IET Faraday Challenge Days
2018-2019 season event report

Explore the IET Faraday Challenge at theiet.org/faraday
IET Faraday Challenge Days 2018-2019 Review

This was our biggest season yet. We held 68 IET in-school events, 12 events at our Academic Partner universities and, thanks to the generosity of our supporters, we were able to hold a further 109 events throughout the UK. That’s a total of 189 IET Faraday Challenge Days with 475 schools and 6,326 students involved.

Our supporters and sponsors this year included Airbus, Arconic Foundation, David Family Foundation, Jack Petchey Foundation, Kirby Laing Foundation, Kitronik, Motorola Solutions Foundation, Queen Mary University, Science & Technology Facilities Council and Spirax Sarco.

The theme for this season was in association with James Webb Space Telescope. When it launches, this spectacular telescope will look even deeper into the Universe than Hubble. We asked teams of students to develop a product to help scientists working on the Space Telescope. Their product could be used during the assembly of the telescope; to help with transporting parts from all over the world; for launch; for deploying, powering or focusing the telescope once in space; or to keep the engineers themselves comfortable, safe or happy whilst working on the project. The prototype had to include an electrical circuit.

After designing and building the prototype, the teams presented their ideas to the judge, teachers and their peers.

Judges scored students on their planning and research; development and functionality of the product; use of budget; how they met the demands of the area/environment; the final presentation, and their teamwork and attitude.

Members of each winning team won an Amazon voucher for themselves, a trophy for their school, and had their score added to the league table. At the end of the season, the five top teams took part at the National Final at The Royal Observatory in Edinburgh on 10 July.
National Final

At the National Final at The Royal Observatory, teams took a tour around the facility and met with the engineers working on the telescope. They then tackled a fresh challenge, creating a prototype to assist with moving the telescope, once assembled, to the launch site in French Guiana.

The prototype could be something to move things out of the way on the route, to sense obstacles or dangers or to monitor the safety of the telescope itself. The prototype had to include an electrical circuit, contain at least two components and be made with materials purchased from the Faraday Shop on a budget of 100 Faradays.

The five national finalists were Bolsover School, Derbyshire; Castle Court School, Wimborne; Holy Family Catholic High School, North Yorkshire; Lenzie Academy in Glasgow and St Benedict’s Catholic College, Colchester.

After a close competition with impressive presentations this year’s winning team was Lenzie Academy. The team focused their attention on a vehicle that could go ahead of the lorry carrying the telescope. It had a sweeping arm to remove debris from the lorry’s path, with a sensor to detect heavier obstacles and an alert system to inform the driver.

It was an inspiring day for everyone involved and we are sure all the students have very bright futures ahead of them!

Faraday Challenge Days really do inspire students and raise the profile of STEM overall. Let’s hear from the teachers...

"Outstanding day, impressive organisation and students totally engaged all day - many converted to engineering careers. Easy to host, thank you."

"The day was a success. The students seemed to really enjoy themselves and stay focused. I would highly recommend all schools to participate."

"Fun day for the students, with some excellent activities and constructive feedback. I think all involved will have learned something new today, whether that is practical knowledge or team/leadership skills. Thank you!"

"Brilliant day! Enhanced the learning, teamwork, creativity, communication and confidence of all involved and encouraged enthusiasm for STEM!"
Quotes from professionals

Olivia Johnson
Public Engagement Programme Manager
James Webb Space Telescope

“We were thrilled to partner with the IET on this year’s challenge themed around the engineering of the James Webb Space Telescope. Astronomy is a technology-enabled science - we can only explore more of our Universe by working together to build cutting-edge technology. The skills young people develop through participation in the Faraday Challenge - innovation, teamwork, planning and testing - are those needed to make the key science instruments for the next generation, and to tackle big challenges here on Earth.”

Nic Acton
Arconic Foundation UK Lead

“When Arconic were looking for a partner to help them get involved in STEM activities across all their locations within UK, the Faraday Challenge ticked all the boxes! The IET engaged all the UK Arconic locations to excite and inspire children across the country. With the UK facing a shortfall of new engineers it is paramount we continue to give young people the opportunity to experience engineering in a fun and engaging way and inspire them to consider engineering as a career. We will continue to grow and expand the relationships we have built with local schools across the country and would like to thank the IET for the opportunity to take part in this excellent Project.”

Phil Hart
IET Challenge Leader

“What a fantastic season! The 2018-2019 Faraday Challenge Day season was met with great enthusiasm by the students and teachers throughout the UK. Initially, as the awareness of the James Webb Space Telescope (JWST) was likely to be limited, I thought I would have to spend a fair bit of time explaining the potential challenges the JWST engineers face. I could not have been more wrong. On most of the Challenge Days, I found that the students were itching to get on with some practical development as soon as they knew the subject matter.

We purposely designed the brief so it was quite broad and the students could really use their imagination and explore many aspects of the JWST project. This worked particularly well as it allowed for much discussion and debate within the teams, particularly in the Planning section of the day. It was a joy to stand back and see a room of 36 young engineers enthusiastically debating solutions to engineering challenges.

One particularly enjoyable part of the day is when I open the shop and the students are then allowed to buy their components and start to build their chosen developments. So often you see the students looking towards the adults in the room for approval or guidance. This, of course, is not allowed. The students have their own teammates and that’s it! Soon they get used to making decisions within the team and after about 15 minutes of the shop opening, the room becomes a really creative environment. To see the belief in their own ability build this way is a real pleasure.

The teachers found this rewarding, often saying that they are used to being given answers to problems and it’s great to see them being given the time, space and resource to work things out themselves. The teachers are also regularly surprised that the students are rushing back to the room so early after lunch!

To be in a room where some students will be the next generation of engineers is very rewarding and makes my role of Challenge Leader extremely enjoyable. To see students who had no real grasp of engineering at 9am that day get really excited about the subject by 3pm is great.

Roll on 2019-2020.”
Headline statistics from the full season

No. of events: 189
No. of students: 6,326
No. of schools: 475 (including 1 Pupil Referral Unit)

Student feedback

The following stats represent the % of students who were in agreement with these statements:

- I enjoyed the Faraday Challenge 98%
- I learnt new things 98%
- I now understand more about what engineering is 97%
- I have a better idea about what engineers do and the skills they need 96%
- Before today I was considering studying or working in engineering 33%
- Following this event I am now considering studying or working in engineering 59%
- I'd like to do something like this again 96%

Age

- 11 years 1%
- 12 years 51%
- 13 years 46%
- 14 years 1%
- 15 years 0.08%
- Not specified 1%

Gender

- Male 46%
- Female 53%
- Not specified 1%
Student quotes

“I enjoyed it and it opened my eyes to the world of engineering.”
12 year old girl

“Thank you for letting us take part. I had so much fun! I strongly feel that we need more girls in engineering and they have inspired me and my friends. Thanks again.”
12 year old girl

“Really enjoyed today. It was great to be learning in a new exciting way. The leader was very nice/friendly 😊”
12 year old boy

“The Faraday Challenge is amazing and convinces young people to use their creative ideas to help the world. I love making stuff!”
12 year old boy

Student feedback

- Positive: 95%
- Negative: 1%
- Both: 3%
- Other: 1%
**Teacher feedback**

The following stats represent the % of teachers who were in agreement with these statements:

- The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years: 99%
- The interest of the students was retained throughout the day: 100%
- The students learnt new concepts and expanded their knowledge base: 100%
- The registration process was straightforward with enough time to plan for the event: 99%
- I would be interested in taking part next year: 100%
- I would recommend the IET Faraday Programme: 100%

**Teacher quotes**

"Extremely well run - good open brief - inclusive and encouraging to all."

"An excellent activity that provided a high level of stretch and challenge. It challenged students' own perceptions of their skills and strengths. It was possible to see all students learn and grow throughout the day."

"The students were engaged throughout the day and they all felt like they were winners."

**Special thanks**

The IET Faraday Challenge has reached more young people than ever before thanks to the generosity of engineering, technology and science companies and charities who have funded individual events or contributed towards the core IET events and online teaching resources.

A HUGE THANK YOU TO YOU ALL.

The next generation of Engineers will have better skills thanks to their IET Faraday experiences and thanks to you.
Airbus

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<thead>
<tr>
<th>Date</th>
<th>Host school</th>
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<tbody>
<tr>
<td>26 September 2018</td>
<td>Thomas Alleyne Academy</td>
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<td>27 September 2018</td>
<td>Barnwell School</td>
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<td>28 November 2018</td>
<td>Admiral Lord Nelson</td>
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<td>12 December 2018</td>
<td>Alun School</td>
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<td>20 December 2018</td>
<td>Aerospace Museum Bristol</td>
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<td>31 January 2019</td>
<td>Portsmouth University</td>
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<td>1 February 2019</td>
<td>Bay House School</td>
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<td>12 February 2019</td>
<td>Hawarden School</td>
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<td>25 February 2019</td>
<td>Airbus Facility Bristol</td>
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<td>26 February 2019</td>
<td>Nailsea School</td>
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<td>27 March 2019</td>
<td>St George’s School</td>
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<td>10 May 2019</td>
<td>Blacon High School</td>
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Student feedback

Age: 12: 232 (58%), 13: 162 (41%), not specified: 2 (1%)
Gender: Male: 197 (49%), Female: 200 (50%), not specified: 2 (1%)

The following stats represent the % of students who were in agreement with these statements:
- I enjoyed the Faraday Challenge 98%
- I learnt new things 98%
- I now understand more about what engineering is 97%
- I have a better idea about what engineers do and the skills they need 96%
- Before today I was considering studying or working in engineering 32%
- Following this event I am now considering studying or working in engineering 61%
- I’d like to do something like this again 94%

No. of events: 12
No. of students: 414
No. of schools: 26

Student quotes

"Very fun day that I would love to do again. I learnt that I’d enjoy engineering as a job."
13 year old boy

"I thought the challenge was really fun and has given me a new love for engineering and physics."
13 year old girl

"It was helpful to see what I could do in the future and what it’s like to work in those conditions. I will consider becoming an engineer now."
12 year old girl

"Interactive, fun and educational. The perfect day!"
12 year old boy

"I loved this opportunity and before this I never thought I’d love to be an engineer when I’m older but I would now."
13 year old girl
Teacher feedback

The following stats represent the % of teachers who were in agreement with these statements:

- The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years  100%
- The interest of the students was retained throughout the day  100%
- The students learnt new concepts and expanded their knowledge base  100%
- The registration process was straightforward with enough time to plan for the event  97%
- I would be interested in taking part next year  97%
- I would recommend the IET Faraday Programme to other teachers  100%

Teacher quotes

"Absolutely amazing session - it got all of the students thinking and working in an engineering mindset. The presenter’s knowledge and enthusiasm was second to none and it was evident all of the students loved the day!"

"This was my first Faraday experience and I was totally impressed. Would recommend and attend again. Very enjoyable and proactive event."

"Absolutely delighted in our student's participation. The day was very enjoyable and stretched and challenged our students very well."

"Excellent challenge day. Fantastic to network with other teachers, the IET, Faraday Staff and engineers. Students rose to the challenge! Our teams appreciated help and advice from a 'proper' engineer. Great to have access to so many resources and the step further of a budget - students experienced this for the first time. Lovely to be inspired by the passion of students from different schools too - lots of potential engineers and designers, and great teamwork."
Arconic Foundation

Student feedback

Age: 12: 393 (62%), 13: 239 (37%), not specified: 6 (1%)
Gender: Male: 292 (46%), Female: 333 (52%), not specified: 5 (1%), other: 8 (1%)

The following stats represent the % of students who were in agreement with these statements:
- I enjoyed the Faraday Challenge 99%
- I learnt new things 98%
- I now understand more about what engineering is 96%
- I have a better idea about what engineers do and the skills they need 95%
- Before today I was considering studying or working in engineering 30%
- Following this event I am now considering studying or working in engineering 59%
- I’d like to do something like this again 95%

Student quotes

"It was really fun and I’m always up for that especially when against other schools." 12 year old boy

"I enjoyed the apprenticeship style learning and liked how we had to solve a problem with a budget and then having develop and pitch our solution." 13 year old girl

"I enjoyed being put under pressure and working in proper work conditions." 13 year old girl
Teacher feedback

The following stats represent the % of teachers who were in agreement with these statements:

- The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years: 100%
- The interest of the students was retained throughout the day: 100%
- The students learnt new concepts and expanded their knowledge base: 100%
- The registration process was straightforward with enough time to plan for the event: 100%
- I would be interested in taking part next year: 100%
- I would recommend the IET Faraday Programme to other teachers: 100%

Teacher quotes

"The day was excellent, I particularly enjoyed the fact budgeting was involved and many facets other than just the science focus. Although the STEM content has also been of a high calibre. Stretching but at a suitable complexity for accessibility."

"Inspirational presenter. Students engaged throughout the day. The day was an accurate representation of real-life situations."

"Lots of skill development. Great ideas, presentations, team work, creativity and time management."
## David Family Foundation

<table>
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<tr>
<th>Date</th>
<th>Host school</th>
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<tbody>
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<td>19 October 2018</td>
<td>Christ the King College</td>
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<td>20 November 2018</td>
<td>Bowland High School</td>
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<td>10 January 2019</td>
<td>Belmont Community School</td>
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<td>22 January 2019</td>
<td>Reddish Vale High School</td>
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<td>7 February 2019</td>
<td>Blue Coat C of E Academy</td>
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<td>19 March 2019</td>
<td>Netherhall Learning Campus School</td>
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<td>26 March 2019</td>
<td>St Peter’s School</td>
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<td>27 March 2019</td>
<td>Sunderland University</td>
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<td>21 May 2019</td>
<td>Parkside Academy</td>
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<td>24 May 2019</td>
<td>Bethany School</td>
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No. of events: 10  
No. of students: 336  
No. of schools: 24

### Student feedback

Age: 11: 3 (1%), 12: 103 (46%), 13: 115 (52%), not specified: 3 (1%)  
Gender: Male: 104 (47%), Female: 115 (52%), not specified: 3 (1%)

The following stats represent the % of students who were in agreement with these statements:

- I enjoyed the Faraday Challenge: 97%  
- I learnt new things: 98%  
- I now understand more about what engineering is: 97%  
- I have a better idea about what engineers do and the skills they need: 98%  
- Before today I was considering studying or working in engineering: 28%  
- Following this event I am now considering studying or working in engineering: 51%  
- I'd like to do something like this again: 95%

### Student quotes

"I had a great day and I learnt the true meaning of engineering… Creativity!"  
12 year old girl

"I liked this, and it was a good experience and helped with much more than just engineering."  
12 year old girl

"I enjoyed working with all the electronics and figuring out how it all worked. It was amazing fun and genuinely worthwhile."  
12 year old boy
Teacher feedback

The following stats represent the % of teachers who were in agreement with these statements:

- The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years: 100%
- The interest of the students was retained throughout the day: 100%
- The students learnt new concepts and expanded their knowledge base: 100%
- The registration process was straightforward with enough time to plan for the event: 90%
- I would be interested in taking part next year: 100%
- I would recommend the IET Faraday Programme to other teachers: 100%

"Teacher quotes"

"Fantastic day which has inspired a number of students."

"Really impressed with the prototypes year 8 came up with, excellent experience for them."

"Good session. I liked the fact that it also concentrated on soft skills as well as engineering. Fabulous!"
## Jack Petchey Foundation

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<td>10 October</td>
<td>Oasis Academy Southbank</td>
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<td>15 October</td>
<td>Clacton County High School</td>
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<td>16 October</td>
<td>Colchester County High School for Girls</td>
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<td>17 October</td>
<td>Maltings Academy</td>
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<td>30 October</td>
<td>Ernest Bevin College</td>
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<td>Lilian Bayliss Technology School</td>
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<td>2 November</td>
<td>Wallington High School for Girls</td>
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<td>Orleans Park School</td>
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<td>Grey Court School</td>
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<td>St Olave's Grammar School</td>
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<td>St Catherine's Catholic School for Girls</td>
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<td>Ravensbourne School</td>
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<td>Loxford School</td>
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<td>Shenfield High School</td>
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<td>Mayfield School</td>
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<td>Park High School</td>
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<td>5 December</td>
<td>Greenford School</td>
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<td>6 December</td>
<td>Walthamstow School for Girls</td>
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<td>Highams Park School</td>
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<td>St Thomas More Catholic School</td>
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<td>Edmonton County School</td>
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<td>St Marks West Essex Catholic School</td>
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<td>Philip Morant School</td>
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<td>Chase High School</td>
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<td>Sarah Bonnell School</td>
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<td>St Bonaventure's School</td>
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<td>Chiswick School</td>
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<td>Marylebone Boys</td>
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<td>1 April</td>
<td>Langley Park School</td>
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<td>2 April</td>
<td>Harris Academy Purley</td>
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<td>Woodside High School</td>
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<td>Ramsey Academy</td>
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<td>Riddlesdown Collegiate</td>
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<td>4 April</td>
<td>Tabor Academy</td>
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<td>23 April</td>
<td>Lady Margaret School</td>
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<th>Date</th>
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<tr>
<td>24 April</td>
<td>Harris Academy St John's Wood</td>
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<td>25 April</td>
<td>Kingsley Academy</td>
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<td>26 April</td>
<td>Copthall School</td>
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<td>29 April</td>
<td>Harris Girls Academy East Dulwich</td>
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<td>3 May</td>
<td>Eastbury School</td>
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<td>4 May</td>
<td>Dagenham Park High School</td>
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<td>15 May</td>
<td>Coopers Company &amp; Coborn School</td>
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<td>16 May</td>
<td>Harris Academy Rainham</td>
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<td>17 May</td>
<td>Billericay School</td>
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<td>22 May</td>
<td>Dormer Wells High School</td>
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<td>13 June</td>
<td>Eastbrook School</td>
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<tr>
<td>25 June</td>
<td>Chislehurst &amp; Sidcup Grammar School</td>
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No. of events: 60  
No. of students: 1,954  
No. of schools: 117  

Student feedback:

Age: 11: 21 (1.1%), 12: 987 (52%), 13: 881 (46%), 14: 2 (0.1%), not specified: 23 (1%)  
Gender: Male: 886 (46%), Female: 1,007 (53%), not specified: 21 (1%)  

The following stats represent the % of students who were in agreement with these statements:

- I enjoyed the Faraday Challenge: 98%  
- I learnt new things: 97%  
- I now understand more about what engineering is: 97%  
- I have a better idea about what engineers do and the skills they need: 97%  
- Before today I was considering studying or working in engineering: 32%  
- Following this event I am now considering studying or working in engineering: 60%  
- I’d like to do something like this again: 96%
**Student quotes**

"It was extremely fun to do and showed engineering in a positive way and helped me to understand the jobs engineers do and problems they may face."

12 year old girl

"I thought before this that engineering was boring, but it is actually amazing!"

12 year old girl

"Engineering is better and had more of a range of skills than I thought."

12 year old boy

"This was a great taster of what engineers do in real life."

12 year old boy

"I really enjoyed today, it has taught me you do not have to be a boy to be a decent engineer!"

13 year old girl

**Teacher quotes**

"Excellent day. Really well presented. It's really rare for pupils to have free design - it worked brilliantly. Thank you."

"Very easy to plan/organise from a teacher’s perspective. We'll continue to participate and highly recommend to any school wanting to expand their STEM exposure."

"Brilliant day. Hopefully it will inspire our students to do more STEM projects. It has inspired me!"

**Teacher feedback**

The following stats represent the % of teachers who were in agreement with these statements:

- The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years: 99%
- The interest of the students was retained throughout the day: 100%
- The students learnt new concepts and expanded their knowledge base: 100%
- The registration process was straightforward with enough time to plan for the event: 99%
- I would be interested in taking part next year: 100%
- I would recommend the IET Faraday Programme to other teachers: 100%
The winning teams from each of the Jack Petchey Foundation supported events were invited to attend an afternoon event on 26 June at IET London: Savoy Place.

This was to celebrate the achievements of all the teams and an opportunity for students to showcase their products and share ideas. The afternoon involved the students marketing their ideas to the IET judges and peers, and then the students voted for their favourite team. The team with the most votes received the coveted 'Aspiring Engineers Choice Award'.

There were speeches from Professor Colin Cunningham, University of Edinburgh and Trudy Kilcullen, CEO at the Jack Petchey Foundation with a special appearance from Bobby Seagull. There were 7 different award categories.

And the winners are:

- **Team Spirit**
  Harwich and Dovercourt High School

- **Innovation**
  St Mark's West Essex Catholic High School

- **Product Design**
  Park High School

- **Most Promising Engineers**
  Northwood School

- **Best Display**
  Edmonton County School

- **Team We Would Most Like To Spend a Day With**
  Ramsey Academy

- **Aspiring Engineers Choice Award**
  Ravens Wood School
Date | Host school
---|---
22 January 2019 | Rutherford Appleton Laboratory
12 June 2019 | Daresbury Laboratory

No. of events: 2
No. of students: 71
No. of schools: 10

Student feedback

Age: 11: 1 (1.4%), 12: 25 (35.2%), 13: 45 (63.4%)
Gender: Male: 34 (48%), Female: 34 (48%), not specified: 3 (4%)

The following stats represent the % of students who were in agreement with these statements:
- I enjoyed the Faraday Challenge 100%
- I learnt new things 97%
- I now understand more about what engineering is 94%
- I have a better idea about what engineers do and the skills they need 89%
- Before today I was considering studying or working in engineering 24%
- Following this event I am now considering studying or working in engineering 61%
- I’d like to do something like this again 94%

"I like how complicated it was and the trust that we were given to make our own idea."
13 year old boy

"I wish we knew a bit more about engineering as a team because we don't do it at school and I would like to do it more!"
13 year old girl
**Teacher feedback**

The following stats represent the % of teachers who were in agreement with these statements:

- The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years: 100%
- The interest of the students was retained throughout the day: 100%
- The students learnt new concepts and expanded their knowledge base: 100%
- The registration process was straightforward with enough time to plan for the event: 100%
- I would be interested in taking part next year: 100%
- I would recommend the IET Faraday Programme to other teachers: 100%

**Teacher quotes**

"Great day. Very relatable and fun. Lots of scope for different ideas/skills. Surprised how much they got done."

"Really great to be able to bring the students to Rutherford Appleton Laboratory for this event."

"Really excellent day, good challenging event and competing against other schools was brilliant. Boys learnt a lot. We'll be back!"
Spirax Sarco

<table>
<thead>
<tr>
<th>Date</th>
<th>Host School</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 February 2019</td>
<td>Penryn College</td>
</tr>
<tr>
<td>15 February 2019</td>
<td>Helston Community College</td>
</tr>
<tr>
<td>20 March 2019</td>
<td>All Saints Academy</td>
</tr>
<tr>
<td>21 March 2019</td>
<td>Pittsville School</td>
</tr>
<tr>
<td>21 May 2019</td>
<td>Chosen Hill School</td>
</tr>
</tbody>
</table>

No. of events: 5
No. of students: 163
No. of schools: 9

Student feedback

Age: 12: 74 (46%), 13: 81 (50%), 14: 4 (2%), 15: 1 (1%), not specified: 1 (1%)
Gender: Male: 103 (64%), Female: 57 (35%), not specified: 1 (1%)

The following stats represent the % of students who were in agreement with these statements:

- I enjoyed the Faraday Challenge 98%
- I learnt new things 99%
- I now understand more about what engineering is 99%
- I have a better idea about what engineers do and the skills they need 99%
- Before today I was considering studying or working in engineering 43%
- Following this event I am now considering studying or working in engineering 67%
- I'd like to do something like this again 96%

Student quotes

"I really enjoyed being able to learn new things, this has opened my mind."

13 year old girl
Teacher feedback

The following stats represent the % of teachers who were in agreement with these statements:

- The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years 100%
- The interest of the students was retained throughout the day 100%
- The students learnt new concepts and expanded their knowledge base 100%
- The registration process was straightforward with enough time to plan for the event 71%
- I would be interested in taking part next year 100%
- I would recommend the IET Faraday Programme to other teachers 100%

Teacher quotes

“Fantastic day! Students thoroughly enjoyed the day. Well organised and it allowed the students to work together and think outside the box.”

“Awesome. I was really interested to see the level of creativity allowed in the task. Students rose to the challenge set.”

“An enlightening experience for students and teachers. Highly recommended.”