Image credit: Ioanna Kasampa

PLAYING WITH PROTONS

Playing with Protons

Engaging primary students with physics, discovery & innovation

Dr. Angelos Alexopoulos

ΕΛΛΗΝΟΓΕΡΜΑΝΙΚΗ ΑΓΩΓΗ

ELLINOGERMANIKI AGOGI

Why

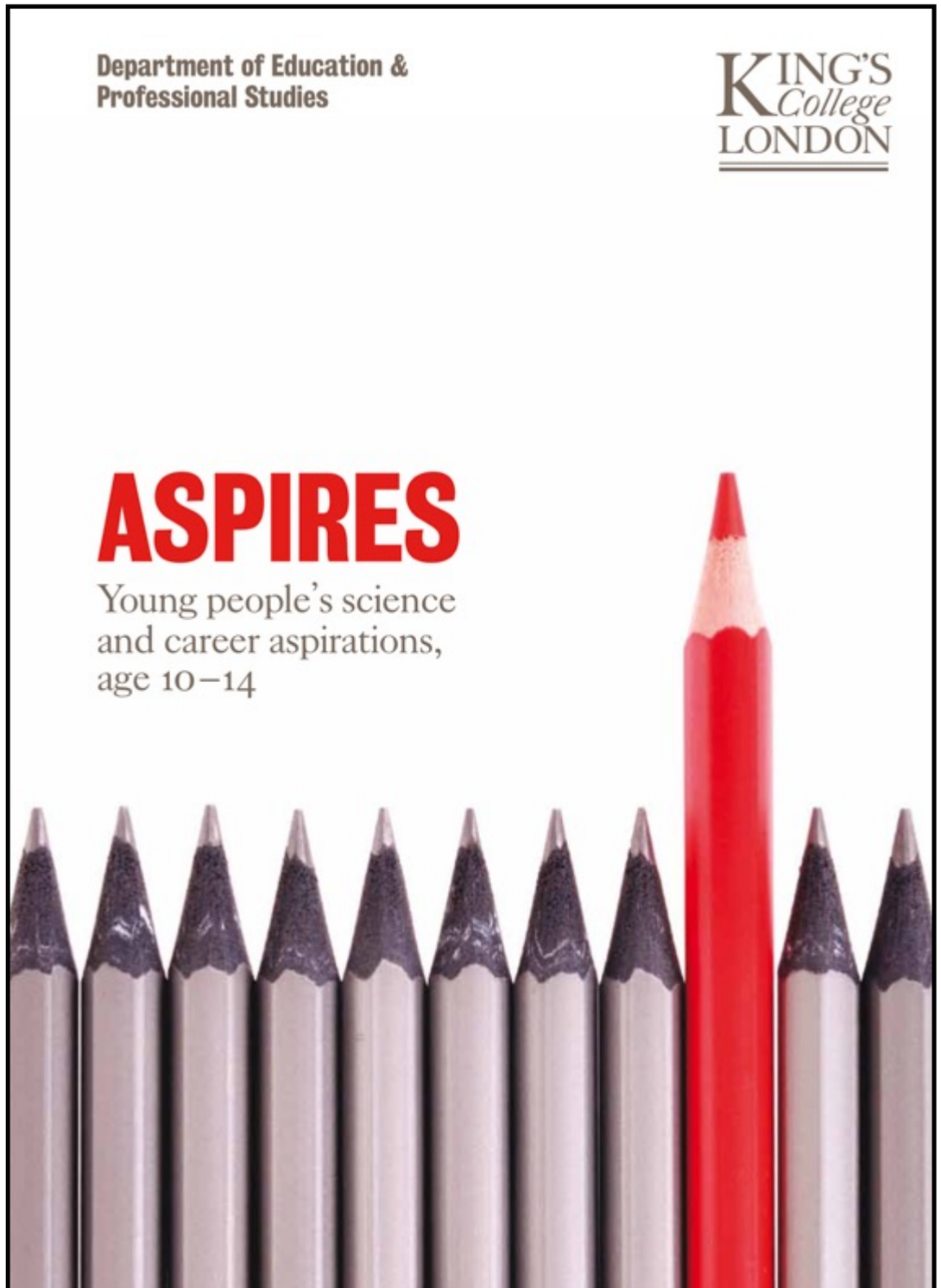
"Children naturally enjoy observing and thinking about nature." (Eshach & Fried, 2005, p. 315)

"It is, therefore, incumbent on the science educator to provide children with environments, materials, and activities, to develop their scientific reasoning while these 'windows of opportunity' are still open." (ibid., p. 334)

Why

"Action needs to begin at primary school - age 14 is too late."

"Efforts to broaden students' aspirations, particularly in relation to STEM, need to begin in primary school. Currently most activities and interventions are targeted at secondary school students."



Primary Teacher PD at CERN

Experience the unique culture of cutting-edge science, technology and innovation at the world's largest particle physics laboratory.

Develop creative educational scenarios and lesson plans that build on and enrich the primary curricula with modern physics ideas to increase the interest, motivation and wonder of students.

Try out new teaching approaches, especially hands-on activities and experiments with everyday materials, to increase their confidence when teaching physics in particular and science in general.

Get inspired and motivated to share newly acquired knowledge and wonder-full experience with peers, parents and the local community.

Supporting bodies

CMS Compact Muon Solenoid

ATLAS EXPERIMENT

CERN Ideas

UNIVERSITY OF BIRMINGHAM | SCHOOL OF PHYSICS AND ASTRONOMY

Science & Technology Facilities Council

The Ogden Trust
making physics matter

ΙΣΝ/SNF
ΙΔΡΥΜΑ ΣΤΑΥΡΟΣ ΝΙΑΡΧΟΣ
STAVROS NIARCHOS FOUNDATION

PERIMETER INSTITUTE

CREATIONS
Developing an Engaging Science Classroom

Open Schools for Open Societies

Development

CMS AND CERN INSPIRE UK PRIMARY-SCHOOL TEACHERS TO PLAY WITH PROTONS

2014

2016

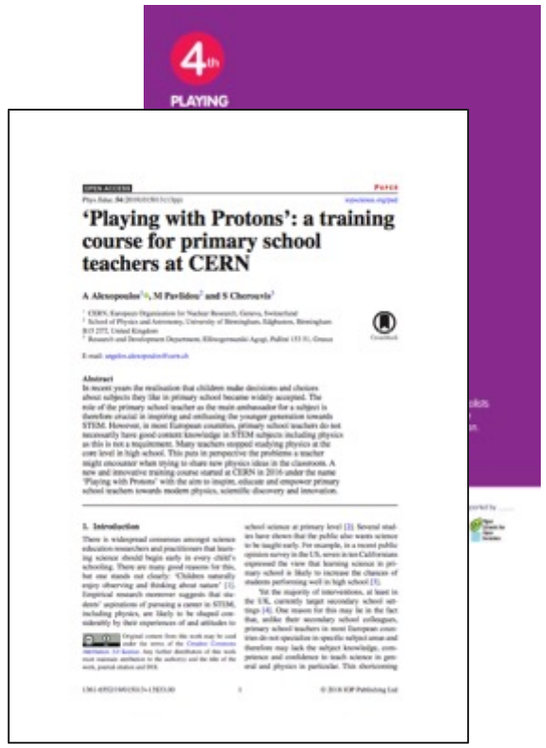
2017

2019

COMMUNITY 26.09.2016

Greek teachers learn ABCs of particle physics at CERN

SAKIS IOANNIDIS



Implementation*

5 courses at CERN

2 countries

155 schools 346 teachers

8,915 students

*In 3 school years (2016-19)

Implementation: (Mean) multiplication ratio

Awards & recognitions

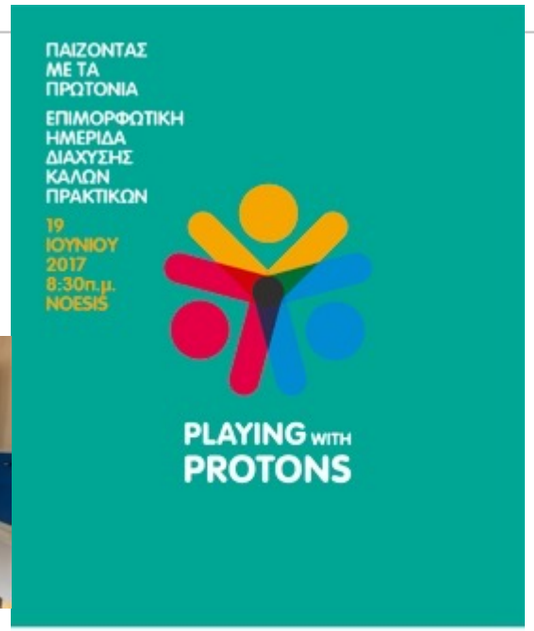
Particles4U (IPPOG)

Looking…Up! (IAU OAD)

Science Communication Awards 2018 ΕΠΙ²

STEAM highlights (1)

2016-17

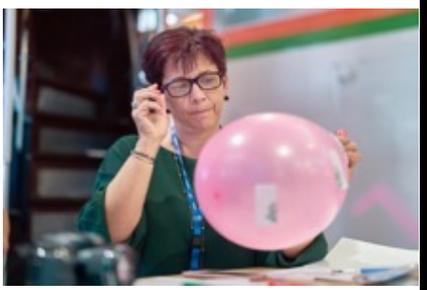


2017-18

6th Intercultural School of Eleftherio-Kordelio, Greece (Image: Kiki Zervou)

Primary School of Vytina, Greece (Image: Giannis Karountzos)

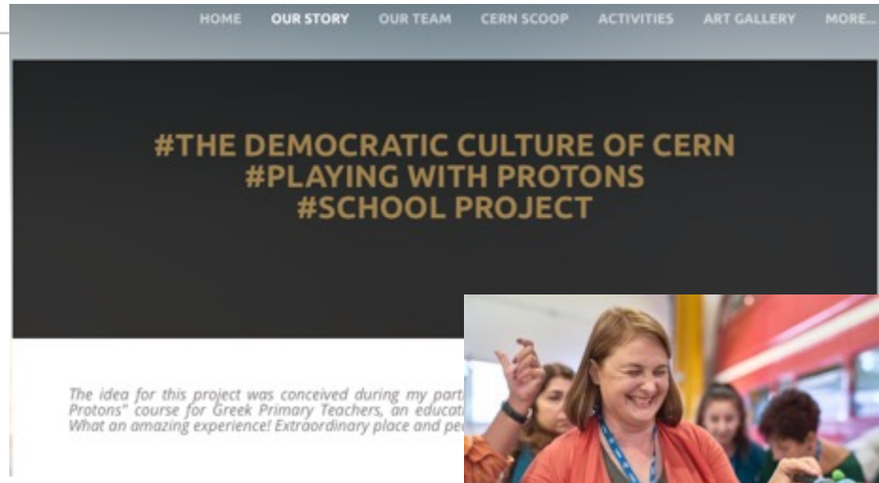
STEAM highlights (2)

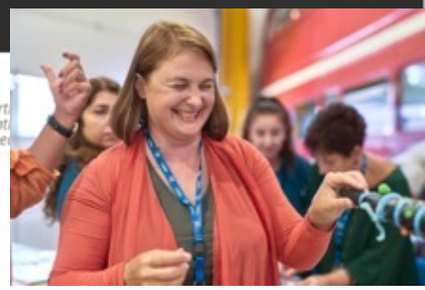


2018-19

14 schools
52 teachers
512 students

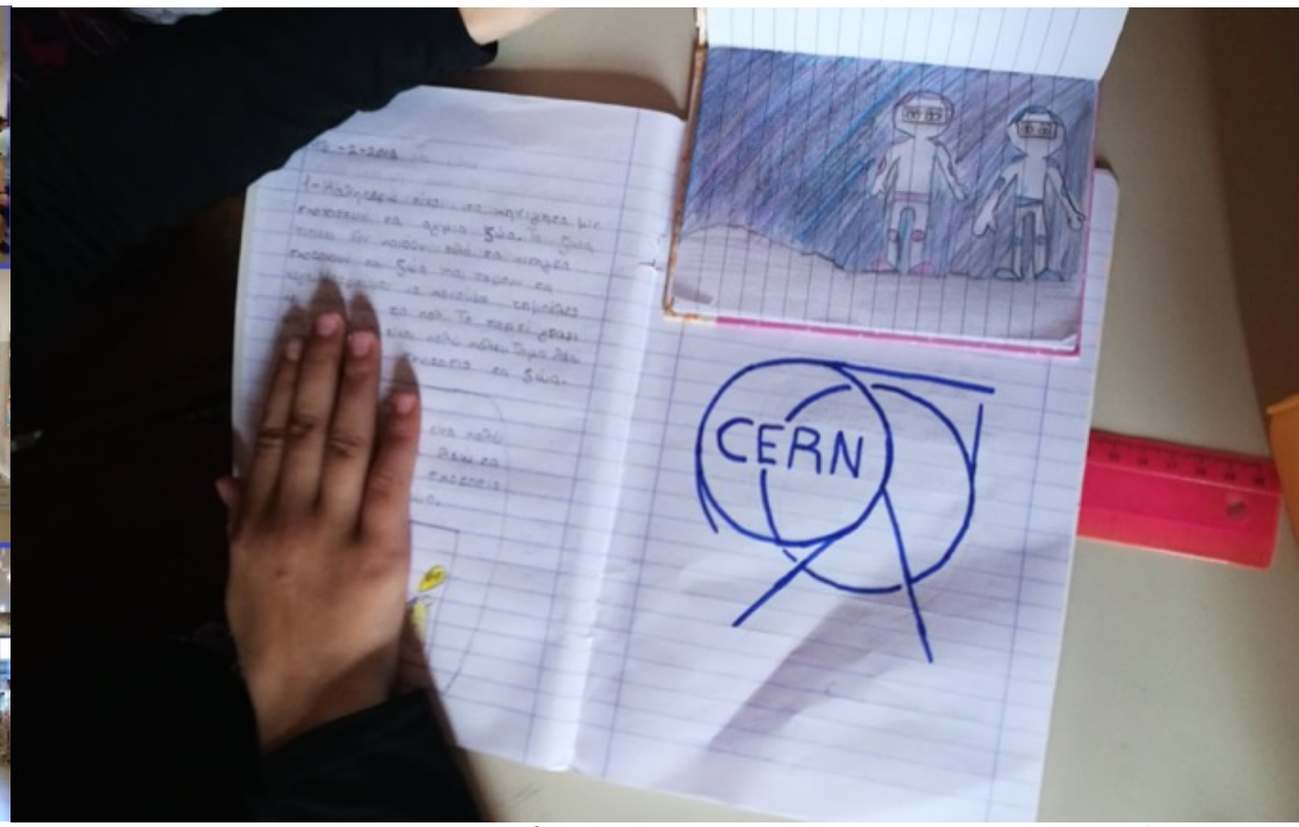
7 schools
28 teachers
270 students
3 countries





2018-19

6th Primary School of Naousa, Greece (Image: Anastasia Lafara)



2nd Minority Primary School of Komotini (Image: Marina Molla)

Course evaluation *

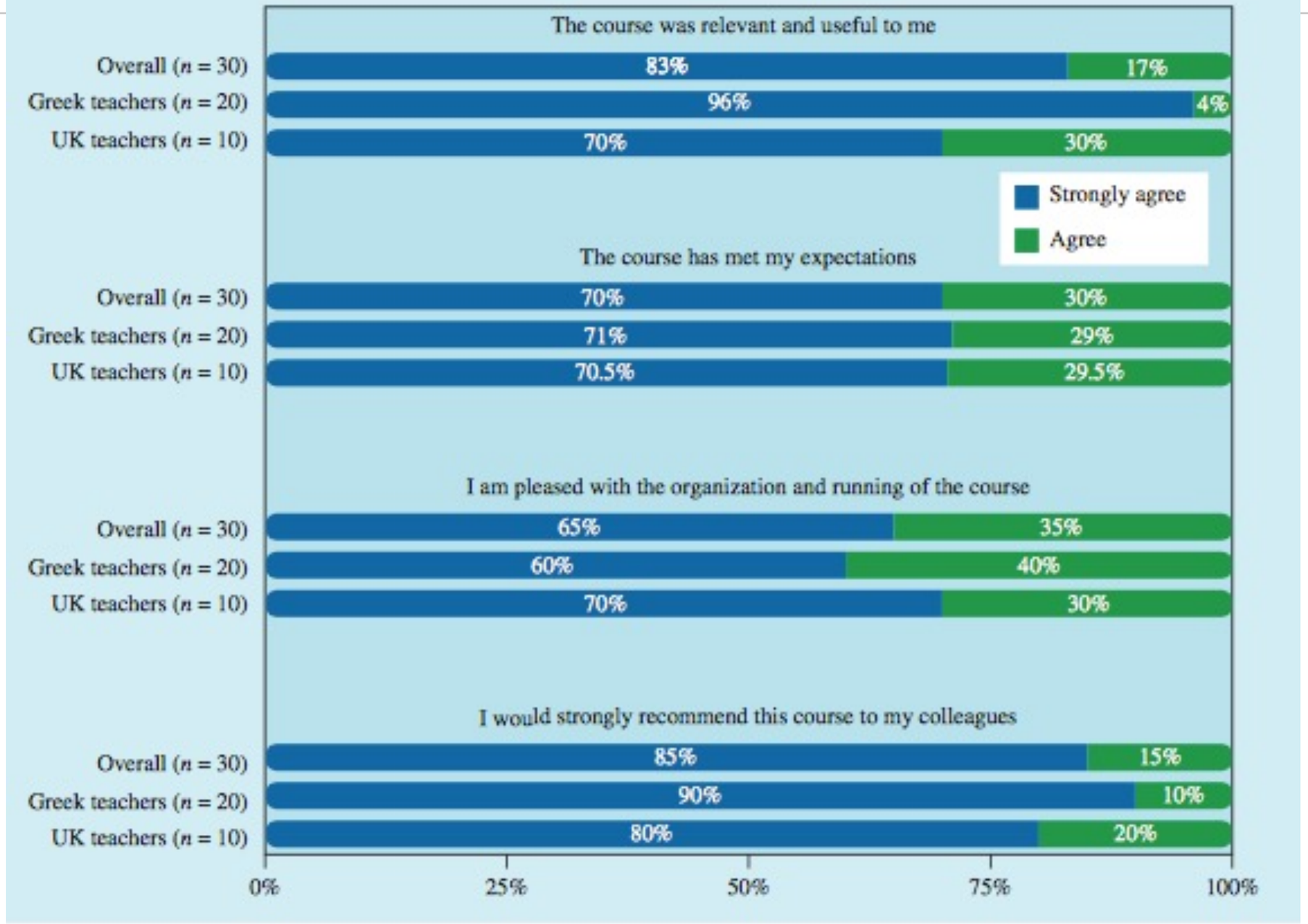


Figure 2. Greek and UK teachers' rating of the course's quality.

Source: Alexopoulos, Pavlidou & Cherouvis (2019)

*3 PD courses (2 GR, 1 UK)

Follow-up evaluation *

Table 5. Impact on teachers' professional development and personal outlook.

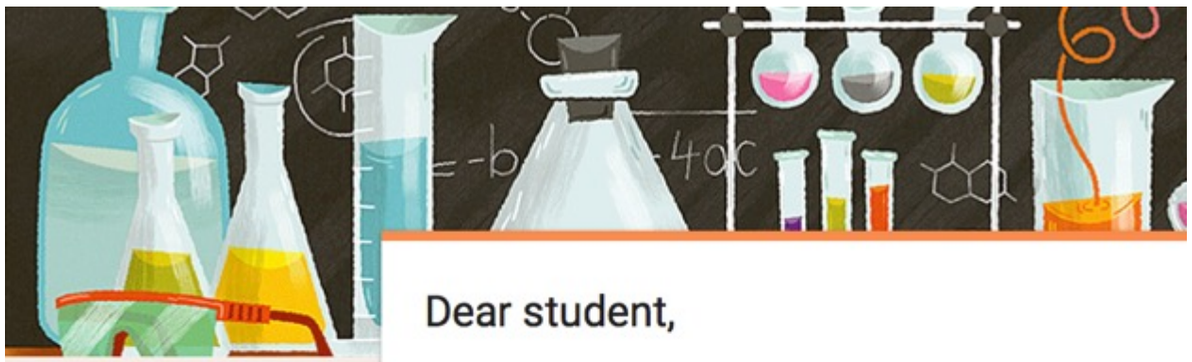
Impact on teachers' professional development	Impact on teachers' personal outlook
'I have applied to and taken part in similar training courses in other European organisations. This would not be possible if I had not taken this course'.	'It opened up a new way of perceiving nature'.
'I have taken part in several seminars and presented ways to teach physics with everyday materials. Many schools have invited me to present what I did during the summer course at CERN'.	'The fact that I met and kept contact with great scientists gave me self-esteem, knowledge and confidence'.
'In the next school year, I will lead a new regional network of schools and teachers inspired by Playing with Protons'.	'I became more positive and patient as a person. Maybe more mature...'
'The course triggered my involvement in interdisciplinary STEM projects but also my development as a Scientix ambassador'.	'New horizons, new knowledge, new friendships'.
'I have had the confidence and enthusiasm to share ideas and concepts from the course at our county conference to over 100 teachers'.	'Personally speaking, there was a positive impact on my views and also my knowledge related to physics, cosmology, CERN and more generally of science'.
'I collaborated with other teachers, school advisors and I helped my school secure a grant from a foundation'.	'My professional and also my recreational choices are more closely related to science. Even my relationships with my students, both professionally and personally, have been improved as a result of my involvement with this course'.

Source: Alexopoulos, Pavlidou & Cherouvis (2019)

*3 PD courses (2 GR, 1 UK)

Student impact

CREATIONS
Developing an Engaging Science Classroom



Dear student,

Thank you for your participation!
All questionnaires are part of a study and your answers are strictly confidential! Your teacher will neither evaluate nor mark it!

Your personal Code is built up of:

*Required

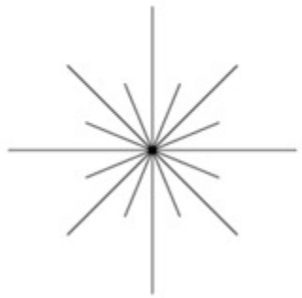
Date of today: *
DD MM YYYY
/ / 2019

Your gender: *
Choose

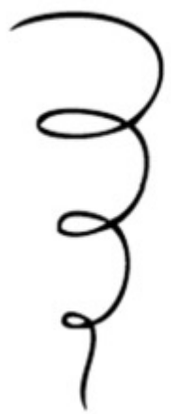
Your month of birth: *

Now look at the first below and write down as many things as you can for what that figure might be. What does it look like? What could it be? *

Now make a list of all of the things that this figure could be. Remember, the more things you write down, the better! *



Now for the last Figure. Remember that there are no grades, this is a game, and you should list as many things as you can! *



Student impact*

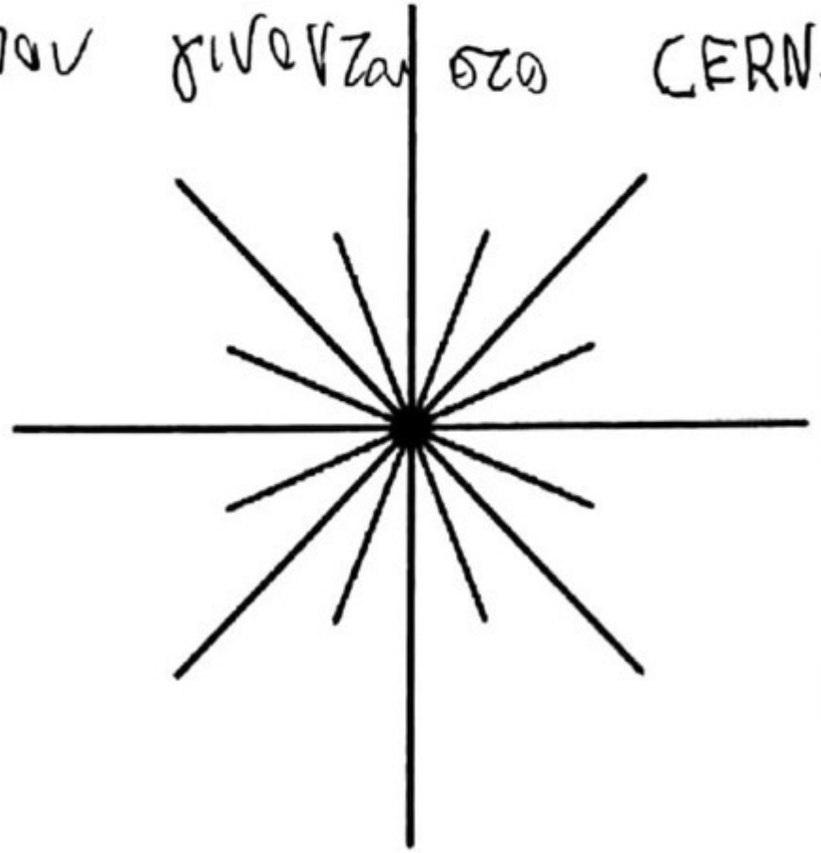
Lead tungstate crystals for the CMS ECAL.

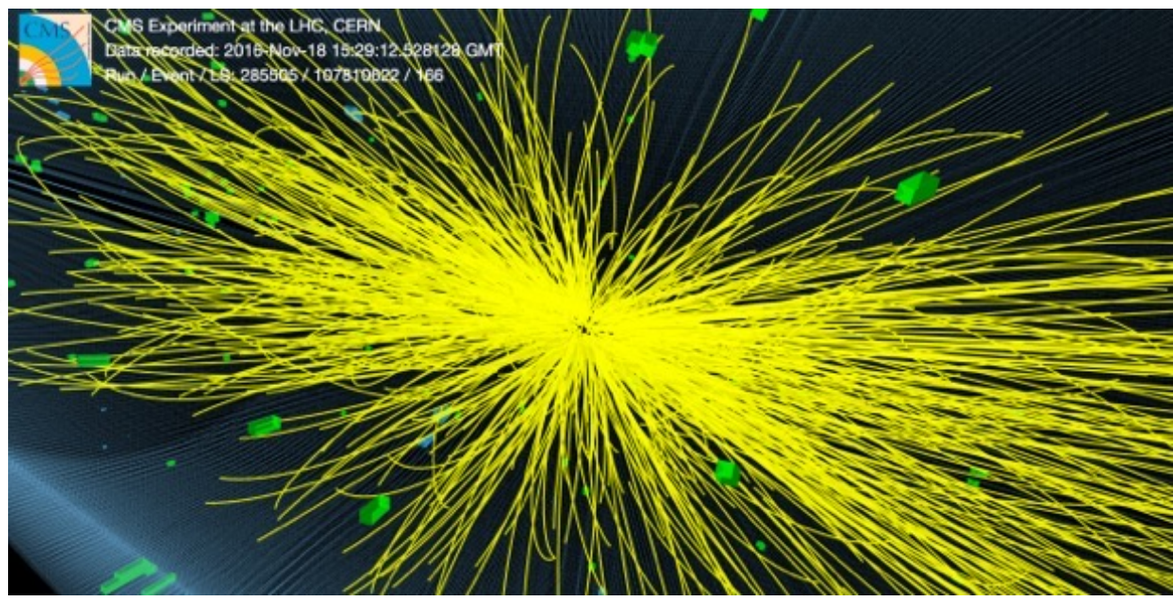
* Based on student assessment in Vytina Primary School, Greece

Student impact*

Τώρα φτιάξε μια λίστα με όλα τα πράγματα που θα μπορούσε να είναι το παρακάτω σχήμα. Θυμήσου, όσο περισσότερα πράγματα γράψεις, τόσο το καλύτερο! *

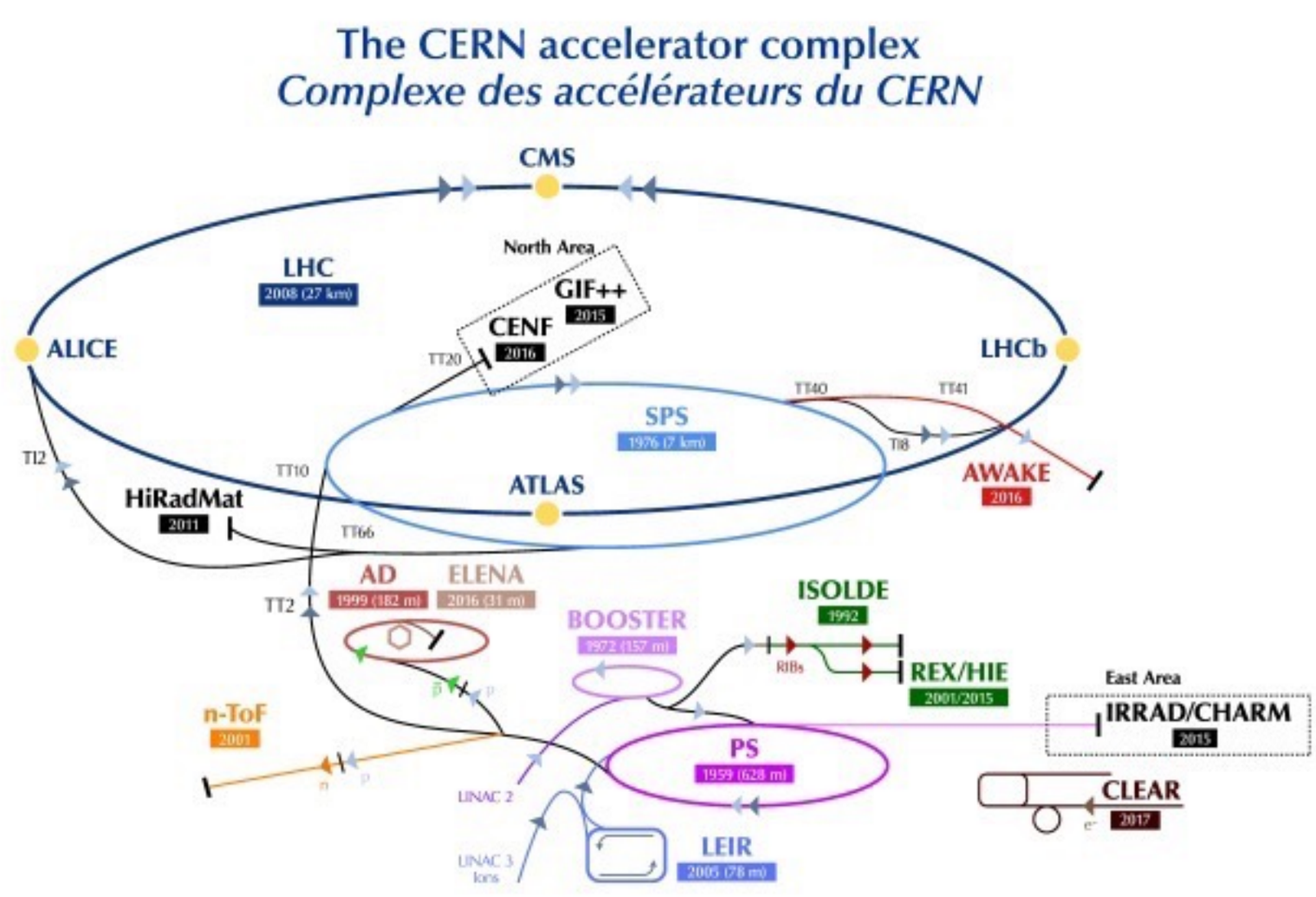
Επίσης μου θύμισε την εξυχαρένεσ εκθεση που γινόταν στο CERN.

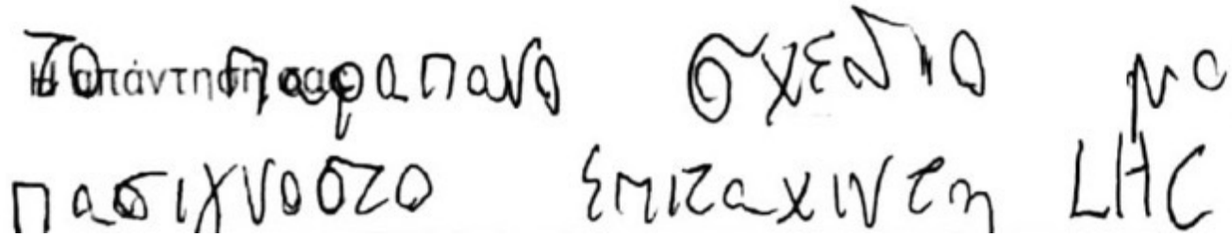




* Based on student assessment in Vytina Primary School, Greece

Student impact*





* Based on student assessment in Vytina Primary School, Greece

Thank you!

Contact

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@playprotons

References

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