



**Biochemical Society Outreach Grant:
Science Kittens promoted to Professors –
2 days of scientific Facts and Fun**

Event Report

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Introduction:

Although scientific outreach activities are vital for disseminating science awareness to the public, these are less common in Romania, because of limited funding and hard to reach public groups. One of these groups is represented by school pupils. Reaching those pupils is of high importance for the Romanian society, because they represent the future of science.

Therefore, we aimed to perform a two-days outreach event, which took place at the school and at the University in Cluj-Napoca, Romania. The event included lectures, hands-on workshops and a visit to the University. To accomplish this event we made a collaboration between scientist (PhD researcher) from The University of Manchester, school teachers from the school, dentist from Cluj-Napoca and a professor from the University. The team was collectively working very hard to achieve the best outcome from this event. The pupils were very enthusiastic and ambitious about the event even before the proposed starting time, as they experience a lack of exposure to scientific facts. This event was carried out for the first time in this school, in which it has had a great attention from the pupils and their parents.

The importance of this event is revealed by the fact that primary school pupils were experiencing the "real science", as well as the opportunity for primary pupils to be taught by secondary pupils and to work with the "big kids". The event used an easy way of sharing science between close age groups. This has offered an opportunity to the pupils to be trained as science educators from their early young age. Importantly, this event not only enhanced students' scientific knowledge but also delivered an important healthcare awareness.

The event:

Over the course of two days, 22nd and 23rd December 2016, the event has been taken place. During this time, pupils were exposed to enormous scientific concepts; also they had the opportunity to practice scientific teaching. The secondary school students were teaching the primary school students and the primary school students were delivering their knowledge to their parents.

On the first day: there was a mixture of lectures and hands-on workshops.

The participating primary school teacher was introducing the event to all of the pupils. Then she explained the teaching concepts and trained the secondary school students to perform the proposed experiments. In turn, these pupils supervised, using these concepts, led the primary school pupils in their experiments.

These teaching concepts were delivered to the students through a lecture. It was given in an interactive manner where students were discussing these concepts together.



Lecture to introduce the event



Explaining teaching concepts and training

The second lecture was given by the scientist in which she has presented the importance of science and its impact on every day's life event. She acknowledged the Biochemical Society for supporting the event, also a brief introduction about the society has been explained to the audiences. The pupils were very attracted to the lecture as the lecturer

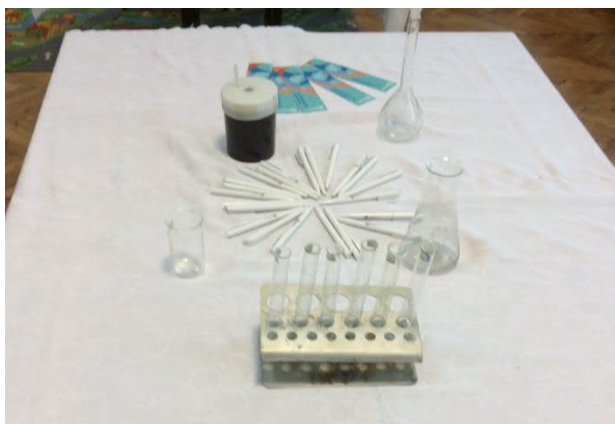
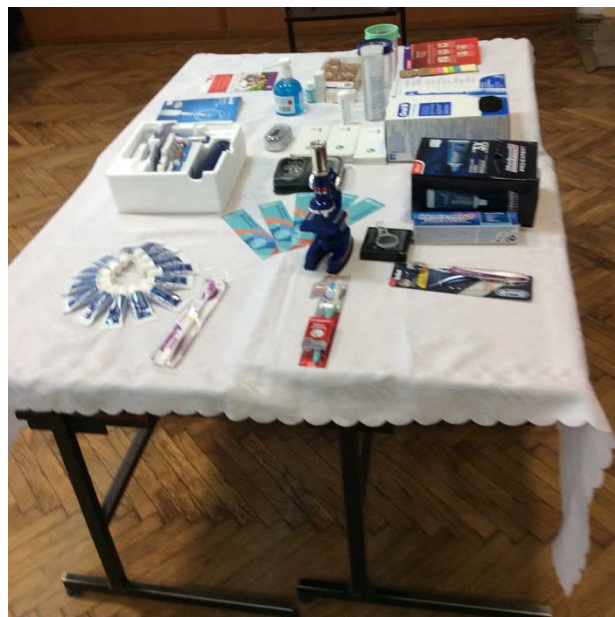
followed an entertaining manner. Many teaching aids have been used to enhance the understanding of the pupils and increase their interest toward science.



Lecture about science in an interactive manner

By the end of the above mentioned lectures a short break was given; then the pupils were prepared to conduct the practical session. All pupils and teachers were given the required health and safety with the emergency protocols including PPE wearing and showing the emergency exits in case of fire.

For the purpose of the workshops, these were split into two sessions. For the best achievement, the primary school pupils were organised in six groups for the first session, in which each group composed of 4-5 pupils being supervised by one secondary school pupil. In this way we ensured that the proposed experiments can be carried out according to the pre-described methods.



Some supplies used in the event

In the first workshop session:

(1) Water quality test: in this test the pupils investigated water purity by testing two water samples (pure and contaminated) a water quality test kit has been used. The pupils have observed the difference in water purity and the importance of clean water for their health and the environment. Many of the pupils were wondering of the consequences of using water from bad source, all these questions were extensively addressed to them. Also the pupils introduced to the basics of chemistry thought this test.



Water quality experiment

(2) Biology tests: based on the water quality test results, a microscopic examination of the two water samples was performed. In this test the pupils recognised how impure water contains many microbes contaminated water.





Biology experiment

(3) The magic ink: at the end of the first workshop's session a chemistry based fun experiment was performed. The pupils were instructed to follow a chemical protocol to produce an invisible ink from lemon juice. They used the synthesised ink to perform hidden writing take in a funny manner. In this experiments the pupils had intensive fun and introduced to the chemical equipment and how to deal with it. At the end of this session a lunch break took place.





The magic ink experiment

After the lunch break the second session has taken place, two experiments were performed.

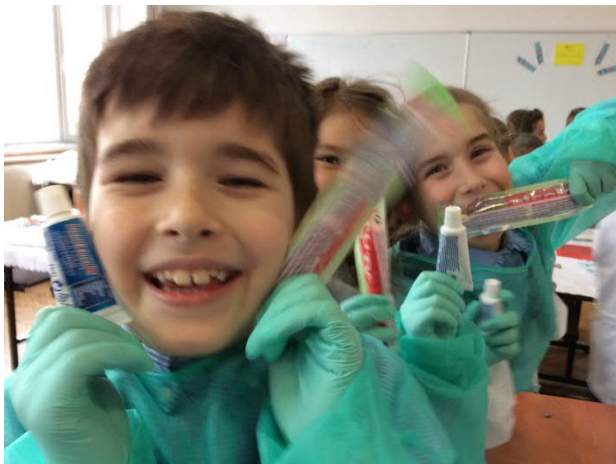
(1) Teeth brushing experiment: under direct supervision of the dentist, testing groups of pupils (with or without teeth brushing). A special disclosing agent were used that stains the plaque on the teeth of the non-brushing group. The pupils were introduced to the importance of teeth brushing and how brushing removes the plaque. Also they were made aware of the consequences of improper teeth brushing. The dentist was extensively explaining the best way of teeth brushing by practicing.



Plaque disclosing agent before and after teeth brushing



Teeth brushing demonstration



Pupils preparing to brush their teeth



Teeth brushing practice



Dental check-up after teeth brushing

(2) The bouncy egg: after explaining the significance of teeth brushing, in this funny experiment that showed the effect of the acids on the teeth was performed. The contents of teeth enamel have been described to the pupils and the effect of the acidic bi-products of plaque bacteria on the enamel. It involved the chemistry of demineralisation of the egg

shell by the acids. The pupils were very much engaged in this experiments and had lots of fun.





The bouncy egg experiment

At the end of the first day, an open discussion lecture included all pupils and their parents, in which the pupils have the opportunity to discuss and deliver to their parents the knowledge they have gained. Also a competition was organized between the pupils and participation prizes and certificates were given.



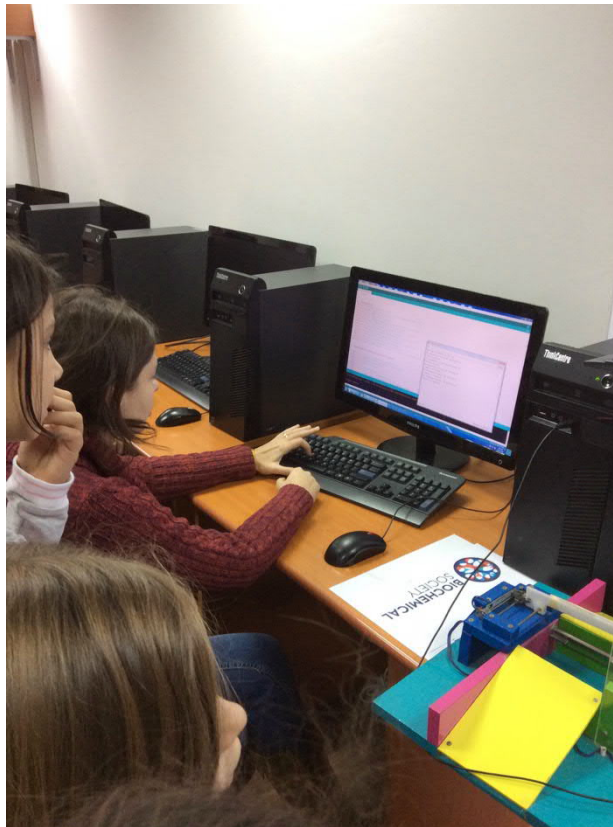
The open discussion lecture with the pupils' parents

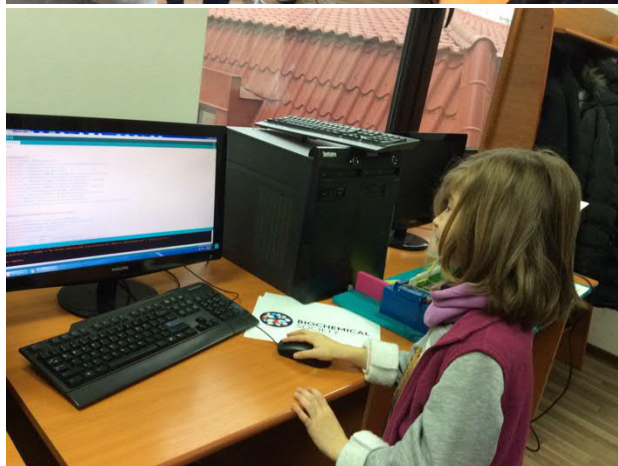
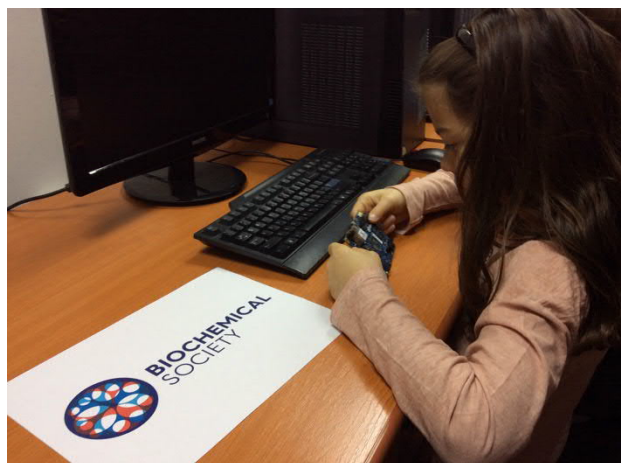
The second day:

In the second day, the primary and secondary school pupils were taken in a half day visit to the University in Cluj-Napoca, Romania. During this visit, the pupils were introduced to the academic environment at the university. With the presence of the university professor who introduced the lecture halls and laboratories to pupils. This exciting tour increased the awareness of the pupils toward science. Most of the pupils expressed a very positive attitude towards the academic atmosphere and wished to be a part of it at some point of their future.







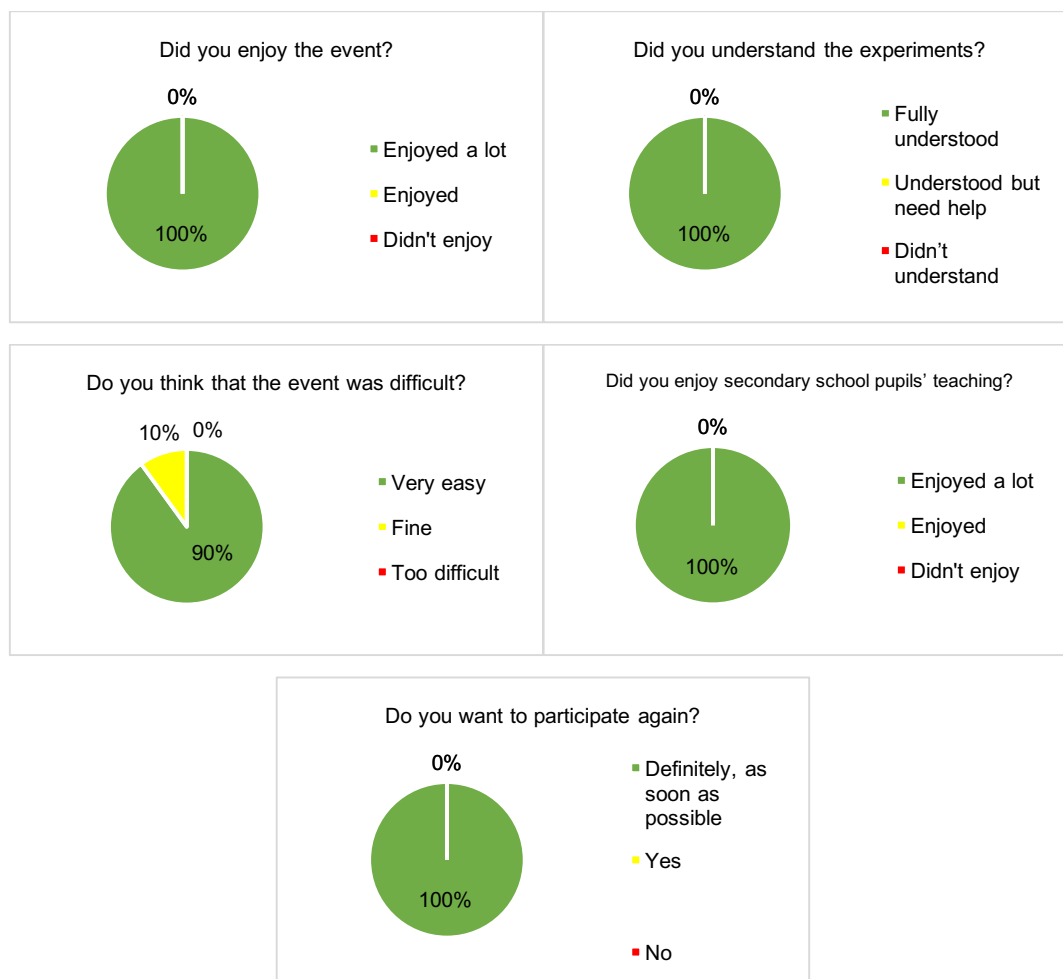


The visit to the University in Cluj-Napoca

Assessment of the event:

An evaluation for the success of the event has been performed based on three different methods.

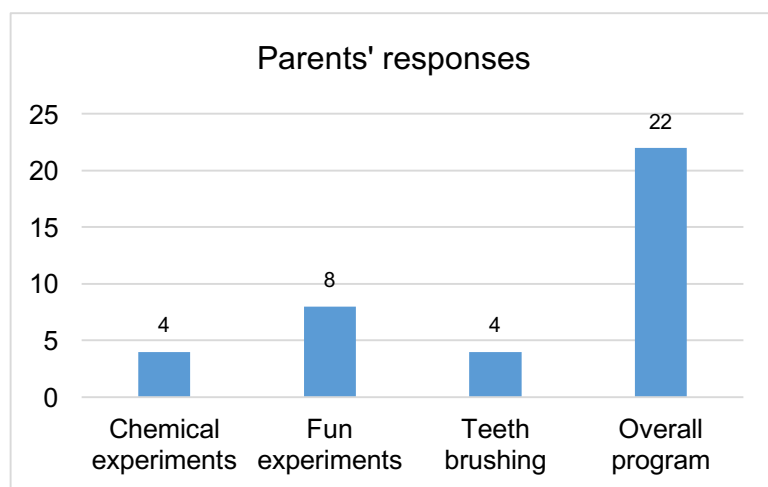
- (1) Pupils' feedback assessment: At the end of the event feedback forms were supplied to pupils to comment on the success of the event. A copy of the feedback form is attached to this report. A summary of the pupils' feedback forms responses is listed below:



Pie charts representing pupils' feedback forms responses

- (2) Parents' feedback assessment: At the end of the event feedback forms were supplied to pupils' parents to comment on the success of the event. A copy of the feedback form is attached to this report. A summary of the parents' feedback forms responses is listed below:

Twenty-two feedback forms were received from the parents. All of the parents responded to all of the feedback forms questions. There was 100% satisfaction rate of the parents, their answers rated different aspects of the event at 3/3. Regarding the multiple choice questions about “what did you like the most from the event?”, all of the parents liked the overall program, some of them like specific experiments as well. The chart below explains parents’ opinion about the program:



(3) An assessment and evaluation for pupils’ engagement and interest in the event. A brief description of the attendance is listed below:

The event’s attendees were 25 primary school pupils and 7 secondary school pupils. Primary school pupils included are aged between 8-9 years old, while secondary school pupil are aged 13 years old. Primary school pupil parents’ attendance was also excellent with all of the parents attending.

Conclusions:

The event matched its aims and communicated science to primary school pupils, which are usually very difficult to be reached, the pupils were introduced to the importance of science in an interactive and appealing manner. The secondary school pupils were trained to teach science and also we have demonstrated a very ambitious way to bridge the age gaps between primary and secondary school pupils. This event successfully correlated scientific concepts: chemical, biological and dental and utilised them to educate school pupils toward a better personal health and hygiene. It also provided a broad training to primary school pupils to be in touch with chemistry and to use chemical reagents and glassware in a funny approach. Based on the attendance, pupils and parents' feedback and our analyses of the feedback, we believe that we have delivered a very successful outreach event. This event can be applicable and reproducible in any country at any time in the future. We would like to continue this scheme to be able to organise more events in the future, to have a continuity in the outreach program. For this we need the help and support of the Biochemical Society.

Acknowledgements

We would like to thank the Biochemical Society for support and funding toward this event. We would have not achieved this event without their generous support. Also we would like to thank the parents of the pupils for their support. Finally, we would like to deeply thank the core of the event, represented by the primary and secondary school pupils, who have achieved a great benefit.