Art as a language to represent science:
a project for Lyceum

Simone Paoletti and Pierluigi Paolucci
Istituto Nazionale di Fisica Nucleare
on behalf of Art&Science Across Italy Collaboration
Which color is the Higgs boson?
Is art a universal language which can speak of science?
Is art a universal language which can speak of science?

- The project was born in 2015 from an idea by P. Paolucci (Napoli), M. Hoch (Austria) and A. Alexopoulos (CERN).
- It was funded and organised by INFN and CERN.
- It is addressed to 3rd and 4th year High School students.
Is art a universal language which can speak of science?

The project was born in 2015 from an idea by P. Paolucci (Napoli), M. Hoch (Austria) and A. Alexopoulos (CERN).

It was funded and organised by INFN and CERN.

It is addressed to 3rd and 4th year High School students.

STEAM is an educational and innovation framework bringing science, technology, mathematic and engineering together with the arts with the goal of being more engaging, creative and naturally successful for all members of any educational system.
The Steps of the Project
The Steps of the Project

Step 1: Education (6 months)
- Lectures on physics, other sciences, art, literature, music, …
- Visit sites of cultural interest: science centers, INFN labs, Museums, trip to cities …
The Steps of the Project

Step 1: Education (6 months)
- Lectures on physics, other sciences, art, literature, music, …
- Visit sites of cultural interest: science centers, INFN labs, Museums, trip to cities …

Step 2: Project design
- Create teams of 3
- Think about the project - Can be anything: picture, sculpture, jewel, animation/movie, music, book, electronic circuit, table top game …
The Steps of the Project

Step 1: Education (6 months)
- Lectures on physics, other sciences, art, literature, music, …
- Visit sites of cultural interest: science centers, INFN labs, Museums, trip to cities …

Step 2: Project design
- Create teams of 3
- Think about the project - Can be anything: picture, sculpture, jewel, animation/movie, music, book, electronic circuit, table top game …

Step 3: Artwork Creation (3 months)
The Steps of the Project

Step 1: Education (6 months)
- Lectures on physics, other sciences, art, literature, music, …
- Visit sites of cultural interest: science centers, INFN labs, Museums, trip to cities …

Step 2: Project design
- Create teams of 3
- Think about the project - Can be anything: picture, sculpture, jewel, animation/movie, music, book, electronic circuit, table top game …

Step 3: Artwork Creation (3 months)

Step 4: Local Exhibition
- 2-4 weeks exhibition in the city
- Local contest to participate in the national exhibition
Step 1: Education (6 months)
- Lectures on physics, other sciences, art, literature, music, …
- Visit sites of cultural interest: science centers, INFN labs, Museums, trip to cities …

Step 2: Project design
- Create teams of 3
- Think about the project - Can be anything: picture, sculpture, jewel, animation/movie, music, book, electronic circuit, table top game …

Step 3: Artwork Creation (3 months)

Step 4: Local Exhibition
- 2-4 weeks exhibition in the city
- Local contest to participate in the national exhibition

Step 5: National Exhibition
- national contest
- 24 students are invited to an Art&Science Master @ CERN
Step 1: Education (6 months)
- Lectures on physics, other sciences, art, literature, music, …
- Visit sites of cultural interest: science centers, INFN labs, Museums, trip to cities …

Step 2: Project design
- Create teams of 3
- Think about the project - Can be anything: picture, sculpture, jewel, animation/movie, music, book, electronic circuit, table top game …

Step 3: Artwork Creation (3 months)

Step 4: Local Exhibition
- 2-4 weeks exhibition in the city
- Local contest to participate in the national exhibition

Step 5: National Exhibition
- National contest
- 24 students are invited to an Art&Science Master @ CERN

Step 6: Master at CERN
- Science and art seminars
- Visits to CERN experiments
- Hands on @ S’Cool Lab
Stimulate Creativity
Stimulate Creativity
Engage in Team Work
Stimulate Creativity
Engage in Team Work
Make a Project
Stimulate Creativity
Engage in Team Work
Make a Project
Profit from Interdisciplinary Competences
Stimulate Creativity
Engage in Team Work
Make a Project
Profit from Interdisciplinary Competences

Bring closer to science:
→ Enable students to express their take
→ We don’t select students and we don’t look at their CV!
Art&Science

A stimulating affinity
Take the chance to break a mindset barrier
Take the chance to break a mindset barrier

Art and Science sharing common historical roots
Take the chance to break a mindset barrier

Art and Science sharing common historical roots

Different ways to observe the world both involving:

Creativity and Abstraction
First edition: 2016-2018

Milano
Padova
Venezia
Firenze
Napoli

38 schools, 100 teachers, more than 3000 students
5 local exhibitions
More than 410 artworks ...
National exhibition @ MANN Naples
Artworks at the national exhibition ...

Make **SCIENCE**

not **WAR**
Award Ceremonies
Public event “on art and science”
Master at CERN
“Numerous activities ... what I liked the most is they were concerning not Science alone, but Philosophy, joining together many things usually related in different ways ... They were able to build a one.”

“Every discipline is not standing alone but we can find connections. This is important also at CERN: people dealing substantially with different scopes working together to a common goal which is to progress with new discoveries which can help all society”
Dai colori del Calamandrèi alla fantasía del Mercalli sfida tra studenti a colpi di arte, scienza e creatività

L'a cura di: S. Paoletti, P. Paolucci - INFN - EPS HEP 2019

More than 100 citations on the press and the national RAI channels

Website: 65.000 clicks/3.000 readers
Facebook: 2.500 followers
Instagram: 250 followers
Youtube channel

https://web.infn.it/artandscience
https://www.facebook.com/artandscienceacrossitaly/
https://www.instagram.com/artandscienceacrossitaly/
Second edition: 2019-2020

PARTNER:

Sapienza Università di Roma
Università degli Studi della Basilicata
Università degli Studi di Napoli Federico II
Università degli Studi di Napoli Parthenope
Università degli Studi di Padova
Università degli Studi di Genova
Università di Pisa
Università degli Studi di Torino
Università degli Studi di Napoli Federico II
Università degli Studi di Milano
Università degli Studi di Milano-Bicocca
Università degli Studi di Firenze
Accademia delle Arti del Disegno di Firenze
Accademia delle belle arti di Roma
Accademia delle belle arti di Napoli
Istituto Italiano di Tecnologia (IIT)
CNR-SPIN
CNR-IMAA
CNR-INO di Pisa
EU Insight project
AMVA4NewPhysics

Firenze
Genova
Milano
Napoli
Padova
Venezia
Pisa
Potenza
Matera
Roma
Torino

• 11 towns
• 90 high schools
• 3646 students
• 98 researchers involved
• 21 institutional partners
• 30 patronages
### Gender
- Female: 55.1%
- Male: 44.9%

### School
- Art: 19.6%
- Classic: 16.3%
- Scientific: 64.1%

### Cities
- Roma: 500
- Napoli: 750
- Univ. Basilicata: 250
- Torino: 200
- Genova: 200
- Pisa: 200
- Milano: 200
- Padova: 100
- Firenze: 100
- Venezia: 100
Evaluation - Students

Survey over a sample of 700 students

General appreciation

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How much did this experience bring you closer to science?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How difficult it was to create the artistic composition?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Evaluation - Teachers

Survey made on a sample of 70 teachers

On the whole, how fruitful or unfruitful do you think that the time you have spent on the ‘Art & Science across Italy’ activity has been?

Would you like to propose this project to your future classrooms?

Gender

male 33,8%
female 66,2%
Evaluation - Teachers

How easy or difficult is it to fit the approaches of the "Art & Science across Italy" activity you are working on into the curriculum you are expected to cover?

How easy or difficult is it to fit the preparation work of "Art & Science across Italy" activity into your working timetable at school (outside classes)?

How easy or difficult is it to fit the approaches of "Art & Science across Italy" activity you are planning into the timetable your classes have?
Thank you for your attention!