EXECUTIVE SUMMARY

The school year 2014-2015 has been the third year of a very successful programme. What was a project is now a regular and well-known activity both internally in SISSA and externally among the schools, the other scientific institutions, the local administrations (Trieste Town Council, Trieste Province, Friuli Venezia Giulia Region, Regional Education Authority) and the media. As in the past editions, for the whole duration of school period, every Thursday school classes were welcome in SISSA. Also on 11th February 2015 we organized a Special Day for high schools, and in September 2014 SISSA for schools participated to the Trieste NEXT in the city centre. Almost 2000 students from tens of different schools were hosted in the regular programme, or in the Special Day for high school or at our booth at Trieste NEXT. According to one of the proposals from improvements made at the end of the previous year suggesting to engage in projects aimed at social inclusion, we started a project with a small group of young students at risk of marginalization and we succeeded in presenting them science in a new and more engaging way. Following the successful format that students and teachers really appreciated from the beginning of the project, the activities were mainly proposed and leaded by SISSA PhD students with the organization of Sissa Medialab. SISSA for schools is part of the international network of the Children’s Universities EUCUNET (eucu.net).

Objectives

The general objectives of SISSA for schools, that is part of a more general communication plan aimed at raising awareness of SISSA and its activities, are gaining trust and support among the younger generations, contributing to build a new citizenship more aware of the role of science in society, attracting new generations of researchers, fostering information and education, and showing science as a vital human activity. For the detailed description of these objectives, we refer to the previous editions of the SISSA for schools reports.

In addition to these objectives, that are common to many outreach programmes, we realized that the SISSA for schools also pursues other objectives, just as important. On the one hand it increases the sense of belonging of the volunteers and then the sense of community that the School represents, in addition to being a place of learning and research. Also SISSA for schools helps to create a new generation of researchers open to the dialogue with the society and will therefore have a long term effect in building a relationship of trust between scientists and citizens.
Main results

SISSA for schools 2014-2015 confirmed the expectations, resulting in a really appreciated programme as it is clear from the evaluations collected from visitors, both students and teachers and SISSA volunteers involved in the programme.

SISSA has managed to show its activities with an interesting and innovative programme. The visiting groups have definitely got a positive image of our institution and a more realistic idea of science.

We hosted more than 700 students from 30 different institutes in the regular programme and about 500 students in a new special event dedicated to last two years of high schools and some hundreds during Trieste NEXT. The number of SISSA volunteers increased reaching more than 100 among PhD students, researchers and staff. Those who participated felt a more active part of the School and increased their sense of belonging. They also improved their ability to interact with the public. We also started a new experimental project with the special school SMAC that hosts a group of pupils at risk of marginalization. This project has aimed to mitigate the school dropout through a direct contact with science and scientists (see chapter Mitigating school dropout with science for more details).

As in the past years, before the end of the 2014-15 school year the reservations for the 2015-2016 school year opened at the end of May 2015 with 26 available dates. On July the 16th 2015 the booking procedure was closed as the requests already exceeded the number of days available. To select the participants, the priority was given to those classes which never came in the past editions. The full calendar 2015-16 is available in the appendix at the end of the report.

How it works

The procedure to organize and manage SISSA for schools has been tuned in these first three years of experience and can be summarize as follow.

• Around the middle of May we publish on the website (http://www.sissa.it/sissa-scuola) the calendar of the days of visits (every Thursday of the school year, excluding holidays).

• We inform by email all schools of the Friuli Venezia Giulia region, and our mailing list of interested teachers built over the years. As of this year the information to schools also goes through the Regional Education Office.

• Interested teachers make a request using a very simple form available online. The teachers need only to indicate the contact details, the class, the type of school (elementary, junior high school, high school, and, in this last case, the specialization) and the number of students. The request is not a reservation, but an expression of interest. All requests are collected and stored on a back office system.

• The teachers are then personally contacted by us for a front-end evaluation to understand their needs, what kind of activities would be more suitable, special requirements, etc. At that time we also fix the date of the visit.

• SISSA for schools is based on the voluntary cooperation of PhD students and young researchers (this year more than 100 volunteers) and offers a variety of workshops, interactive lectures, seminars, discussion games and other participatory and innovative formats. Therefore there isn’t a standard visit. Yet there is a strong common vision (based on the importance of the personal relationship and the presentation of science as a human activity).
that aims to break the barriers that often prevent people to appreciate science.

- As a rule we take one class at a time for primary schools and junior high schools (unless they are very small classes) and up to 50 students for high schools. The activities are very diverse (see the complete list page 56). For each group there are always many volunteers (between 5 and 8) who welcome, accompany, explain, etc. The ratio between researchers and visitors is very good and it is possible to establish a relationship that is rewarding both for the visitors and the volunteers.

- All visits are evaluated and eventually a report is published, which allows to improve the performances in subsequent years.

- The visits, activities and volunteers are organized by Sissa Medialab, that employ two people that deal specifically with this activity.

- Every year we publish a magazine that we give to children in primary and junior high schools and produce a number of workshops, lessons, kits, videos etc. we are gathering on a website (http://medialab.sissa.it/sissaperlascuola/).
OVERVIEW OF THE VISITS

The booking procedure for the school visits programme SISSA for the school year 2014-2015 begun in May 2014. The visits took place always on Thursday, begun October 16th 2014 and finished May 28th 2015, for a total of 25 visits. We accepted 31 classes of different school levels, from the first year of primary school to the fifth year of high school.

A total of 726 students have visited SISSA this year within the regular SISSA for schools programme. Moreover a Special Day dedicated to the students attending the last 2 years of high-school took place on 11th February, and about 500 students took part in this special event.

Within the event Trieste NEXT, the European Show of scientific research, SISSA for schools was present with a 50 square metre booth in the city centre Piazza Unità from September 26th to 28th from 9 am to 9 pm with a variety of activities for schools and general public, that were always full and much appreciated (see the entire programme in Appendix).

As regards the collaboration with the SMAC school, we organized a meeting at the SMAC school, three workshops at SISSA on coding and a Coder Dojo event.

The programme of school visits has been made possible thanks to the collaboration of many PhD students, post-docs, administrative and technical staff and a few senior scientists. Counting guides, speakers and explainers we had more than 100 collaborators in all. The scientific secretariat gave an invaluable contribution as well as other area secretaries, and the staff of the computer centre and the cafeteria who have been willing to welcome the visitors in their spaces. The Director was also often present to welcome the groups, and his participation was very much appreciated.

Table 1. School visits in numbers 2014-15

<table>
<thead>
<tr>
<th>Visits</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools</td>
<td>16</td>
</tr>
<tr>
<td>Classes</td>
<td>31</td>
</tr>
<tr>
<td>Students</td>
<td>686 + 500 (Special Day)</td>
</tr>
<tr>
<td>Teachers</td>
<td>35 + 32 (Special Day)</td>
</tr>
<tr>
<td>SISSA volunteers non-PhD students</td>
<td>47</td>
</tr>
<tr>
<td>SISSA volunteers PhD students</td>
<td>51</td>
</tr>
<tr>
<td>Classes in the waiting list</td>
<td>19</td>
</tr>
</tbody>
</table>

Promotion

The programme of school visits 2014-15 was promoted by means of an invitation sent to all the official email addresses of schools located in Friuli Venezia Giulia and to some teachers who had already participated to previous SISSA outreach activities. The programme was also published on the SISSA web page. The visiting slots had all been booked by July and subsequent requests had been inserted in a waiting list.

We also had a visit from one school from outside the Trieste area (Bergamo), and in the waiting list there are some school from Rome, Milan, Verona, Treviso and Udine.

On May 20th 2015, before the end of the school year, an invitation for the year 2015-16 was
sent to all the Friuli Venezia Giulia schools and to a list of teachers that took part to some SISSA events. The programme has also been published on the SISSA website. The calendar includes 25 Thursdays and is available in the appendix. The last available slot has been booked at the beginning of July.

**Schools**

We had school groups of different levels, from very small children of the first year of primary school to students of the last year of high school. In particular this year we had 13 primary school classes, 11 junior high school classes, and 7 high school classes. High school classes were normally grouped together (two or three classes), while primary and junior high schools were usually not. To give more high schools the possibility to participate to our activities we organized the Special Day for High School on February 11 2015 (for details see chapter Special Day for High Schools).

**Programme**

The programme of each visit was adapted to the needs and the levels of the visitors. For children (primary and junior high schools) the programme was the following:

- Introduction to SISSA
- Tour of the SISSA with PhD students / Treasure hunt (for some classes of primary school)
- Interactive laboratory or lecture

Furthermore the children’s programme comprised three sublevels:

- First and second school years (6-8 year olds): extremely interactive activities with a lot of games and very simple language
- Third-fifth school years (8-11 year olds): interactive activities, a more specialised language and more demanding tasks
- Sixth-eighth school years (11-14 year olds): discussion games, participatory and interactive laboratories, short seminars.
For high schools the programme was the following:

- Introduction to SISSA
- Tour of the SISSA with PhD students
- Two seminars on different topics.

Since one of the main purposes of the school visits is to make the schools and the people who work here known and to give a lively and aggregating idea of science, all groups were taken on a tour of SISSA.

All the activities proposed this year are listed in table 2.

Table 2. List of topics, seminars and activities for school year 2014-15. Activities marked with a "*" are new.

<table>
<thead>
<tr>
<th>School level</th>
<th>Area</th>
<th>Topic</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-V school years</td>
<td>Physics</td>
<td>A cosmic fruit salad *</td>
<td>Claudia Mancuso</td>
</tr>
<tr>
<td>V-VII school years</td>
<td>Physics</td>
<td>Matryoshka Universe *</td>
<td>Claudia Mancuso</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Physics</td>
<td>If you want to keep a secret… tell it to a black hole! *</td>
<td>Juan Manuel Camona Loaiza</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Physics</td>
<td>Spatial waves hunters *</td>
<td>Claudia Mancuso</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Physics</td>
<td>Matryoshka Universe *</td>
<td>Claudia Mancuso</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Physics</td>
<td>Quirks and strangeness from the quarks world</td>
<td>Alessio Belenchia</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Physics</td>
<td>From where sky ends…*</td>
<td>Juan Manuel Camona Loaiza</td>
</tr>
<tr>
<td>VIII school years and high school</td>
<td>Physics</td>
<td>Space, Time and Light: how Einstein changed the world *</td>
<td>Alessio Belenchia</td>
</tr>
<tr>
<td>High schools</td>
<td>Physics</td>
<td>Theory (and theories) of gravity, that is: story of a free falling *</td>
<td>Eolo Di Casola</td>
</tr>
<tr>
<td>High schools</td>
<td>Physics</td>
<td>But… where galaxies come from? *</td>
<td>Claudia Mancuso</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Biophysics</td>
<td>Magical chemistry *</td>
<td>Francesca Rizzato</td>
</tr>
<tr>
<td>High schools</td>
<td>Biophysics</td>
<td>Life the easiest game: from simple rules to biological complexity *</td>
<td>Giovanni Pinamonti and Edoardo Sarti</td>
</tr>
<tr>
<td>IV-V school years</td>
<td>Mathematics</td>
<td>Art, numbers and shapes: the golden ratio</td>
<td>Stefano Amato</td>
</tr>
<tr>
<td>III-V school years</td>
<td>Mathematics</td>
<td>How do mathematicians play? *</td>
<td>Stefano Amato and Lucia Tealdi</td>
</tr>
<tr>
<td>III-V school years</td>
<td>Mathematics</td>
<td>Counting using your finger to understand computers *</td>
<td>Barbara Fantechi</td>
</tr>
<tr>
<td>V-VIII school years</td>
<td>Mathematics</td>
<td>Fractal is served! *</td>
<td>Lucia Tealdi</td>
</tr>
<tr>
<td>---------------------</td>
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<td>----------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Mathematics</td>
<td>Drawing numbers *</td>
<td>Ilaria Lucardesi</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Mathematics</td>
<td>How to train your micro-swimmers</td>
<td>Luca Heltai</td>
</tr>
<tr>
<td>High schools</td>
<td>Mathematics</td>
<td>Matrix is everywhere: graphs and matrices in everyday life *</td>
<td>Francesca Arici</td>
</tr>
<tr>
<td>High schools</td>
<td>Mathematics</td>
<td>Someone reads... and someone understands numbers *</td>
<td>Riccardo Cristoferi</td>
</tr>
<tr>
<td>High schools</td>
<td>Mathematics</td>
<td>So someone understands numbers *</td>
<td>Olga Puccioni and Riccardo Cristoferi</td>
</tr>
<tr>
<td>V-VIII school years</td>
<td>Neuroscience</td>
<td>Let’s move! *</td>
<td>Dario Olivieri</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Neuroscience</td>
<td>Scientist for a day</td>
<td>Adina Drumea</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Neuroscience</td>
<td>Music in the brain *</td>
<td>Silvia Corsini and Daniele Maraspin</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Neuroscience</td>
<td>Myths about brain: true or false? *</td>
<td>Maria Bertuzzi</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Neuroscience</td>
<td>Cut e sew course with DNA *</td>
<td>Jessica Franzot</td>
</tr>
<tr>
<td>VI-VIII school years</td>
<td>Neuroscience</td>
<td>Let’s play with the light lightening up and down cells *</td>
<td>Micaela Grandolfo</td>
</tr>
<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>What can we perceive with our nose?</td>
<td>Simone Pifferi</td>
</tr>
<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>The alphabet of smells *</td>
<td>Simone Pifferi</td>
</tr>
<tr>
<td>Junior high and high schools</td>
<td>Neuroscience</td>
<td>If seeing is so simple...try to do it! *</td>
<td>Olga Puccioni</td>
</tr>
<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>Cut e sew course with DNA *</td>
<td>Jessica Franzot</td>
</tr>
<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>Let’s play with the light lightening up and down cells *</td>
<td>Micaela Grandolfo</td>
</tr>
</tbody>
</table>
Special Day for High Schools

Within the traditional programme for schools, on 11 February 2015 we have organized a Special Day specifically dedicated to the last two classes of high schools. This school year 2014-15 the majority of participants in SISSA for schools were classes of elementary and junior high schools and only a few were high schools. This is not due to a lack of interest, rather to a different organization of external activities that for high schools starts later, when our calendar is already fully booked. Then to meet this need and to open a window on real science and research we organized a special day with a wide range of seminars, demonstrations, interactive lectures, laboratory visits, guided tours to the exhibition on the history of the Universe, discussions and meetings with researchers.

For the entire morning of 11 February, SISSA was entirely at the students' disposal and regular activities were suspended. More than 500 students participated, and they could freely select among more than 50 activities according to their personal interests, and were not guided nor instructed by us or by the teachers. This freedom was the most striking and innovative aspect of the day. The event went very smoothly, the students participated with the utmost interest and a great sense of responsibility.

As for the regular programme of SISSA for schools, this special day had the aim to show science as an important part of our society, a possible professional career, and a vital human activity, made by many intelligent, passionate, professional young women and men coming from many different countries.

The 500 participants came from of various schools of Trieste, Monfalcone, Pordenone, Gemona and Verona, and we received a lot more requests (about 200) even from other Italian regions (such as Lazio and Emilia Romagna). More than 160 SISSA people, including PhD students, young and senior scientists, laboratory and IT technicians, administration staff, actively participated to the event.

The evaluation is overall very positive and the average score given is higher than 4 (in a range from 1 to 5) with some enthusiastic picks and very few low scores.

The event was organised by Sissa Medialab with the support of the scientific secretary, the IT staff and the personnel in charge of the security.

For more detailed information see the full report published on April 2015 and available on request.
<table>
<thead>
<tr>
<th>Aula</th>
<th>10:00-10:30</th>
<th>10:45-11:15</th>
<th>11:30-12:00</th>
<th>12:15-12:45</th>
<th>AULA</th>
</tr>
</thead>
<tbody>
<tr>
<td>128 - primo piano</td>
<td><strong>Daniele Amati</strong> INTERDISCIPLINARITÀ</td>
<td><strong>Daniele Amati</strong> INTERDISCIPLINARITÀ</td>
<td>Guido Marzocchi: <strong>MATERIA, ANTIMATERIA, MATERIA OSCURA, DI CHE COSA E FATTO L'UNIVERSO?</strong></td>
<td>Guido Marzocchi: <strong>MATERIA, ANTIMATERIA, MATERIA OSCURA, DI CHE COSA E FATTO L’UNIVERSO?</strong></td>
<td>128 - primo piano</td>
</tr>
<tr>
<td>129 - primo piano</td>
<td><strong>Andrea Malompari</strong></td>
<td><strong>Andrea Malompari</strong></td>
<td>Alessandra Tronca: <strong>IL NUCLEO DELLE NEUROSCIENCE: UN PERCORSO DALLO SPAZIO ALLA MEMORIA</strong></td>
<td>Alessandra Tronca: <strong>IL NUCLEO DELLE NEUROSCIENCE: UN PERCORSO DALLO SPAZIO ALLA MEMORIA</strong></td>
<td>129 - primo piano</td>
</tr>
<tr>
<td>130 - primo piano</td>
<td>Giuseppe Ricci</td>
<td><strong>Giuseppe Ricci</strong></td>
<td><strong>Matteo Casioli</strong> CONTRO IL CREATIVITÀ: DA FATTORI AL VOCODER</td>
<td><strong>Matteo Casioli</strong> CONTRO IL CREATIVITÀ: DA FATTORI AL VOCODER</td>
<td>130 - primo piano</td>
</tr>
<tr>
<td>131 - primo piano</td>
<td>Sara Lucchetti</td>
<td><strong>Francesca Rizzoli</strong></td>
<td>Stefano Amato: <strong>LA SCALA DELLA VIOLETTA E ALTRI MOSTRI MATEMATICI</strong></td>
<td>Stefano Amato: <strong>LA SCALA DELLA VIOLETTA E ALTRI MOSTRI MATEMATICI</strong></td>
<td>131 - primo piano</td>
</tr>
<tr>
<td>132 - primo piano</td>
<td><strong>Adriana Di Nola</strong></td>
<td>Adriana Di Nola</td>
<td>Simona Zaffo: <strong>PROFILI APRITI E CHIUDETI: SENZA E CANALI IONICI</strong></td>
<td>Simona Zaffo: <strong>PROFILI APRITI E CHIUDETI: SENZA E CANALI IONICI</strong></td>
<td>132 - primo piano</td>
</tr>
<tr>
<td>134 - primo piano</td>
<td><strong>Maria De Tommaso</strong></td>
<td><strong>Maria De Tommaso</strong></td>
<td>Silvia Remis: <strong>THE WORLD INSIDE THE EYES</strong></td>
<td>Silvia Remis: <strong>THE WORLD INSIDE THE EYES</strong></td>
<td>133 - primo piano</td>
</tr>
<tr>
<td>135 - primo piano</td>
<td><strong>Andrea Amato</strong></td>
<td>Andrea Amato</td>
<td>Riccardo Franchetti: <strong>CHI SI È IMPRONTA DELLA MATEMATICA</strong></td>
<td>Riccardo Franchetti: <strong>CHI SI È IMPRONTA DELLA MATEMATICA</strong></td>
<td>134 - primo piano</td>
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<tr>
<td>136 - primo piano</td>
<td><strong>Francesco Arri</strong></td>
<td><strong>Francesco Arri</strong></td>
<td>Stefano Liberati: <strong>BUCHI NERI, MUCCHIELE E MACCHINE DEL TEMPO</strong></td>
<td>Stefano Liberati: <strong>BUCHI NERI, MUCCHIELE E MACCHINE DEL TEMPO</strong></td>
<td>135 - primo piano</td>
</tr>
<tr>
<td>136 - primo piano</td>
<td><strong>Eduardo Sales e Giovanni Psemossi</strong></td>
<td><strong>Eduardo Sales e Giovanni Psemossi</strong></td>
<td>Stefano Cauzzi: <strong>MASSIVI NUMERI TRA LE NODULE: COME RANNO GLI SCIENZIATI A FAR DI CONTO</strong></td>
<td>Stefano Cauzzi: <strong>MASSIVI NUMERI TRA LE NODULE: COME RANNO GLI SCIENZIATI A FAR DI CONTO</strong></td>
<td>136 - primo piano</td>
</tr>
<tr>
<td>137 - primo piano</td>
<td>Giuseppe Puglisi</td>
<td>Giuseppe Puglisi</td>
<td>Saverio Demaria: <strong>OLTRI IL CREATIVO: LA MATERIA INVISIBILE</strong></td>
<td>Saverio Demaria: <strong>OLTRI IL CREATIVO: LA MATERIA INVISIBILE</strong></td>
<td>137 - primo piano</td>
</tr>
<tr>
<td>138 - primo piano</td>
<td><strong>Saverio Demaria</strong></td>
<td><strong>Saverio Demaria</strong></td>
<td>Maria Morena, Matteo Alpini e Nina Fiora</td>
<td>Maria Morena, Matteo Alpini e Nina Fiora</td>
<td>138 - primo piano</td>
</tr>
<tr>
<td>139 - primo piano</td>
<td><strong>Saverio Demaria</strong></td>
<td><strong>Saverio Demaria</strong></td>
<td>Giorgia Masciozzi: <strong>MA LE GALASSIE, DA DOVE VENnero?</strong></td>
<td>Giorgia Masciozzi: <strong>MA LE GALASSIE, DA DOVE VENnero?</strong></td>
<td>139 - primo piano</td>
</tr>
<tr>
<td>3 piano terra</td>
<td><strong>Antonio Laia</strong></td>
<td><strong>Antonio Laia</strong></td>
<td>Giovanni Dusi: <strong>CAPTIVE LA BIOLOGIA CON LA DINAMICA MOLCULARE</strong></td>
<td>Giovanni Dusi: <strong>CAPTIVE LA BIOLOGIA CON LA DINAMICA MOLCULARE</strong></td>
<td>3 piano terra</td>
</tr>
<tr>
<td>5 piano terra</td>
<td><strong>Antonio Laia</strong></td>
<td><strong>Antonio Laia</strong></td>
<td>Gaetano Pollera e Daniele Gheri</td>
<td>Gaetano Pollera e Daniele Gheri</td>
<td>5 piano terra</td>
</tr>
</tbody>
</table>

**INTERVISTE CON SCIENZIATI E SCIENZIATRICI**

| ATR01 - piano terra | Stefano Liberati - Astronomia | Riccardo Franchetti - Matematica |
| ATR02 - piano terra | Barbara Fantechi - Matematica | Simona Zaffo - Neurontologia |
| MENG - piano terra | Carolina Boil - Matematica | Filippo Guglielmi - Fisica |
| settore piano | Francesca Persichetti - Neurobiologia | Francesca Persichetti - Neurobiologia |

**MOSTRA • visita guidata**

| sesto piano | **LA STORIA DELL’UNIVERSO A COLPO D’OCCHIO** - terna 1 |
| LABORATORI • solo per chi ha la prenotazione |

| Lab1 - terzo piano | **GUARDARE IL CERVELLO SENZA APRIRE LA TESTA** - terna 1 |
| Lab2 - quinto piano | **COLTIVARE NEURONI** - terna 1 |
| Lab3 - quinto piano | **TASLIO E CUCIUT CON IL DNA** - terna 1 |
| Lab4 - quinto piano | **ACCENDIAMO LE CELLULE** - terna 1 |
| Lab6 - settimo piano | **SVILUPPO DELLA CORTECCE CEREBRALE** - terna 1 |

**DISCUSSION GAME 1** 5 giochi partecipativi su temi di scienze naturali
Within the programme of SISSA for schools, we have started a collaboration with the SMAC School in Trieste, a sort of alternative school to allow young people who have dropped out of school to fulfill the junior high school diploma. SMAC aims to mitigate early school leaving and helps young people at risk of marginalization and deviance to comply with the compulsory school. Run by volunteers, mainly retired teachers, and by professional educators of the San Martino al Campo association, SMAC is housed in premises provided by the Municipality of Trieste. This school year SMAC has hosted 13 kids from 12 to 15 years old.

The collaboration started in October 2014, when Sissa Medialab and a group of PhD students donated a digital whiteboard, and organized a morning of activities with snack and various scientific activities, from the mathematics of facebook (graph theory) to neuroscience and chemistry. The meeting ended with an interview which turned into a very direct and open dialogue.

After this first approach, on a proposal of Francesca Rizzato e Lucia Tealdi, we started a series of workshops on coding dedicated only to the older students attending the third and last year (6 people) of the SMAC school. We used the software Scratch! (https://scratch.mit.edu) produced by the MIT to introduce children to programming. With Scratch! children can realize their own projects, whether they are animations, cartoons, games or whatever, in great freedom helped by facilitators present during the workshops. Using ready-to-use commands, characters, backgrounds, landscapes and other objects they learn the basic steps of programming, including the necessary logical sequence.

After three workshops (15 January, 12 February, 12 March) the participants, helped by the facilitators, produced their own games and, at the same time, began to become familiar with SISSA, with the scientists working there, and the world of science and higher education in general. In a relaxed situation without compulsion, we led them through SISSA, visited the exhibition on the sixth floor, talked about their and our lives, their programmes for the future and learned to know each other establishing a relationship of mutual trust. This was already a very positive result, however we went a step further asking them to become mentors themselves in a Coder Dojo workshop we were organizing in collaboration with the local Coder Dojo Group. Coder Dojo (https://coderdojo.com) is a world movement born at the MIT that spreads the information technology culture to children, fostering in this way the logical thinking, the intelligent and active use of computers and creativity. The Coder Dojo events are countless all over the world and up today there are 10.201.376 Scratch! projects published on the website and in 5 minute time there will be more.

The Coder Dojo event at SISSA was held on May 28 for 30 children aged 9-10. Five out of six SMAC pupils accepted to be mentors, together with SISSA PhD students, Sissa Medialab and Coder Dojo experts. They participated to the briefing before the meeting with the other mentors, and then took care of the children with utmost care and responsibility, sharing with them their expertise, helping and encouraging when there were difficulties and ultimately enjoying the day very much.

According to the SMAC educators this is a extremely positive outcome: they have completed a complex project, they took responsibility, they dealt with other people external to their usual circle (both children and adults), in a context in which they have been valued and respected. The project has been documented, and will be the subject of a thesis of the Master in Communication of Science (author: Elena Canel; supervisor: Simona Cerrato) and will be submitted to JCOM - Journal of Science Communication (http://jcom.sissa.it).
We are planning more activities for the next school year with the SMAC school.

**SISSA volunteers’ recruitment and participation**

The school visits programme is strongly based on the active participation of the SISSA PhD students and post-docs. We promoted the participation to SISSA for schools through various methods: word of mouth from volunteers of past years, direct contacts with possible interested people, presentation of the programme to the Students’ Council, cooperation with the SISSA Club, one-day stand at the entrance of the cafeteria with video and the presence of the Sissa Medialab personnel, and postcards inviting to join the group. During this year the number of volunteers continuously increased, reaching almost 100 people, even if most of them have participated to the activities only occasionally.

In addition to PhD students, a few senior scientists have held seminars for high schools, and some people among the SISSA technical staff also took part as volunteers.

PhD students always had the freedom to choose the time and manner of their participation to the visits according to their needs and preferences, avoiding interference with their other more important commitments. Their dedication, professionalism and communication skills were very much appreciated. Researchers also have had a positive impact from their active participation in the visits as seen from the evaluation achieved through a focus group, the results of which are presented later in this report. The benefits of this outreach activities are therefore two-way: from researchers to visitors and vice versa.

Sissa Medialab provided a continuous organisation support, as well as professional assistance in preparing seminars and activities.

The staff of the cafeteria and computer centre welcomed children of the primary schools showing them unusual but important aspects of our School. This was important to fulfil one of the major objectives of the school programme, that is to present science as one of the many human activities in its daily making. The secretarial staff provided ongoing and very cooperative support whenever it was necessary to improve the organization of the visits.

**Improvements**

In the 2013-2014 evaluation some ideas were proposed to improve the SISSA for schools programme.

<table>
<thead>
<tr>
<th>Aim</th>
<th>Improvement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening some laboratories to the groups.</td>
<td>For some visits the and in the Special Day interactive activities were held in some neuroscience laboratories with the guide of the technical staff.</td>
<td>Achieved</td>
</tr>
<tr>
<td>Better organization for the bus.</td>
<td>At the beginning of the year the Trieste Trasporti was informed of the school visits programme and we asked for collaboration. Unfortunately special buses were provided only for request of at least 35 passengers.</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>Better planning of the tour of SISSA designed with the volunteers.</td>
<td>This point need to be addressed.</td>
<td>Not achieved</td>
</tr>
</tbody>
</table>
In general to improve the outreaching activity of SISSA.

<table>
<thead>
<tr>
<th>Aim</th>
<th>Improvement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>A day of orientation for the last two years of high school with discussion at lunch.</td>
<td>A Special Day for the last two years of high school was organized. Given the success of this event the next edition is already scheduled.</td>
<td>Achieved</td>
</tr>
<tr>
<td>Making annual the training course in science communication for all the SISSA volunteers interested in.</td>
<td>The training course in science communication for volunteers was not organized. However to some of the volunteers of SISSA for schools programme was offered the participation to the JCOM Masterclasses about some specific topics related to Science Communication organized by Medialab. <a href="http://jcom.sissa.it/masterclasses/">http://jcom.sissa.it/masterclasses/</a></td>
<td>Partially achieved</td>
</tr>
<tr>
<td>Annual meeting for teachers.</td>
<td>This point need to be addressed.</td>
<td>Not achieved</td>
</tr>
</tbody>
</table>

**EVALUATION**

The evaluation of the school visits was carried out with teachers, children, students and SISSA volunteers by collecting data through two main instruments:

1) questionnaires  
2) qualitative considerations  
3) free messages on post-it.

The questionnaires were composed by a series of open questions and a quantitative scoring system from 1 (lowest) to 4 (highest) on various aspects of the visits. The scores are:

1 = very bad  
2 = not so good  
3 = good  
4 = very good

A fifth score (corresponding to neither a positive nor a negative evaluation) was deliberately avoided to force polarization of the judgements away from the median.

Qualitative considerations were collected from teachers and students directly during the visit or immediately after, and were always very positive, often enthusiastic. As regards the SISSA personnel involved in the school visits, there have been many occasions for short conversations, coffee breaks, exchanges of impressions both personally and via Facebook. The overall impression is that this experience has been very positive for everybody. The results of the questionnaire confirm this impression.

**Teachers’ evaluation**

Evaluations given in informal conversations during the visits or immediately afterwards were always very positive. The questionnaire has been given regularly to teachers attending the visits.
Several teachers who took their classes in the past editions booked one or more visits for this year (and already asked for a reservation for the 2015/2016 edition) and recommended the visit to colleagues in the same institutes. This is a clear sign of appreciation, which goes far beyond the specific answers to the questions.

For a more quantitative evaluation the questionnaire has been given regularly to teachers attending the visits.

The aspects that were more appreciated, similarly to the previous years, were:

1) the ability of PhD students to engage with children and older students
2) dedication of the guides and speakers
3) the topics presented to the students.

In the previous report it was highlighted that an aspect that teachers asked to improve was the limited time of the visit. This year the average time of the visits was extended and for junior-high and high-schools the visits lasts 2 hours and a half.

The questionnaire was composed as follows.

**EVALUATION QUESTIONNAIRE FOR TEACHERS**

Dear teacher,

Thank you for visiting SISSA. We wish to make an assessment of the programme of guided tours of the SISSA in which you participated with your class. Your opinion would be very helpful and we kindly ask you to answer the questionnaire below. At the bottom you will find a space for comments and suggestions that can be used to add something more personal if you wish. Thank you for your willingness to answer the questionnaire.

1. Which programme did you take part in?
   - Primary schools
   - Junior high schools
   - High schools

2. Rate from 1 (very bad) to 4 (very good) the following aspects:
   - Interest
   - Relevance to the school curriculum
   - Enjoyment
   - Utilities for the students
   - Appropriateness of the programme to the age and knowledge of the students
   - Skill and sympathy of SISSA students and speakers
   - Quality of materials
   - Accuracy of the organization

3. What was the best element?

4. What was the worst element?

5. Are you planning to take other classes to SISSA in the coming years
   - Yes
No
It depends on the offer

6. What kind of activity would you like to take part in?
- Discussion games
- Visits to laboratories
- Seminars held by researchers and SISSA students
- Debates on issues of contemporary research
- Activities in the laboratories
- Individual meetings or in small groups with researchers
- Other (please specify)

7. Would you participate if the visits were in English?
- Yes
- No

8. Comments
Thank you

1. Which programme did you take part in?

Respondents: 27

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary schools (scuole primarie)</td>
<td>37.04%</td>
<td>10</td>
</tr>
<tr>
<td>Junior high schools (scuole medie)</td>
<td>37.04%</td>
<td>10</td>
</tr>
<tr>
<td>High schools (scuole superiori)</td>
<td>25.93%</td>
<td>7</td>
</tr>
</tbody>
</table>
2. Rate from 1 (very bad) to 4 (very good) the following aspects:

Respondents: 28

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>19</td>
<td>3,68</td>
<td>28</td>
</tr>
<tr>
<td>Relevance for the curriculum</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>16</td>
<td>3,29</td>
<td>28</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>22</td>
<td>3,79</td>
<td>28</td>
</tr>
<tr>
<td>Utilities for the students</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>23</td>
<td>3,75</td>
<td>28</td>
</tr>
<tr>
<td>Appropriateness of the programme to the age and knowledge of the students</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>17</td>
<td>3,46</td>
<td>28</td>
</tr>
<tr>
<td>Quality of material</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>27</td>
<td>3,96</td>
<td>28</td>
</tr>
<tr>
<td>Accuracy of the organization</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>27</td>
<td>3,96</td>
<td>28</td>
</tr>
</tbody>
</table>

3. What was the best element?

Respondents: 28

What was the best element?

- Treasure hunt
- The visit to the history of the universe
- The simplicity used to explain very difficult topics
- Everything
- Involvement of researchers
- Diversity of laboratories
- The activity in English
- The activities/experiments
- The approach towards the students
• Willingness of speakers
• The welcome and the way to get in touch with children.
• The collaboration of speakers with pupils
• Very clear explanations appropriate for the age
• The vivacity of speakers, and the ability of making easy difficult concepts
• The organization of activities
• Familiarity of speakers and other people
• The topics presented

4. What was the worst element?

Respondents: 17
• Nothing
• Not being admitted to the laboratories
• Too much theory for first classes
• Quantum physics
• The mathematic lesson
• Quality of movies in first activity

5. Are you planning to take other classes to SISSA in the coming years?

Respondents: 28

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>85.71%</td>
<td>24</td>
</tr>
<tr>
<td>No</td>
<td>3.57%</td>
<td>1</td>
</tr>
<tr>
<td>Depends on the programme</td>
<td>10.71%</td>
<td>3</td>
</tr>
</tbody>
</table>

Are you planning to take other classes to SISSA in the coming years?
6. What kind of activity would you like to take part in?

Respondents: 25

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion games</td>
<td>56,0%</td>
<td>14</td>
</tr>
<tr>
<td>Visits to laboratories</td>
<td>68,0%</td>
<td>17</td>
</tr>
<tr>
<td>Seminars held by researchers and SISSA students</td>
<td>24,0%</td>
<td>6</td>
</tr>
<tr>
<td>Debates on issues of contemporary research</td>
<td>40,0%</td>
<td>10</td>
</tr>
<tr>
<td>Activities in the laboratories</td>
<td>76,0%</td>
<td>19</td>
</tr>
<tr>
<td>Individual meetings or in small groups with researchers</td>
<td>60,0%</td>
<td>15</td>
</tr>
<tr>
<td>Other (please, specify)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

What kind of activity would you like to take part in?

![Bar chart showing percentages and numbers of responses for different activities.]

7. Would you participate if the visits were in English?

Respondents: 26

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>57,7%</td>
<td>15</td>
</tr>
<tr>
<td>No</td>
<td>42,3%</td>
<td>11</td>
</tr>
</tbody>
</table>
8. Comments

Respondents: 13

- Everyone was very nice and kind, I would like to especially thank Dario, who gave a lift to one of our students who couldn’t walk properly.
- Keep like this
- Activity in English if agreed in advance and with some kind of preparation
- For I and II year students interactive reflections through the activities
- More practical for first years and more theoretical for the final years
- The mathematic lecture was difficult (not appropriate for the age)
- Great initiative
- I would suggest more videos and of higher quality

Students’ evaluation

Three different questionnaires were prepared, one for each school level: primary school, junior high school and high school.

At the end of the visit students were given a printed copy of the questionnaire on site. Despite the fact that the questionnaire has not been administered to every visit we collected 249 questionnaires.

Primary schools

Since primary school children were no used to fill questionnaire it was proposed only during one visit.
Dear children,
Thank you for coming to visit us at SISSA. As it is very important for us to know what you think of the visit, we kindly ask you a few minutes of your time to answer the questionnaire below. At the bottom you will find a space for comments and suggestions that you can use to add something more personal if you wish. Thank you for your willingness to answer the questionnaire.

1. Please rate from 1 (very bad) to 4 (very good) the activities you took part in today:

2. Rate from 1 (very bad) to 4 (very good) the following things:
   Skill and sympathy of SISSA students and speakers
   Quality of materials

3. What was the thing you liked most?
   (open answer)

4. What was the thing you liked less?
   (open answer)

5. Would you like to come back?
   Yes
   No
   It depends on what will we do

6. What kind of activities would you like participating in?
   Discussion games
   Visits to laboratories
   Experiments
   Other (please specify)

7. Are you willing to participate in meetings in English?
   Yes
   No

8. Please rate from 1 (not at all) to 4 (very much) each aspect considering the visit in general:
   It was interesting
   I enjoyed it
   It made me want to learn more about science
   I learned something new

9. If the visit made you want to know more about the science could you tell us which topics would you like to address?
   (open answer)

10. Comments. If you want to say something personal, make suggestions or make comments you can write here.
    (open answer)

Thank you
1. Please rate from 1 (very bad) to 4 (very good) the activities you took part in today:

Respondents: 19

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive activity “Fractal is served!” with Lucia</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>13</td>
<td>3,7</td>
<td>18</td>
</tr>
<tr>
<td>Interactive activity “Let’s move” with Dario</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>16</td>
<td>3,8</td>
<td>19</td>
</tr>
<tr>
<td>SISSA tour with students</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>3,8</td>
<td>18</td>
</tr>
</tbody>
</table>

2. Rate from 1 (very bad) to 4 (very good) the following things:

Respondents: 19

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill and sympathy of the SISSA students and speakers</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>14</td>
<td>3,7</td>
<td>19</td>
</tr>
<tr>
<td>Quality of materials</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>13</td>
<td>3,6</td>
<td>19</td>
</tr>
</tbody>
</table>
3. What was the thing you liked most

Respondents: 25
The cloud of keywords appeared more frequently in this answer

**SISSA** We went around **Lik** **ed** **Lesson** **Brain**

Other noteworthy answers:
- The thing I liked most was everything
- I saw how we study the brain
- Where we go to get food
- The math lesson with Lucia
- Dario’s lesson
- The brain and the library
- Going around SISSA

4. What was the thing you liked less

Respondents: 24
The cloud of keywords appeared more frequently in this answer

**Lik** **ed**

Other noteworthy answers
- Nothing
- There is nothing I did not liked
- I saw too few things
5. Would you like to come back?

Respondents: 18

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>72,2%</td>
<td>13</td>
</tr>
<tr>
<td>No</td>
<td>0,0%</td>
<td>0</td>
</tr>
<tr>
<td>Depends on the programme</td>
<td>27,8%</td>
<td>5</td>
</tr>
</tbody>
</table>

![Pie chart showing responses]

6. What kind of activities would you like participating in?

Respondents: 18

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion games</td>
<td>61,1%</td>
<td>11</td>
</tr>
<tr>
<td>Visits to laboratories</td>
<td>55,6%</td>
<td>10</td>
</tr>
<tr>
<td>Experiments</td>
<td>72,2%</td>
<td>13</td>
</tr>
<tr>
<td>Individual meeting/in small groups with scientists</td>
<td>33,3%</td>
<td>6</td>
</tr>
<tr>
<td>Other (please, specify)</td>
<td>11,1%</td>
<td>2</td>
</tr>
</tbody>
</table>
Other

- To discover the functions of different chemical formulas
- Taking part in a whole day from 12 am till 5 pm

7. Are you willing to participate in meetings in English?

Respondents: 18

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>66.7%</td>
<td>12</td>
</tr>
<tr>
<td>No</td>
<td>33.3%</td>
<td>6</td>
</tr>
</tbody>
</table>

Are you willing to participate in meetings in English?
8. Please rate from 1 (not at all) to 4 (very much) for each aspect considering the visit in general:

Respondents: 18

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was interesting</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>14</td>
<td>3,7</td>
<td>19</td>
</tr>
<tr>
<td>I enjoyed it</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>13</td>
<td>3,6</td>
<td>19</td>
</tr>
<tr>
<td>It was interesting</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>13</td>
<td>3,7</td>
<td>18</td>
</tr>
<tr>
<td>I enjoyed it</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>15</td>
<td>3,8</td>
<td>18</td>
</tr>
<tr>
<td>It made me want to learn more about science</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>3,2</td>
<td>18</td>
</tr>
<tr>
<td>I learned something new</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>12</td>
<td>3,6</td>
<td>18</td>
</tr>
</tbody>
</table>

9. If the visit made you want to know more about the science could you tell us which topics would you like to address?

Respondents: 14
The cloud of keywords appeared more frequently in this answer

**Mathematics** I would **Brain** Gymnastic

Other noteworthy answers
- Chemical formulas and high technology
- Chemical anatomy, mathematics, English
- About spinal cord
- Molecules
• I want change nothing
• Brains
• Something about fractal, about universe
• Brain and universe
• Nothing

10. Comments. If you want to say something personal, make suggestions or make comments you can write here.

Respondents: 12

• It was great
• It has been fun and interesting
• It was very beautiful
• You are already very good, you need nothing by Gabriele VB Gaspardis
• I would suggest studies on animals
• I think everything was perfect
• I enjoyed everything
• On the brain make a research from brain to nerves
• You are nice, good and polite
• When I’ll grow up I would like to come to study in SISSA
• It was beautiful
• You are fantastic

Messages on sticky notes

Most of the time, at the end of the visit, instead of filling the questionnaire, the children were asked to write something on a sticky card, as a message for us. Messages clearly show that children really appreciated the visits. They had fun, want to come back and complained the visit was too short. Moreover they felt welcome by the volunteers and experienced SISSA as a very pleasant place. Often children wrote in the sticky notes that scientist have been “kind” with them, that they are “friends”, and repeatedly appears the willingness of being like some of the scientists met during the visit, usually PhD students.
Junior high schools
The questionnaire for junior high school students was composed as follows.

## EVALUATION QUESTIONNAIRE – JUNIOR HIGH SCHOOLS

Dear students,
Thank you for coming to visit us at SISSA. As it is very important for us to know what you think of the visit, we kindly ask you a few minutes of your time to answer the questionnaire below. At the bottom you will find a space for comments and suggestions that you can use to add something more personal if you wish. Thank you for your willingness to answer the questionnaire.

1. Please rate from 1 (very bad) to 4 (very good) the activities you took part in today:

2. Rate from 1 (very bad) to 4 (very good) the following things:
   - Skill and sympathy of SISSA students and speakers
   - Quality of materials

3. What was the thing you liked most?
   (open answer)

4. What was the thing you liked less?
   (open answer)

5. Would you like to come back?
   - Yes
   - No
   - It depends on what will we do

6. What kind of activities would you like participating in?
   - Discussion games
   - Visits to laboratories
   - Seminars held by researchers and SISSA students
   - Debates on issues of contemporary research
   - Experiments
   - Individual or in small groups meetings with researchers
   - Other (please specify)

7. Are you willing to participate in meetings in English?
   - Yes
   - No

8. Please rate from 1 (not at all) to 4 (very much) each aspect considering the visit in general:
   - It was interesting
     - I enjoyed it
     - It made me want to learn more about science
     - I learnt something new
9. If the visit made you want to know more about the science, could you tell us which topics would you like to address?

10. Comments.
   If you want to say something personal, make suggestions or make comments you can write here.
   (open answer)

Thank you!

1. Please rate from 1 (very bad) to 4 (very good) the activities you took part in today:

Respondents: 132

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was interesting</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>14</td>
<td>3,7</td>
<td>19</td>
</tr>
<tr>
<td>Interactive activity Spatial waves hunters with Claudia</td>
<td>1</td>
<td>0</td>
<td>17</td>
<td>24</td>
<td>3,52</td>
<td>42</td>
</tr>
<tr>
<td>Interactive activity How to train your micro-swimmers with Luca</td>
<td>0</td>
<td>2</td>
<td>9</td>
<td>10</td>
<td>3,38</td>
<td>21</td>
</tr>
<tr>
<td>Interactive activity Quirk and strangeness from quarks’ world with Alessio</td>
<td>0</td>
<td>1</td>
<td>10</td>
<td>6</td>
<td>3,29</td>
<td>17</td>
</tr>
<tr>
<td>Interactive activity Space, Time and Light: how Einstein changed the world with Alessio</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>11</td>
<td>3,69</td>
<td>16</td>
</tr>
<tr>
<td>Interactive activity From where sky ends… with Juan</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>11</td>
<td>3,65</td>
<td>17</td>
</tr>
<tr>
<td>Interactive activity If seeing is so simple…try to do it! with Olga</td>
<td>2</td>
<td>0</td>
<td>23</td>
<td>34</td>
<td>3,51</td>
<td>59</td>
</tr>
<tr>
<td>Interactive activity The seven bridges of Königsberg with Francesca</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>12</td>
<td>3,65</td>
<td>17</td>
</tr>
<tr>
<td>Interactive activity Matryoshka Universe with Claudia</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>13</td>
<td>3,57</td>
<td>21</td>
</tr>
<tr>
<td>Laboratoral activity Let’s play with the light lightening up and down cells with Micaela</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>3,42</td>
<td>19</td>
</tr>
<tr>
<td>Laboratoral activity Cut e sew course with DNA with Jessica</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>16</td>
<td>3,84</td>
<td>19</td>
</tr>
<tr>
<td>SISSA tour with PhD students</td>
<td>0</td>
<td>11</td>
<td>34</td>
<td>82</td>
<td>3,56</td>
<td>127</td>
</tr>
</tbody>
</table>
2. Rate from 1 (very bad) to 4 (very good) the following things:

Respondents: 132

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill and sympathy of the SISSA students and speakers</td>
<td>0</td>
<td>3</td>
<td>28</td>
<td>101</td>
<td>3,7</td>
<td>132</td>
</tr>
<tr>
<td>Quality of materials</td>
<td>0</td>
<td>5</td>
<td>51</td>
<td>76</td>
<td>3,5</td>
<td>132</td>
</tr>
</tbody>
</table>

Rate from 1 (very bad) to 4 (very good) the following things:
3. What was the thing you liked most

Respondents: 129
The cloud of keywords appeared more frequently in this answer

SISSA Tour Juan Astrophysics Bridge School Matrioska
Garden Terrace Liked Play with Light Optical Illusions See neurons Lesson Micro Swimmers
Francesca’s activity DNA Space time and Light Alessio
Laboratory Hallway Observing cells Cat Universe Library

Other noteworthy answers (in Italian)

- il giro della SISSA
- il lavoro con Claudia
- Mi è piaciuta molto la biblioteca e il reparto di neurobiologia
- Cacciatori di onde spaziali
- la linea del tempo al sesto piano
- la visita della scuola
- Il giro con alessio
- la lezione interattiva “Cacciatori di onde spaziali”
- fare il tour della SISSA con Dario
- la lezione interattiva con Olga
- Astrofisica
- il giro con Alessio
- la lezione di neuroscienza
- la lezione sulle illusioni ottiche
- la lezione di astrofisica
- la lezione con Olga
- mi è piaciuta la lezione interattiva e la visita
- mi è piaciuto tutto, in particolare la visita dell’edificio
- La teoria di matematica e geometria
- la Biblioteca
- Vedere i neuroni
- corso taglio e cucito con il DNA con Jessica
- la mostra sull’universo
- il viaggio nel tempo
- osservare le cellule con le luci diverse
- Corso di taglio e cucito col DNA
- i giochi nel giardino
- Giro della SISSA
- Il laboratorio sull’attrazione dei corpi vicino ai buchi neri con latte e caffè
- il giro della SISSA perché ci hanno spiegato cose molto interessanti
- il giro in giardino e dove c’era il corridoio con la storia dell’universo
- la lezione interattiva con Juan
- triangolo impossibile
- Il giro per la SISSA con Richard
- è stato guardare l’RNA al computer in 3D
- Spazio Tempo e Luce: come Einstein ha cambiato il mondo
- la lezione interattiva di Alessio sullo spazio tempo e luce
- è difficile da spiegare…tutto?
- la biblioteca
- i punti di Koliberg
- il grande corridoio
- la lezione con Francesca
- gatto di S****
- disegnare le cose/ il gatto nella scatola
- visitare i laboratori scientifici con all’interno le macchine
- L’universo matrioska
- il corridoio della storia dell’universo
- il tour della sissa e la lezione micro swimmers
- mi è piaciuto tutto allo stesso modo
- tutto
4. What was the thing you liked less

Respondents: 109
The cloud of keywords appeared more frequently in this answer

**Library Training Your Micro Swimmers**
**Travel Play with Light Astrophysics**
**Interesting Liked Guide Lesson School SISSA Tour Team Cat**
**Neuroscience Electtrical Activity of a cell**

Other noteworthy answers (in Italian)

- la lezione di scienze di astrofisica
- il lavoro con Olga
- niente
- biblioteca
- il giro della sissa
- neuroscienze
- la lezione interattiva con Claudia
- lezione interattiva se vedere è un gioco da ragazzi
- il viaggio in ascensore
- il giro della scuola è stato molto veloce e superficiale
- Sinceramente nessuna, tutto molto interessante
- la visita della scuola perché per colpa del poco
- tempo a disposizione è stata molto sbrigativa
- cacciatori di onde spaziali
- il giro della SISSA perché l’avevo già fatto! ;)
- la guida parlava troppo veloce
- giochiamo con la luce... (ecc)
- niente, tutto perfetto
- giochiamo con la luce
- mi è piaciuto tutto, non saprei
- mi è piaciuto tutto non c’è niente che mi è piaciuto meno
- tutto buono
- attività elettrica di una cellula
- tutte bellissime
- il paragone tra “l’ideale scienziato” e gli scienziati veri
- Stare nel laboratorio dei cervelli
- spazio tempo e luce
- Le illusioni ottiche sono quelle che mi sono piaciute
- meno perché sono state spiegate troppo velocemente
- e non sono riuscita a seguire
- certe parti della lezione di Alessio
- che qualche volta non riuscivo a capire
- Il giro, perché c’era poco tempo
- il gatto di Scerdinger
- la 38
- il servizio pubblico (bus)
- quello ... (disegno delle particelle che sbattono su una superficie)
- La spiegazione di Luca su uno specifico argomento
- Training your micro swimmers
- lavorare in squadra
- universo Matrioska
5. Would you like to come back?

Respondents: 125

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>86,4%</td>
<td>114</td>
</tr>
<tr>
<td>No</td>
<td>2,3%</td>
<td>3</td>
</tr>
<tr>
<td>Depends on the programme</td>
<td>11,4%</td>
<td>15</td>
</tr>
</tbody>
</table>

Would you like to come back?

6. What kind of activities would you like participating in?

Respondents: 131

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion games</td>
<td>28,2%</td>
<td>37</td>
</tr>
<tr>
<td>Visits to laboratories</td>
<td>57,3%</td>
<td>75</td>
</tr>
<tr>
<td>Seminars held by researchers and SISSA students</td>
<td>14,5%</td>
<td>19</td>
</tr>
<tr>
<td>Debates on issues of contemporary research</td>
<td>18,3%</td>
<td>24</td>
</tr>
<tr>
<td>Experiments</td>
<td>67,9%</td>
<td>89</td>
</tr>
<tr>
<td>Individual meetings of in small groups with researchers</td>
<td>32,8%</td>
<td>43</td>
</tr>
<tr>
<td>Other (please, specify)</td>
<td>6,9%</td>
<td>9</td>
</tr>
</tbody>
</table>
Other:
• taking part in a lecture
• experiments
• visiting the wood
• going into the garden and analyze biological substances
• four of the garden
• football match in the garden

7. Are you willing to participate in meetings in English?

Respondents: 119

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>66.4%</td>
<td>79</td>
</tr>
<tr>
<td>No</td>
<td>33.6%</td>
<td>40</td>
</tr>
</tbody>
</table>
8. Please rate from 1 (not at all) to 4 (very much) for each aspect considering the visit in general:

Respondents: 129

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was interesting</td>
<td>0</td>
<td>0</td>
<td>49</td>
<td>80</td>
<td>3,62</td>
<td>129</td>
</tr>
<tr>
<td>I enjoyed it</td>
<td>2</td>
<td>1</td>
<td>64</td>
<td>62</td>
<td>3,44</td>
<td>129</td>
</tr>
<tr>
<td>It made me want to learn more about science</td>
<td>4</td>
<td>12</td>
<td>56</td>
<td>57</td>
<td>3,29</td>
<td>129</td>
</tr>
<tr>
<td>It made me want to learn more about science</td>
<td>0</td>
<td>6</td>
<td>61</td>
<td>61</td>
<td>3,43</td>
<td>128</td>
</tr>
</tbody>
</table>

Please rate from 1 (not at all) to 4 (very much) for each aspect considering the visit in general

9. If the visit made you want to know more about the science could you tell us which topics would you like to address?

Respondents: 93
The cloud of keywords appeared more frequently in this answer

About universe  Discover  Optical  Light  Physics  Topic  Activities
Analyze  Astrophysics  Science  Brain  Laboratories
Space  Galaxies  Neuroscience  Electrical  Circuitry
Astronomy  Molecules  Astrophysics  Cellules  DNA
Neurobiology  Neurology
dell’universo ma anche il fatto che anche le cose scontate sono complicate
- le neuroscienze e la fisica unita alla biologia
- il cervello
- la chimica e le sostanze e le funzioni del cervello
- vorrei approfondire l’argomento della Galassia
- Elettricità circuiti elettrici neuro scien
cognitivo
- elettricità circuiti elettri
- Scienze Umane, Laboratori
- l’astrofisica e la neuroscienza cognitiva
- sulla neuroscienza
- spazio tempo e luce
- i buchi neri (e in genere l’universo)
- come funziona il cervello
- va bene come hanno detto
- illusioni ottiche
- Le attività in laboratorio
- psicologia e studi sul cervello
- effetti ottici e laboratori
- molto di più sul cervello e le sue scoperte
- neuroscienze
- mi piacerebbe approfondire la teoria della relattività di Einstein
- tutti
- su la fisica, come la velocità può cambiare il tempo
- ingegneria
- le molecole
- attività di Alessio
- nessuno
- molecole
- niente
- gli atomi
- i grafi
- la conoscenza del cervello e il tunnel
- mi ha fatto voglia di esplorare i laboratori
- Se dovessi approfondire sulla scienza sceglierei
di approfondire sullo spazio e tutto al riguardo.
- Astrofisica mi è interessato moltissimo, mi sarebbe
- piaciuto approfondire di più e fare altri giochi
- spazio
- la materia oscura e l’energia oscura vorrei scoprire cosa sono.
- la vita dell’universo e la sua formazione
- l’universo perché si espande le stelle...
astro-fisica e neurologia
la scienza della terra e di comunicazioni
un po’ di tutto
Spazio
Il movimento degli oggetti nei fluidi e l’universo
lo spazio in generale

L’universo Matrioska
Training your micro swimmers
spazio
lo spazio
Senz’altro i buchi neri e i “confini” dell’universo ma anche il fatto che anche le cose scontate sono complicate

10. Comments

If you want to say something personal, make suggestions or make comments you can write here.

Respondents: 85

See Prepared Fun Enjoyed Cafè Simpatici Semplici Interesting Beautiful Liked Sandwich Learnt Suggestions Laboratories Good Great English Instructive

All the answers (in Italian)
• è stato bello! :)
• mi è piaciuta molto la visita! è stato interessante …e vorrei tornarci per vedere più cose
• mi sento davvero molto fortunata ad essere venuta qui, non penso che ogni giorno una persona possa vedere quello che oggi abbiamo visto e sentito. Ci tornerei volentieri.
• è stata una bella opportunità soprattutto perché io dovrò fare la tesina sul cervello e dei suggerimenti non penso di darli perché è perfetta
• Mi è piaciuto e mi ha interessato molto il discorso sugli effetti ottici…molto divertenti
• mi è piaciuta molto la visita
• la visita mi è piaciuta molto e tutti sono stati simpatici e gentili :)
• molto bello e interessantissimo
• Mi sono divertito e mi ha molto interessato questo argomento di cui non ero molto informato, ma di cui ero molto curioso
• è stato molto interessante e le guide erano simpatiche e competenti
• mi è piaciuto molto e mi sono divertito
• è stato molto bello e interessante
• siete molto preparati
• Grande preparazione
• la visita e le attività sono state molto interessanti e spero di ritornare e fare altri incontri
• è stato tutto molto simpatico e divertente, ma soprattutto istruttivo e interessante
• la lezione con Olga è stata un po’ noiosa, io direi di fare teoria in modo più simpatico
• c’è una bella terrazza/e
• mi è piaciuta molto la visita e spero di tornare
• un maggiore giro della scuola e più ampio
• mi è piaciuto tutto moltissimo, soprattutto l’astrofisica perché da grande vorrei fare l’astrofisica
• niente, è stato bello
• lol, wot?
• mi è piaciuta molto la vista perché i relatori erano tutti ben preparati
• è stato molto interessante perché ho imparato cose nuove
• è stato bellissimo, spero da grande di venire a fare ricerca qua

SISSA FOR SCHOOLS

37
Mi è piaciuto molto e vorrei tornare a fare una lezione più approfondita sulla neuroscienza anche in laboratorio. É tutto molto interessante, gli argomenti essendo a volte complicati sono un po’ difficili da essere compresi in inglese, si può cercare perciò di alternare l’inglese all’italiano. Comunque bravil! <3

Chi propone incontri in inglese deve parlare più lentamente e chiaramente.

Voglio dire che oggi è stata un’esperienza fantastica. Ho imparato tante cose nuove e mi sono divertita molto.

È stato molto bello, secondo me è perfetto così.

È stato molto bello!

Tutti molto simpatici e chiari nella spiegazione.

Arletta potrebbe parlare più piano.

Secondo me servirebbe più tempo perché era molto bello.

Vedere più varietà di laboratori.

Ho trovato la visita molto bella, utile per sapere e imparare cose sulla scienza in modo divertente.

No comment.

È stato molto bello e utile imparare meglio la scienza e l’inglese.

La visita mi è molto piaciuta perché hanno spiegato in modo molto chiaro.

Mi è piaciuto e sieté stati simpaticissimi!

Secondo me bisognerebbe non solo parlare ma fare più laboratori.

Mi è piaciuto molto, spero di poter rivivere questa esperienza.

Era bello.

No, niente, qui è tutto perfetto, interessante e istruttivo.

Non servono suggerimenti perché siete tutti splendidi.

Che è stata una delle gite migliori che ho mai fatto.

È stato molto bello e interessante e divertente.

La mia guida era molto brava e ho imparato cose nuove.

Secondo me non c’è niente da aggiungere o da modificare.

Mi sono divertita molto ed erano tutti simpaticissimi!

Allargare i giardini e far entrare nei laboratori dove si analizza più sostanza organica e biologica.

Sono stati tutti molto simpatici ed è stato MOLTO interessante!

Buona fortuna al futuro.

Tutti molto bravi e simpatici.

Tutti bravissimi e simpatici.

BRAVISSIMI!

Sono stati molto simpatici.

Bravissimi.

Secondo me sarebbe carino far fare agli studenti esperimenti pratici.

Olga è stata molto brava e simpatica.

Adoro l’aula dove batti le mani e le tende si aprono.

A me è piaciuto moltissimo provare a fare le cassette, la stella,… con Francesca.

È stato molto bello.

L’aula battimani delle tende.

Vocaboli più semplici.

L’aula battimani.

Prego <3 divertente.

Trattare cose più semplici.

Molto interessante anche perché è così che si scopre come lavorano e spiegano le cose i dottorandi.

È stato molto interessante e nonostante non sono una “fan” della scienza ammetto che questa lezione mi ha fatto venire voglia di saperne di più.

Bellissimo! Ho trovato solamente un po’ noioso l’approfondimento sul nuoto.

:) la biblioteca era bellissima!

Il corridoio era molto interessante.

I relatori sono moltò simpatici e gli argomenti sono molto interessanti.

Gita molto bella! Grazie a tutti!

Do i complimenti per la collaborazione generale.

Pranzo offerto dal bar.

Panino gratis allunni.

Magari fare cose un pochino più interattive o giochi o laboratori.

Bello.

Vì ringrazio tutti è stato molto istruttivo.

La persona più simpatica che ho conosciuto è stata Olga perché è molto buona, gentile anche spiega molto bene.

Niente.

Un panino dal bar gratis.
EVALUATION QUESTIONNAIRE – HIGH SCHOOLS

Dear students,
Thank you for coming to visit us at SISSA. As it is very important for us to know what you think of the visit, we kindly ask you a few minutes of your time to answer the questionnaire below. At the bottom you will find a space for comments and suggestions that you can use to add something more personal if you wish. Thank you for your willingness to answer the questionnaire.

1. Please rate from 1 (very bad) to 4 (very good) the activities you took part in today:

2. Rate from 1 (very bad) to 4 (very good) the following things:
   - Skill and sympathy of SISSA students and speakers
   - Quality of materials

3. What was the thing you liked most?
   (open answer)

4. What was the thing you liked less?
   (open answer)

5. Would you like to come back?
   - Yes
   - No
   - It depends on what will we do

6. What kind of activities would you like participating in?
   - Discussion games
   - Visits to laboratories
   - Seminars held by researchers and SISSA students
   - Debates on issues of contemporary research
   - Experiments
   - Individual or in small groups meetings with researchers
   - Other (please specify)

7. Are you willing to participate in meetings in English?
   - Yes
   - No

8. Please rate from 1 (not at all) to 4 (very much) each aspect considering the visit in general:
   - It was interesting
   - I enjoyed it
   - It made me want to learn more about science
   - I learnt something new
9. If the visit made you want to know more about the science, could you tell us which topics would you like to address?
   (open answer)

10. Comments.
    If you want to say something personal, make suggestions or make comments you can write here.
    (open answer)
    Thank you!

1. Please rate from 1 (very bad) to 4 (very good) the activities you took part in today:

Respondents: 98

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space, Time and Light: how Einstein changed the world with Alessio</td>
<td>0</td>
<td>1</td>
<td>15</td>
<td>7</td>
<td>3,26</td>
<td>23</td>
</tr>
<tr>
<td>Someone reads… and someone understands numbers with Olga and Riccardo</td>
<td>0</td>
<td>3</td>
<td>17</td>
<td>13</td>
<td>3,30</td>
<td>33</td>
</tr>
<tr>
<td>Life the easiest game: from simple rules to biological complexity with Giovanni e Edoardo</td>
<td>0</td>
<td>4</td>
<td>16</td>
<td>13</td>
<td>3,27</td>
<td>33</td>
</tr>
<tr>
<td>The alphabet of smells with Simone</td>
<td>2</td>
<td>9</td>
<td>52</td>
<td>35</td>
<td>3,22</td>
<td>98</td>
</tr>
<tr>
<td>If “clouds are not spheres and mountains are not cones”, what are they? with Lucia Tealdi.</td>
<td>0</td>
<td>8</td>
<td>22</td>
<td>12</td>
<td>3,10</td>
<td>42</td>
</tr>
</tbody>
</table>

Please rate from 1 (very bad) to 4 (very good) the activities you took part in today

- Space, Time and Light: how Einstein changed the world with Alessio
- Someone reads… and someone understands numbers with Olga and Riccardo
- Life the easiest game: from simple rules to biological complexity with Giovanni e Edoardo
- The alphabet of smells with Simone
- If “clouds are not spheres and mountains are not cones”, what are they? with Lucia Tealdi.
2. Rate from 1 (very bad) to 4 (very good) the following things:

Respondents: 87

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill and sympathy of the SISSA students and speakers</td>
<td>0</td>
<td>1</td>
<td>31</td>
<td>64</td>
<td>3,66</td>
<td>96</td>
</tr>
<tr>
<td>Quality of materials</td>
<td>1</td>
<td>5</td>
<td>54</td>
<td>36</td>
<td>3,30</td>
<td>96</td>
</tr>
</tbody>
</table>

3. What was the thing you liked most?

Respondents: 93

The cloud of keywords appeared more frequently in this answer

Clouds are Not Spheres and Mountains
Astrophysic Laboratory Experiment Life Einstein SISSA
Tour Alphabeth of smells Lesson Guide Space
Time and Light Riccardo

All the answers (in Italian)

- il giro della SISSA con gli studenti
- “l’alfabeto degli odori
- il giro della sissa forse sarebbe stato se il giro durasse molto di più
- L’alfabeto degli odori
- Lezione interattiva Spazio Tempo e Luce
- l’alfabeto degli odori
- Spazio tempo e luce
- giro della sissa
- come Einstein ha cambiato il mondo
- la presentazione di einstein
- le lezioni interattive
- L’esperimento con la cioccolata
- giro della sissa
- il giro della sissa
- spazio tempo e luce
- il giro della SISSA
- l’alfabeto degli odori
- laboratorio
- Il giro della sissa e gli esperimenti
- gli esperimenti
- game of life
- lezione sugli odori
- l’esperimento degli odori
- l’alfabeto degli odori
- lezione sugli odori
- la visita al laboratorio di ricerca sulla formazione del linguaggio (neuroscienze)
- la disponibilità dei relatori
- nella lezione di Simone applicare quello che affermava: la difficoltà dell’associare l’odore a una parola
- il giro della SISSA
- il gelato
- il giro dell’edificio con la guida
- il giro con la guida
- l’alfabeto degli odori
- la lezione interattiva con Olga e Riccardo
- la lezione di biologia
- Giro della SISSA
- laboratorio dello studio del linguaggio
- la lezione sugli odori
- Life: the easiest game.
- C’è chi dà i numeri. E chi li legge...
- Alfabeto degli odori
- lezione interattiva Life con Giovanni e Edoardo
- Lezione Life: the easiest game
- Essersi adeguati alla nostra preparazione
- L’alfabeto degli odori
4. What was the thing you liked less?

Respondents: 73
The cloud of keywords appeared more frequently in this answer

Someone reads and someone understand numbers Space Time and Light Easiest Game Interesting L’alphabet of smells Stairs Lessn Clouds are Not Spheres and Mountains Galaxies SISSA Tour

All the answers (in Italian)

- alfabeto degli odori
- lezione spazio tempo e luce
- visita più lunga tempo e luce
- all’aperto
- Spazio Tempo e Luce
- L’alfabeto degli odori
- il giro della sissa
- “Ma le galassie, da dove vengono?”
- lezione interattiva sulle galassie
- “Ma le galassie, da dove vengono?”
- le altre cose
- Il giro della SISSA
- Lezione sulle galassie
- Il giro della SISSA
- Lezione sulle galassie
- L’alfabeto con gli odori
- le galassie
- la biblioteca
- lezione sulle galassie
- la lezione sulle galassie
- la lezione di astrofisica sulle galassie
- astrofisica
- seconda lezione
- tutto
- la lezione in inglese con Sig. Lucia
- il giro della sissa
- lezione interattiva “Ma le galassie, da dove vengono?”
- tutto
- alfabeto degli odori
- Lezione interattiva “If clouds are not spheres and mountains are not cones...”
- Giro

- la libreria
- tutto è stato interessante
- nulla
- Giro della sissa
- lezione interattiva (troppo lenta)
- non vedo bene la lavagna
- le prove di odori
è stato tutto interessante
fisica
le spiegazioni troppo lunghe e dettagliate
statistica (ma perché non mi piace l’argomento)
il game
life: the easiest game
la lezione interattiva sulla complessità biologica
non poter vedere un esperimento
il giro della SISSA (secondo questa esperienza) sarebbe stato interessante
Life: the easiest game
le scale
c’è chi dà i numeri
c’è chi dà i numeri
nulla
la lezione sul the game of Life
Life: the easiest game.
laboratorio degli odori
Life: the easiest game.
life the easiest game
niente
niente
C’è chi dà i numeri. E chi li legge...
C’è chi dà i numeri. E chi li legge...
la lezione sui numeri
niente
“*If clouds aren’t spheres and mountains are not cones, what are day?”*
le scale
le scale
le galassie
l’alfabeto degli odori
il fatto di essere stati poco
x
Lezione interattiva “*If clouds are not spheres and mountains ...”
“Ma le galassie, da dove vengono?”
“Ma le galassie, da dove vengono?”
il giro per la SISSA
“L’alfabeto degli odori”
“L’alfabeto degli odori”
/
le galassie
Matematica
lezione interattiva sugli odori
“*If clouds are not spheres and mountains are not cones*
le galassie
Lezione con Claudia
L’alfabeto degli odori
Lezione di “*If clouds are not spheres ...*
Lezione “L’alfabeto degli odori”
il giro
lezione interattiva con Lucia
niente
lezione sugli odori
“L’alfabeto degli odori”
La lezione “L’alfabeto degli odori”
/
nessuna
la cosa degli odori
/
le galassie
giro della SISSA

5. Would you like to come back?

Respondents: 98

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>67,3%</td>
<td>66</td>
</tr>
<tr>
<td>No</td>
<td>5,1%</td>
<td>5</td>
</tr>
<tr>
<td>Depends on the programme</td>
<td>27,6%</td>
<td>27</td>
</tr>
</tbody>
</table>
6. What kind of activities do you like participating in?

Respondents: 95

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion games</td>
<td>21,1%</td>
<td>20</td>
</tr>
<tr>
<td>Visits to laboratories</td>
<td>72,6%</td>
<td>69</td>
</tr>
<tr>
<td>Seminars held by researchers and SISSA students</td>
<td>13,7%</td>
<td>13</td>
</tr>
<tr>
<td>Debates on issues of contemporary research</td>
<td>21,1%</td>
<td>20</td>
</tr>
<tr>
<td>Experiments</td>
<td>61,1%</td>
<td>58</td>
</tr>
<tr>
<td>Individual meetings of in small groups with researchers</td>
<td>27,4%</td>
<td>26</td>
</tr>
<tr>
<td>Other (please, specify)</td>
<td>2,1%</td>
<td>2</td>
</tr>
</tbody>
</table>

- Videogames
- Everything!
7. Are you willing to participate in meetings in English?

Respondents: 91

<table>
<thead>
<tr>
<th>Options</th>
<th>Percentages of responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>73,6%</td>
<td>67</td>
</tr>
<tr>
<td>No</td>
<td>26,4%</td>
<td>24</td>
</tr>
</tbody>
</table>

8. Please rate from 1 (not at all) to 4 (very much) for each aspect considering the visit in general:

Respondents: 95

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average rating</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was interesting</td>
<td>0</td>
<td>4</td>
<td>48</td>
<td>3,46</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>I enjoyed it</td>
<td>1</td>
<td>7</td>
<td>30</td>
<td>3,22</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>It made me want to learn more about science</td>
<td>3</td>
<td>17</td>
<td>27</td>
<td>3,04</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>I learned something new</td>
<td>0</td>
<td>5</td>
<td>37</td>
<td>3,34</td>
<td>94</td>
<td></td>
</tr>
</tbody>
</table>
9. If the visit made you want to know more about the science could you tell us which topics would you like to address?

Respondents: 45

The cloud of keywords appeared more frequently in this answer

**Astrophysics**  **Olfaction**  **Galaxies**  **Brain**  **Neuroscience**  **Neurology**  **Mathematics**  **Universe**  **Physics**

All the answers (in Italian)

- non vorrei sapere tanto di più perché non mi piace la scienza
- neurologia e olfatto
- lo spazio
- non saprei
- neuroscienze
- fisica atomica
- neuroscienze
- neuroscienze
- neuroscienze
- fisica
- fisica, spazio-tempo, matematica
- neuroscienze
- ricerche sui metodi alternativi alla sperimentazione su animali
- gli argomenti di neuroscienze (la loro applicazione in laboratorio)
- Richard Feynman
- neuroscienze
- neuroscienze
- neuriscienze
- fisica teorica
- matematica
- Gli altri sensi oltre all’olfatto
- neurologia
- neuroscienze
- neuroscienze
- astrofisica
- le galassie, lo studio della matematica
- le galassie e matematica
- galassie
- le galassie
- astrofisica
- astrofisica
- alfabeto degli odori
- chimica neuroscienze
- Il cervello e le sue parti
- Astrofisica
- olfatto e biologia
- le galassie e l’astrofisica
- il cervello
- universo
- Matematica
- Le origini dell’universo
- Sulle galassie
- le galassie
- Universo
- astrofisica
- matematica
- galassie
- Neurologia

10. Comments

If you want to say something personal, make suggestions or make comments you can write here.

Respondents: 12

All the answers (in Italian)

- Mi è piaciuto molto però non sono un tipo da fisica o scienza perciò non mi interessa
- non saprei
SISSA volunteers’ evaluation

In order to evaluate the programme from every point of view is very important considering the evaluation from people who were involved in the programme. For such evaluation the method of focus group\(^1\) was chosen and the volunteers who were mostly engaged with SISSA for schools (about 20) were invited in giving their availability to take part in during the end of June 2015. Volunteers were divided in two groups based on their preference with respect to possible date scheduled. Two groups where formed by 7 PhD students each, both males and females and each session lasted approximately 1 hour. All the participants knew each other being part of the same institution and therefore there was no major problems to elicitate the debate.

The meetings were audiotaped with the permission of the participants, a moderator lead the discussion.

Participants were asked to answer to 5 questions:

1. What did you expect from SISSA for schools?
2. What did you get from SISSA for schools?
3. In your opinion, the 2014-2015 edition of SISSA for schools was successfull?
4. What would you like for you, taking part in next year edition of SISSA for schools?
5. Do you have comments or suggestions for next year?

1. What did you expect from SISSA for schools?

Since within an evaluation it is important to investigate which where the expectations of people with respect to experiences or activities done the first question aimed at making people thinking about it.

In order to have a qualitative and a more “quantitative” measure, participants were asked to write their answer in a sticky note and to stick it along a line going from “poco” – i.e. “a little” and “molto” – i.e. “a lot”.

As displayed in the picture the amount of expectations varied a lot along all the range.

---

\(^1\) A focus group is a qualitative research methodology developed in the field of social sciences in the Forties and Fifties in the United States, and frequently used in social research, media and marketing. It consists of a sort of “group interview”, where a moderator leads a discussion in a small group of people. The participants are invited to reflect on a topic and to express their opinions in respect to the other persons in the group. The aim of the technique is to underline differences in opinions on a specific topic and to observe how the different points of view can converge to a common ground.
The main topic where
• No particular expectations
• Having fun
• Improving communicative skills toward children
• Raising curiosity and interest for science in kids

2. What did you get from SISSA for schools?

Comparing these pictures with respect to those of the previous question it is clear that on average volunteers felt they got more than what they expected. Indeed, while in the “what did you expect?” line sticky notes covered equally the range from “a little” to “a lot”, answering to the question “what did you get?” volunteers put their comments mainly near a lot and none put its own below the middle of the line.
The disposition of sticky notes suggests that in the two focus groups different communication dynamics took place, but in both groups after an initial “cold phase” participants where happy to express more widely what did they meant in their written answers.

The main topic in the answers where
• Fun
• Few commitment
• Self confidence
• Raising curiosity and interest for science in kids
• Good exercise for communication skills
• Good italian practice
• New stimuli, still in the scientific field but out of research itself

3. In your opinion, the 2014-2015 edition of SISSA for schools was successful?

Again the distribution of evaluation was skewed toward the “a lot”.
All the volunteer involved in the focus groups answer that the programme was successful, however it suffered from

• Lack of guides
• SISSA tour could be improved

In particular some of the participants complain about other guides that did not take care properly at pupils.

4. What would you like for you, taking part in next year edition of SISSA for schools?

This question was important in order to invite participants thinking about their own objectives to pursue taking part in SISSA for schools.

The main objectives expressed by volunteers are
• Improving science communication skills
• Having more time to take part in the SISSA for schools activities
• Propose new activities/talks

5. Do you have comments or suggestions for next year?

Collecting suggestions, critics and comments from volunteers involved in the programme is very important, both because they can make useful suggestion and for making them feeling part of the
whole mechanism of the programme.

Things that mostly appeared in the comments were

- Improving guides recruitments in SISSA
- Try to propose activity that connects more areas
- Improve the SISSA Tour

Some specific suggestions were

- Having more time
- Thinking about a new format
- More reward for guides
- Having more activities in small groups
- Finding a way to stimulate questions
- Doing graphical simulation in MATLAB for high schools
- Having the SISSA tour always in English for high schools
- Using the SISSA library to do a short research

Global outcomes

Volunteers who took part in SISSA for schools are on average satisfied of the programme. Their expectations were lower with respect to what they think they gained from the participation in SISSA for schools and the other outreach activities. For most of them being involved in the programme resulted in getting more results than expected in what were their objectives before actually taking part in the programme. Moreover they found benefits they did not expect before.

Understanding both expectations and valuable results will be very important in order to find a solution for the major problem faced during the year, as emerged in the discussion during the focus groups: the fact of few people regularly involved as guides.

Volunteers complained that always the same group of people participate and gave their availability for many times in which the number of guides was not enough, and ask to find a solution to involve more students, especially new ones. PhD volunteers suggested trying to involve new people in the programme acting within each research group.

Similarly to the past evaluation done for the 2013/2014 edition, from the discussions it emerged that the mere transmission of information to pupils was not the main objective of people who decide to take part in the activities. Rather the transmission of the passion and curiosity for science itself in children and students was one of the major points of interest for PhD volunteers.

The need to improve their communication abilities was another driver to being involved. PhD students report that during their PhD training they have no opportunities to learn and train how to communicate the value and the results of their job to a general public and that SISSA for schools and the other outreaching activities gave them this opportunity. Some of the volunteers stressed that studying a topic to explain it to general public, especially to children, forced them to understand it much better then usual, improving their competence also in doing research.

Another very important aspect that appeared in the discussion was that being engaged in the outreaching activities is fun. Volunteers do it for having fun and getting some breaks from their work, although at the same time such kind of fun resulted to be useful and fruitful for their education as researchers.
Unfortunately another aspect is still present, as stressed in the previous evaluation: the fact that some supervisors discourage their students in taking part in science communication activities. The improvement of science communication skills is still not seen as part of the training that a PhD programme should provide in order to mold better scientists. On the contrary, some senior scientists keep looking at this activities as a loss of time or a not-scientific-enough attitude. Despite this fact, every year more and more people belonging to the SISSA staff (and not only PhD students) accepted to be involved, with different roles, in the events directed to the public, such as the Special Day for high schools. For sure this could be considered a sign of changing in the direction of an increased sensibility to the theme of science communication and of the social responsibility of scientists.

**SOME IDEAS FOR THE FUTURE**

**Trieste NEXT**

From September 25th to 27th SISSA will participate to the 2015 Trieste NEXT edition. The title of this year is *BioLogos - The future of Life*. Similarly to the last edition, school visits will take place during 25th and 26th mornings, whereas in the afternoons and the whole Sunday the SISSA booth will be open to the public, which could take part to some activities. The activities proposed will be some of those proposed during the other outreaching activities such as SISSA for schools, the previous Next edition and the Special Day and some new ones.

**Regular school visits**

Some improvement that should be address as regards the organization of the visit

- Better planning of the tour of SISSA designed with the volunteers.
- Improving the recruitment of new volunteers

Some more general proposals emerged from participants, volunteers and organizers

- Having a the training course in science communication for all the SISSA volunteers interested in.
- Organizing some kind of event dedicated to teachers.
- A different way of evaluate the visits, especially for high school students.
### Appendixes

**SISSA FOR SCHOOLS**

**CALENDAR 2014-2015**

From October 16th 2014 to May 28th 2015 (25 Thursday)

Interruption for New Year holiday: from December 12th, 2014 to January 14th 2015

Interruption Easter: from March 30th to April 13th, 2015

Interruption 1 May: from April 24th to May 4th, 2015

<table>
<thead>
<tr>
<th>Date</th>
<th>School</th>
<th>School level</th>
<th>Class</th>
<th>N. visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCTOBER 2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 October 2014</td>
<td>I.C. “Marco Polo” scuola primaria Gaspardis - Trieste</td>
<td>Primary</td>
<td>V C</td>
<td>19</td>
</tr>
<tr>
<td>23 October 2014</td>
<td>Scuola media Roli - Trieste</td>
<td>Junior high school</td>
<td>III</td>
<td>19</td>
</tr>
<tr>
<td>30 October 2014</td>
<td>I.C. “Marco Polo” scuola primaria Gaspardis - Trieste</td>
<td>Primary</td>
<td>V A</td>
<td>22</td>
</tr>
<tr>
<td>NOVEMBER 2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 November 2014</td>
<td>Ricreatorio F.Savio - Trieste</td>
<td>Primary</td>
<td>IV</td>
<td>21</td>
</tr>
<tr>
<td>13 November 2014</td>
<td>Liceo scientifico Copernico - Trieste</td>
<td>High school</td>
<td>2 IV</td>
<td>43</td>
</tr>
<tr>
<td>20 November 2014</td>
<td>Scuola primaria Umberto Saba - Trieste</td>
<td>Primary</td>
<td>V B</td>
<td>24</td>
</tr>
<tr>
<td>27 November 2014</td>
<td>Istituto comprensivo di via Commerciale - Trieste</td>
<td>Junior high school</td>
<td>I E</td>
<td>25</td>
</tr>
<tr>
<td>DECEMBER 2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 December 2014</td>
<td>Scuola media Corsi - Trieste</td>
<td>Junior high school</td>
<td>II</td>
<td>25</td>
</tr>
<tr>
<td>11 December 2014</td>
<td>Scuola media Corsi - Trieste</td>
<td>Junior high school</td>
<td>III</td>
<td>20</td>
</tr>
<tr>
<td>JANUARY 2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 January 2015</td>
<td>International School of Venice - Mestre</td>
<td>Junior high school</td>
<td>II e III</td>
<td>26</td>
</tr>
<tr>
<td>22 January 2015</td>
<td>Istituto comprensivo di via Commerciale - Trieste</td>
<td>Junior high school</td>
<td>II E</td>
<td>20</td>
</tr>
<tr>
<td>29 January 2015</td>
<td>I.C. “Marco Polo” scuola primaria Gaspardis - Trieste</td>
<td>Primary</td>
<td>V B</td>
<td>20</td>
</tr>
<tr>
<td>FEBRUARY 2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 February 2015</td>
<td>POSTPONED</td>
<td>High school</td>
<td>2 V</td>
<td>45</td>
</tr>
<tr>
<td>12 February 2015</td>
<td>Scuola primaria Vittorio Longo - Trieste</td>
<td>Primary</td>
<td>IV</td>
<td>21</td>
</tr>
</tbody>
</table>
26 February 2015  |  Scuola primaria Vittorio Longo - Trieste  |  Primary  |  V  |  20  

**MARCH 2015**

5 March 2015  |  Liceo scientifico Copernico - Udine  |  High school  |  2 I  |  45  

12 March 2015  |  I.C. di Via Commerciale - Scuola secondaria primo grado Corsi - Trieste  |  Junior high school  |  IIIC  |  18  

19 March 2015  |  F.lli Fonda Savio-Manzoni - Trieste  |  Junior high school  |  II  |  21  

26 March 2015  |  Liceo scientifico Copernico - Udine  |  High school  |  2 V  |  45  

26 March 2015  |  I.C. di Via Commerciale - Scuola secondaria primo grado Corsi - Trieste  |  Junior high school  |  IIIB  |  18  

**APRIL 2015**

16 April 2015  |  Scuola elementare Pertini - Trieste  |  Primary  |  IIIA  |  25  

23 April 2015  |  Centro Studi Volta - Udine  |  High school  |  V  |  19  

**MAY 2015**

7 May 2015  |  I.C. di Ponte nelle Alpi  |  Junior high school  |  IIIA  |  48  

14 May 2015  |  Scuola primaria Emo Tarabocchia - Trieste  |  Primary  |  IIIA  |  16  

21 May 2015  |  Scuola primaria Umberto Saba-Trieste  |  Primary  |  III  |  21  

28 May 2015  |  IT lingua d’insegnamento slovena J Stefan - Trieste  |  High school  |  II  |  40  

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**SISSA FOR SCHOOLS**

**CALENDAR 2015-2016**

From October 8th 2015 to May 26th 2016 (27 Thursday)

Interruption for New Year holiday: from December 18th, 2015 to January 13th 2016

Interruption Easter: from March 18th to April 06th, 2016

Interruption 1 May: from April 22th to May 4th, 2016

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## ALL ACTIVITIES PROPOSED FROM THE BEGINNING OF THE PROGRAMME

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<td>A cosmic fruit salad</td>
<td>Claudia Mancuso</td>
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<td>Our ideas of the Universe</td>
<td>Carlo Baccigalupi, Rossella Aversa, Eolo Di Casola</td>
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<td>Physics</td>
<td>Matryoshka Universe</td>
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<td>Stefano Amato and Lucia Tealdi</td>
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<td>Let’s move!</td>
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<td>When ideas fight, the brain acts as referee</td>
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<td>Water, soap and minimal surfaces</td>
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**High school**

<p>| High schools | Physics | From Newton to strings in 30 minutes | Matteo Bertolini |
| High schools | Physics | Geometry is boring...for that it works! | Eolo Di Casola |
| High schools | Physics | Time machine: science or science fiction? | Eolo Di Casola |
| High schools | Physics | The Anthropic Principle | Eolo Di Casola |
| High schools | Physics | &quot;Theory (and theories) of gravity, that is: story of a free falling.&quot; | Eolo Di Casola |
| High schools | Physics | A postcard from the universe. | Carlo Baccigalupi |
| High schools | Physics | LHC and Higgs Boson | David Marzocca |
| High schools | Physics | What are we looking for out there? | Eolo Di Casola and Claudia Mancuso |
| High schools | Physics | Ideas of space and time | Eolo Di Casola |
| High schools | Physics | LHC: promises and discoveries | David Marzocca |
| High schools | Physics | Detection of gravitational waves | Eolo Di Casola |
| High schools | Physics | Black holes and revelation | Juan Manuel Carmona Loaiza |
| High schools | Physics | Superconductivity and superfluidity: quantum effects to the naked eye | Giacomo Mazza |
| High schools | Physics | But... where galaxies come from? | Claudia Mancuso |
| High schools | Physics | Space, Time and Light: how Einstein changed the world. | Alessio Belenchia |
| High schools | Physics | Physics and biology: not so far away | Mattia Marenda, Matteo Adorisio e Nina Ilieva |
| High schools | Physics | Who has ever seen a black hole? Who has fallen in it? | Juan Carmona Loaiza |</p>
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<td>Who cares about mathematics</td>
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<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>The 2014 Nobel Prize for neuroscience: a path from space to memory</td>
<td>Alessandro Treves</td>
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<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>Behind the doors of the laboratory: The story of an experiment</td>
<td>Adina Drumea</td>
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<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>Embryonic development of the central nervous system</td>
<td>Antonello Mallamaci</td>
</tr>
<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>For a handful of neurons. Team quiz on the brain</td>
<td>Gianluca Pietra and Dario Olivieri</td>
</tr>
<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>Look into the brain without opening the head</td>
<td>Georgette Argiris and Sebastian Korb</td>
</tr>
<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>Growing... neurons!</td>
<td>Beatrice Pastore</td>
</tr>
<tr>
<td>High schools</td>
<td>Neuroscience</td>
<td>Development of the cerebral cortex</td>
<td>Antonello Mallamaci and his lab group</td>
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</table>
### Domenica 28

<table>
<thead>
<tr>
<th>Orario</th>
<th>Evento</th>
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</thead>
</table>
| 11:00  | Quo interattivo: Miti e balie di scienza
| 12:00  | Laboratorio di matematica con gli occhi di un bambino
| 15:00  | Seminario: I miti e la balie di scienza
| 18:00  | Laboratorio di matematica con gli occhi di un bambino

### Sabato 27

<table>
<thead>
<tr>
<th>Orario</th>
<th>Evento</th>
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</thead>
</table>
| 10:00  | Laboratorio di neuroscienze con gli occhi di un bambino
| 11:15  | Quo interattivo: Miti e balie di scienza
| 12:30  | Laboratorio di matematica con gli occhi di un bambino
| 15:00  | Seminario: I miti e la balie di scienza
| 18:00  | Laboratorio di matematica con gli occhi di un bambino

### Venerdì 26

<table>
<thead>
<tr>
<th>Orario</th>
<th>Evento</th>
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</table>
| 09:00  | Laboratorio di neuroscienze con gli occhi di un bambino
| 10:15  | Quo interattivo: Miti e balie di scienza
| 11:30  | Laboratorio di matematica con gli occhi di un bambino
| 15:00  | Seminario: I miti e la balie di scienza
| 18:00  | Laboratorio di matematica con gli occhi di un bambino

### Venerdì 25

<table>
<thead>
<tr>
<th>Orario</th>
<th>Evento</th>
</tr>
</thead>
</table>
| 20:00  | Seminario: I miti e la balie di scienza
| 21:00  | Il mondo di confronto e la matematica va in giro

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SISSA BOOTH PROGRAMME FOR TRIESTE NEXT 2014

SISSA PER LA SCUOLA
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