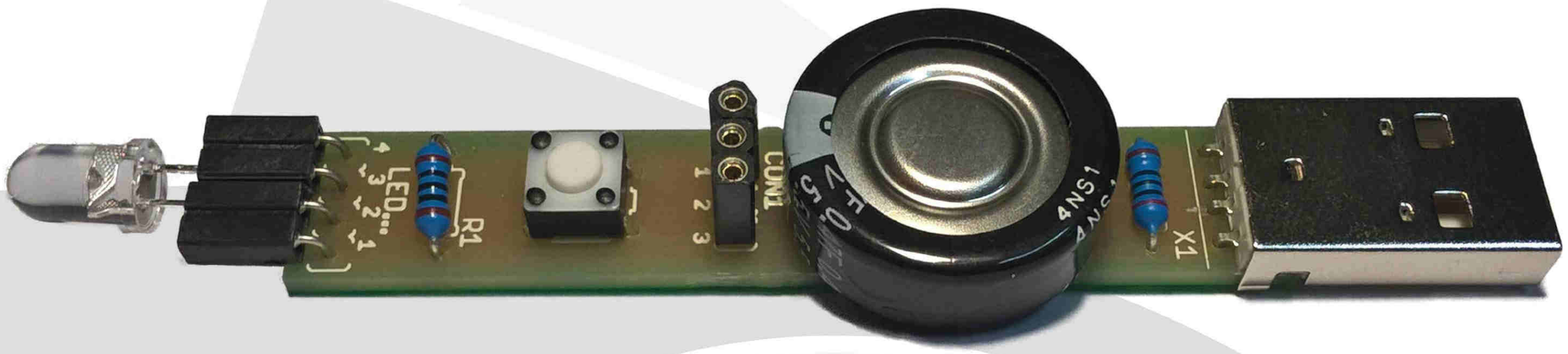
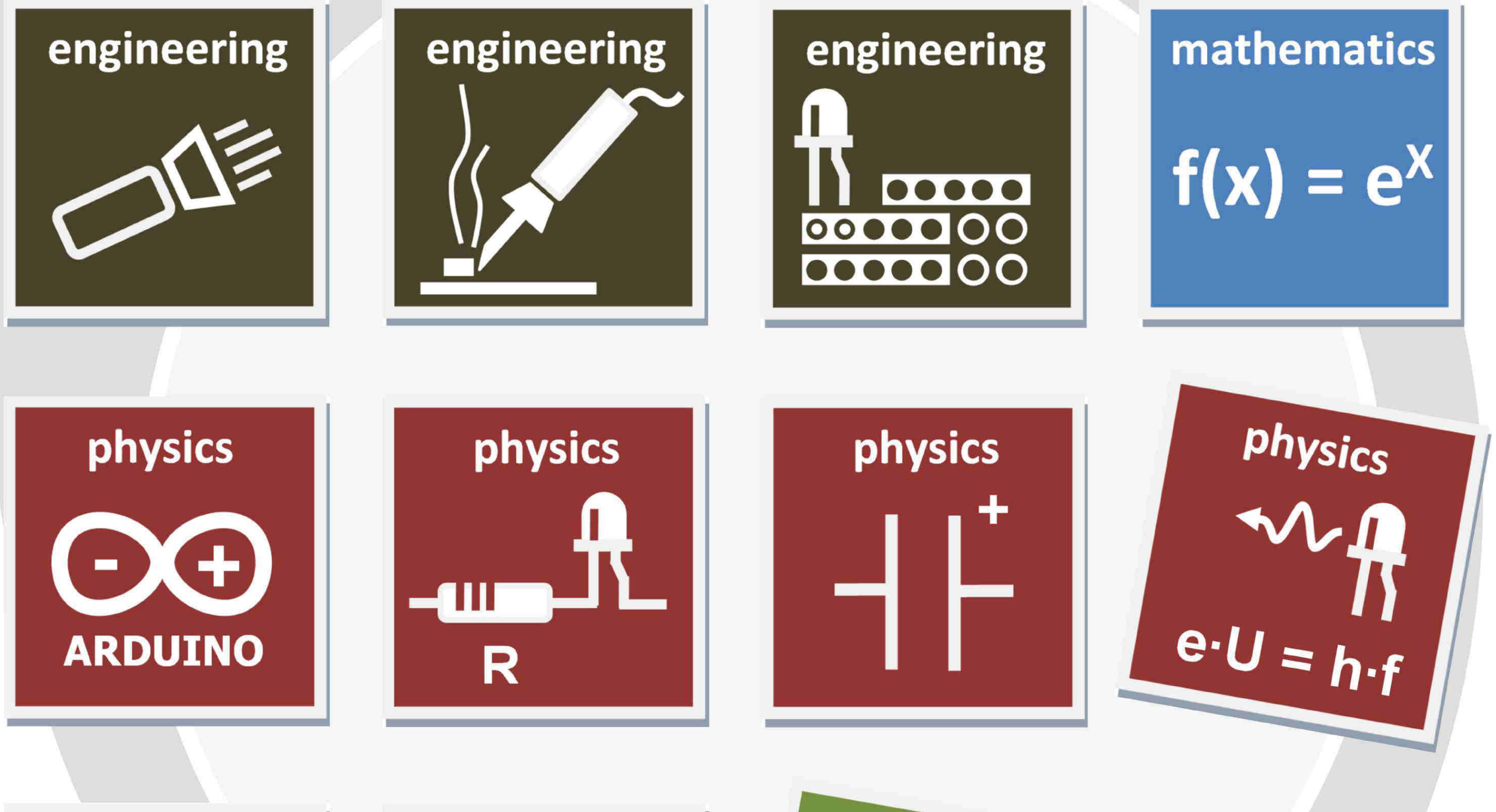
Leif-Erik Grabe & Patrick Schmitz | Carl-Benz-Schule Koblenz | Germany

Construction of an USB Flashlight

Informatics, mathematics, physics, engineering ...





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Tibor Vizi | DSzC Brassai S. High School | Debrecen | Hungary

Inquiry Based Learning in VET

to help students to be productive problem solvers

Inquiry-based learning is a process where students investigate widely, and build new understandings, and knowledge.
These understandings are deeper than any pre-packaged one way knowledge-transfer from teachers to students.
My goal was to try this method in vocational education in my classroom.

Teaching With Technology and Inquiry: An Open Course For Teachers

Instructors from the worlds of research and practice engage you in design-oriented collaborative activities focused on STEAM+ learning.

UNIVERSITY OF TORONTO

I N Q U I R E

Investigate Your Surroundings	Narrow Your Focus	Ask Comparative Questions	Uncover Your Prediction	Initiate an Action Plan	Research and Data Collection	Examine Results and Communicate Findings

I attempt to teach more effectively making spontaneous questions that cause students to wonder and to ask further questions.

"Too often we are preoccupied with the destination, that we forget the journey"

DSzC DEBRECENI SZAKKÉPZÉSI CENTRUM edX Capilano BRASSAI DEBRECEN NATIONAL INSTRUMENTS