IET Education
The Institution of Engineering and Technology
Faraday

IET Faraday Challenge Days 2017-18 season

Event report

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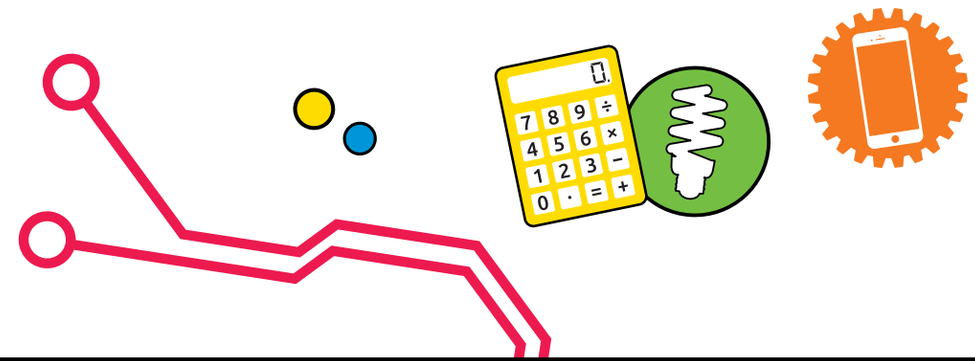
www.ietfaraday.org

IET Faraday Challenge Days 2017-18

The 2017-18 season was the 10th Anniversary of the IET Faraday Challenge. We received 282 applications from schools wanting to host one of the 68 in-school events. We also ran 12 events at the IET's Academic Partner Universities, and thanks to the overwhelming support from sponsors, we were able to run a total of 167 Faraday Challenge Days reaching 480 schools and 5,670 students. Our sponsors include Airbus Foundation, Arconic Foundation, Bosch UK, Jack Petchey Foundation, Kitronik, Motorola Solutions Foundation, Queen Mary University and Science & Technology Facilities Council.

The 2017-18 challenge theme was in association with Thorpe Park Resort. Teams of six students were given the task of developing a new attraction for a specific area of the park. Students invented rides, restaurants and VR cinemas to name but a few. After designing and building the prototype, which had to include an electrical circuit, they presented the ideas to the judge, teachers and their peers.

Students are scored throughout the day on their planning and research; development and functionality of the product; use of budget; how they met the demands of the attraction area/environment and target market; the final presentation, and their teamwork and attitude throughout. 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 5 top scoring teams were invited to take part in the National Final at Thorpe Park Resort in Surrey on 11th July 2018.



National Final

At the National Final, the teams were randomly given an attraction to research. They had to come up with ways of making it safer, more attractive to visitors or more efficient to use. Their idea must include an electrical circuit and they should take into account ride safety, queuing times and bag storage. Teams had 10 minutes to pitch their ideas to the judges and were scored on the creativity, innovation and bravery.

This year's winning team from King Edward VI Camp Hill School for Girls, in Birmingham, concentrated on the safety aspects of the Saw ride adding an emergency button that glows in the dark and signalling lights to indicate when visitors are seated securely. The four runners up teams were from Bishop Wordsworth's School, Salisbury; Chislehurst & Sidcup Grammar School, Sidcup; Dr Challoner's High School, Little Chalfont; and Horsforth School, Leeds.

All the students were amazing and we are positive that some future engineers have been inspired during their Faraday Challenge Day experience.

Quotes from professionals

Dawn Childs

Group Engineering Director for Merlin Entertainments

"Increasing enthusiasm for engineering in schools and inspiring the next generation of engineers is absolutely critical to try and plug the gap in engineering skills in the UK. Engineering within the leisure and entertainment sector is very exciting, creative and enjoyable. That is why it was really important for Thorpe Park and Merlin to partner with the IET for the Faraday Challenge to allow another type of engineering to be showcased right across the country. The fact that over 50% of the students were girls is incredible and demonstrates that less known forms of engineering can really capture the imagination!"

Mick Dunne

IET Challenge Leader

"I have had a fabulous time working as a Challenge Leader. There really is nothing quite like the buzz of excitement, often mixed with a little apprehension, as six teams of young (12-13 year old) engineers gather to compete in a Faraday Challenge. Once given the brief and with varying degrees of understanding about the nature of the task before them, away they go. Immediately, transferable skills such as teamwork, effective communication, reflecting on and evaluating both their own and their teammates' limitations and capacities, although not always universally recognised, become key aspects of ensuring a successful day. I have thoroughly enjoyed many different aspects of a Challenge Day, but my greatest satisfaction is to watch how these young people take on the responsibility of tackling the brief, how they develop growing self-assurance and gain confidence in decision making and functioning independently of their teacher. The stronger teams ensure both labour is divided effectively across the team and each member has their nominated responsibility and, most importantly, a voice. Most impressive has been the flair and verve observed as teams apply enterprising, innovative and quite often, totally unexpected creative engineering solutions to the task. Having worked in education for forty years, I can honestly state that this year's Faraday Challenge has been one of the most worthy experiences of my professional life. I also commend both the teachers and host schools for enthusiastically supporting such an important event in the lives of these young potential engineers.

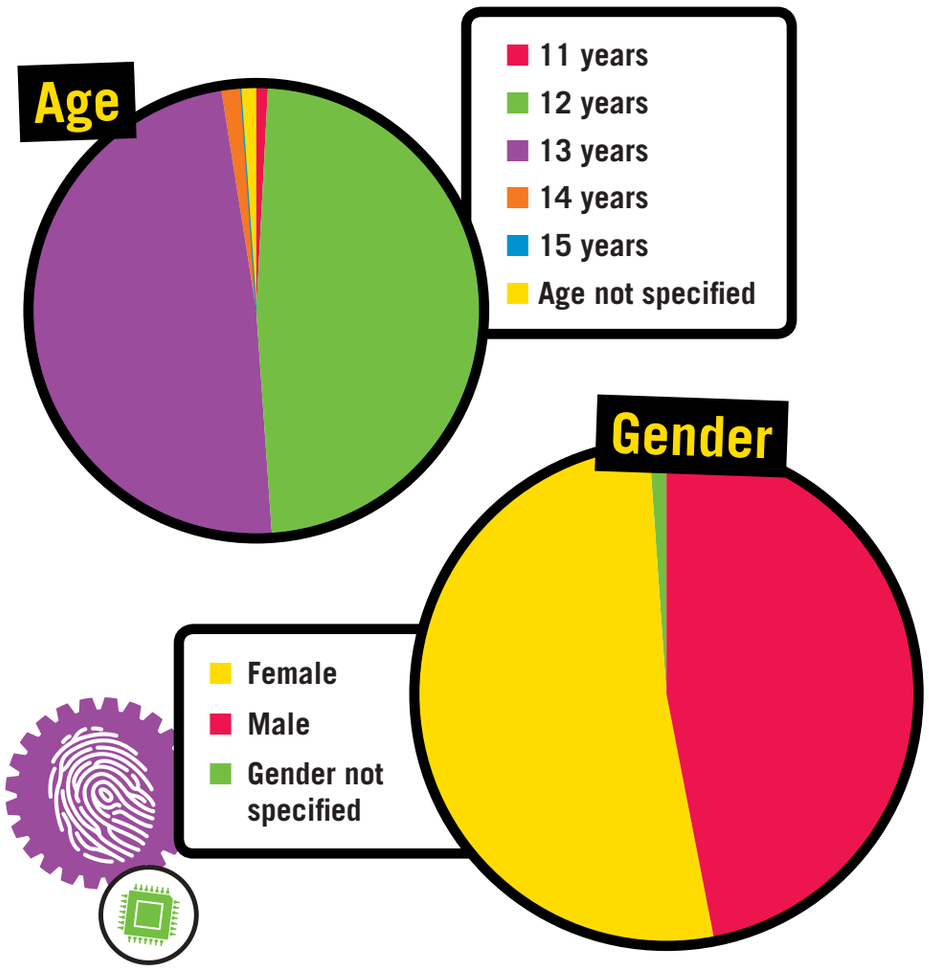
Sir Jack Petchey CBE

Founder of Jack Petchey Foundation

"My introduction to engineering was as a teenager in the Fleet Air Arm. I think it's such a vital skill for young people and for the future of this country. We need more engineers! It's really important to get young people interested in engineering at an early age. This is why we support the IET Faraday Challenge. It teaches young people how to 'think outside the box', to work together as a team, bringing all sorts of creative ideas together in order to solve problems. The 'Challenge' element creates a sense of excitement about the project. It is wonderful to see the way young people work in teams, drawing on each other's strengths and coming up with new ideas and products. If we can just 'spark' their interest at a young age, and enable them to believe "I can" find a solution, then imagine what they will invent when they're older!"

Headline statistics from the full season

No. of events: 167
No. of students: 5,670
No. of schools: 480 (including 1 Pupil Referral Unit)

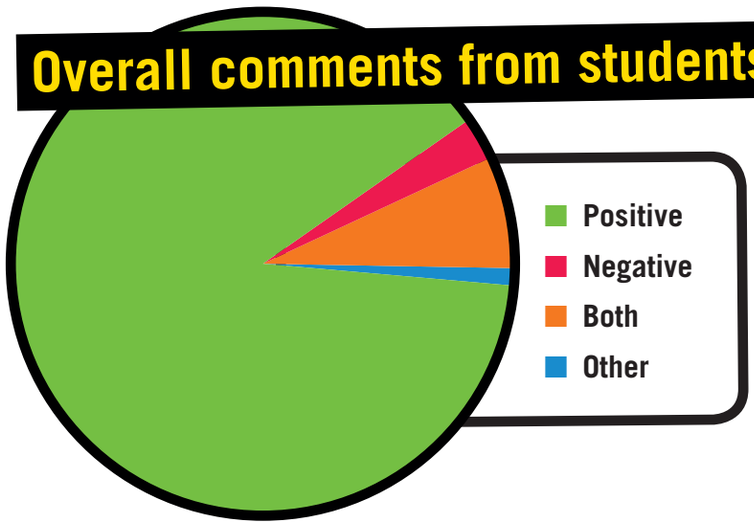


Student feedback

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

- I enjoyed the Faraday Challenge **99%**
- 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 **96%**
- Before today I was considering studying or working in engineering **35%**
- Following this event I am now considering studying or working in engineering **59%**
- I'd like to do something like this again **96%**

Overall comments from students



Student quotes

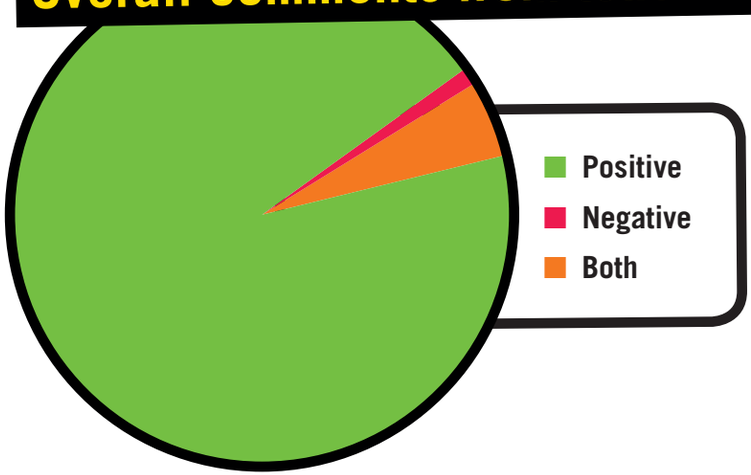
- "I think this is a brilliant idea to grow young minds"
- "I think this was a fantastic day and it made my managing and teamwork skills so much better and I thank the IET for bringing this to us. It also gave me a good experience of life"
- "It was very fun and interesting because I got to feel like I was a real engineer for a day"
- "I think that the Faraday Challenge Day was a fun and new experience challenging us to use our creativity and knowledge about engineering"
- "It was really fun. I learnt new things and developed my team working skills. It was a good level of difficulty and I liked how we were given lots of responsibility, currency and decision making."
- "Creative, Enjoyable. I liked that the design we had come to life as a prototype and learning about accountancy"
- "I'd seriously consider studying engineering after this"

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 **96%**
- I would be interested in taking part next year **99%**
- I would recommend the IET Faraday Programme to other teachers **100%**

Overall comments from teachers



Teacher quotes

- "Very well-orchestrated, integrated several (complex) concepts and ideas from several branches of STEM subjects and explaining in a way the pupils understand it easily"
- "An excellent day. Pupils learned a huge amount without being taught!"
- "Really good day - good fun - lots of learning - confidence building. Exactly what is needed to inspire the next generation of engineers"
- "An excellent day where life skills were learnt and curriculum context put into the real world"

Special thanks

We would like to say a very special thank you to all our backers who funded individual events or contributed towards the core IET events.

Because of you, we have had the biggest season to date and introduced so many young people to the world of engineering and technology.

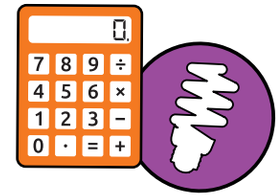
Airbus Foundation

AIRBUS

Date (2018)	Host school
7th November	Marlwood School
15th November	Christ the King College
4th December	Airbus Broughton Visitor Centre
5th December	Alun School
5th December	John Henry Newman School
8th December	Admiral Lord Nelson
6th March	Thomas Alleyne Academy
29th March	Bay House School
18th April	Downend School
25th April	St Richard Gwyn
10th May	Abbeywood School
19th June	Concorde Museum, Bristol

No. of events: 12
No. of students: 418
No. of schools: 34

Student feedback



Age: 12: 204 (52%), **13:** 184 (47%), **not specified:** 4 (1%)
Gender: Male: 196 (50%), **Female:** 184 (47%), **not specified:** 10 (3%)

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

- I enjoyed the Faraday Challenge **99%**
- I learnt new things **94%**
- I now understand more about what engineering is **94%**
- 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 **42%**
- Following this event I am now considering studying or working in engineering **47%**
- I'd like to do something like this again **96%**

Student quotes

- "I really enjoyed today and it has me considering choosing a career in engineering. I love it!"
- "The reason I enjoyed it is because we got to work as a team and realise how sensible you need to be with money"
- "It was an interesting day with other schools competing for a prize; it gave the event a nice sense of competition and excitement. Working with people that I am unfamiliar with gave it a fun element to the overall experience. I would do again. Very interesting. Good day"

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 **98%**
- I would be interested in taking part next year **100%**
- I would recommend the IET Faraday Programme to other teachers **100%**

Teacher quotes

- "All pupils really enjoyed the day. A fantastic way of introducing pupils to engineering. I am hoping to use a similar activity within D & T Lessons after today's activity"
- "Really well throughout and resourced. Encouraged students to be independent and encouraged creativity"

Arconic Foundation

ARCONIC
Innovation, engineered.

Date (2018)	Host school
26th February	CTC Kingshurst Academy
27th February	King Edward VI Camp Hill School for Girls
28th February	Tile Cross Academy
8th March	Stanborough School
13th March	Allestree Woodlands School
14th March	Handsworth Grange Community Sports College
20th March	Kingsbury School
22nd March	Holy Trinity School
27th March	Erdington Academy
28th March	Woodfield Academy
19th April	Fulneck School
24th April	Glossopdale School
26th April	University Church of England Academy
11th May	The Maynards School
13th June	Wreake Valley Academy

No. of events: 15
No. of students: 526
No. of schools: 38

Student feedback

Age: 12: 159 (31%), **13:** 319 (61%), **not specified:** 16 (3%)
Gender: Male: 236 (45%), **Female:** 275 (53%), **not specified:** 8 (2%)

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

- I enjoyed the Faraday Challenge **99%**
- 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 **37%**
- Following this event I am now considering studying or working in engineering **59%**
- I'd like to do something like this again **97%**

Student quotes

- "I enjoyed being able to use my creativity for something that became a reality"
- "I loved this workshop and would be glad to do something like this again. I've never thought about or looked into engineering but I think I might now"
- "I found today extremely fun and I can definitely say it was an experience worth remembering. I think my teamwork and patience was improved today"
- "It's one of the coolist things I've ever done!"

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 **95%**
- I would be interested in taking part next year **100%**
- I would recommend the IET Faraday Programme to other teachers **100%**

Teacher quotes

- "Activity has really emphasised importance of team work to students, which is something they tend to see more of in less academic subjects"
- "Fantastic opportunity for students to showcase their knowledge in a fun, structured but much more free environment than they can in school time. Allows them to explore creative solutions and develop a vast array of skills both interpersonal, personal and STEM specific"

Bosch UK

BOSCH
Invented for life

Date (2018)	Host school
19th January	Stowuplands High School
30th January	Parkside Middle School
7th March	Comberton Village College
12th March	Dr Challoner's High School
23rd April	University of Manchester
2nd May	Glenrothes High School
14th June	The John Lyons School

No. of events: 7
No. of students: 236
No. of schools: 30

Student quotes

- "I wish to do more events like this. Thank you!"
- "I loved talking to a real engineer and learning about his job. I felt that it has inspired me to study engineering even more"
- "I didn't know much about engineering before, and I have learnt something and enjoyed myself today"
- "Now I am very confident in making and putting circuits together"

Student feedback

Age: 12: 79 (34%), **13:** 142 (61%), **14:** 11 (5%), **not specified:** 1 (0%)
Gender: Male: 121 (52%), **Female:** 111 (48%), **not specified:** 1 (0%)

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

- I enjoyed the Faraday Challenge **99%**
- I learnt new things **96%**
- I now understand more about what engineering is **98%**
- 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 **36%**
- Following this event I am now considering studying or working in engineering **63%**
- I'd like to do something like this again **97%**

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 **100%**
- I would recommend the IET Faraday Programme to other teachers **100%**

Teacher quotes

- “Great questioning to draw out learning. Good talking to students to raise aspirations! Thanks!”
- “One of the best challenge days we have been involved in. Pacey, engaging and extremely well organised.”
- “An enjoyable day. It helped encourage students to work together and inspire the quieter ones to contribute”

Jack Petchey Foundation

Date (2017)	Host school
9th October	Hammersmith Academy
10th October	Westminster Academy
11th October	St Mary's St John's CE School
19th October	St Bonaventure's School
20th October	Edmonton County School
1st November	Bexley Grammar School
2nd November	Langley Park School for Boys
3rd November	Wallington School for Girls
14th November	Bullers Wood School
15th November	Harris City Academy Crystal Palace
27th November	Orleans Park School
28th November	Richmond Park Academy
11th December	Clacton County High School
12th December	Philip Morant School
13th December	Maltings Academy
18th December	Lister Community School

Date (2018)	Host school
12th January	Overton Grange
17th January	The Billericay School
23rd January	The Urswick School
24th January	Bridge Academy
25th January	The Petchey Academy
21st February	The Ravensbourne School
22nd February	Oasis Academy Coulsdon
23rd February	Carshalton School for Girls
6th March	St. Mark's Catholic Academy
6th March	Dormer Wells High School
7th March	Chiswick School
8th March	Harris Academy St John's Wood
15th March	Ark Evelyn Grace Academy
15th March	Sarah Bonnell School
16th March	Tiffin Girls' School
27th March	St Anne's School for Girls
28th March	Vyners School
18th April	Chistlehurst & Sidcup Grammar
19th April	Townley Grammar School
24th April	Seven Kings School
25th April	Ursuline Academy Ilford

Jack Petchey Foundation

Date (2018)	Host school
26th April	Harris Academy Rainham
2nd May	Woodford County School
3rd May	Walthamstow Girls' School
4th May	Nightingale Academy
16th May	Riddlesdown Collegiate
21st May	Barking Abbey School
22nd May	Eastbury Community School
23rd May	Eastbrook School
15th June	Park High School
20th June	Chase High School
21st June	Great Baddow School
25th June	Cophall School
26th June	Malden Oaks PRU

No. of events: 50 **(+1 Festival for Aspiring Engineers)**
No. of students: 1,662
No. of schools: 107 **(including 1 Pupil Referral Unit)**

Student feedback

Age: 11: 2 (0.12%), **12:** 781 (47%), **13:** 827 (50%), **14:** 21 (1.3%), **15:** 3 (0.2%), **18:** 1 (0.1%), **not specified:** 13 (1%)
Gender: Male: 712 (43%), **Female:** 924 (56%), **not specified:** 12 (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 **95%**
- I now understand more about what engineering is **96%**
- 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 **58%**
- I'd like to do something like this again **95%**

Student quotes

- “Made me think of more job options”
- “Today was very fun and very educational. Thanks! I feel like I have learnt more about engineering, and I am very interested in it”
- “Great experience, I realised the importance of STEM”
- “I had fun cos we got to work in a group. We made jokes and laughed and still learnt a lot!”
- “Really enjoyable and introduced you into how maths and science is used in the real world”
- “I enjoyed this challenge because I learnt new things and I can now communicate with people I’ve never worked with.”

Teacher quotes

- “I enjoyed watching the children working together towards a goal, whilst learning new skills such as communication (without using text or snapchat!) and co-operation. Teamwork Rules!”
- “It has been a real pleasure having hosted the Faraday event and genuinely do believe the students have taken home a lot from the session. Thank you”
- “This made the topic electricity interesting. It allowed them to show knowledge they already had but go much deeper. It presented engineering careers positively and engaged the girls. Thank you very much!”

Teacher feedback

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

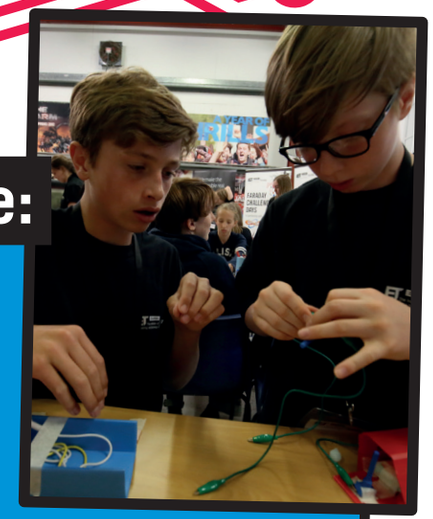
The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years	**100%**
The level of complexity was suitable for a National STEM challenge aimed at students aged 12-13 years	**99%**
The interest of the students was retained throughout the day	**100%**
The students learnt new concepts and expanded their knowledge base	**100%**
The registration process was straightforward with enough time to plan for the event	**95%**
I would be interested in taking part next year	**99%**
I would recommend the IET Faraday Programme to other teachers	**99%**

Festival for Aspiring Engineers
Wednesday 18th July 2018

The winning teams from each of the Jack Petchey Foundation supported events were invited to attend an afternoon event on 18th July at IET London: Savoy Place. This was a celebration of the achievements of all the team and an opportunity for students to showcase their products and share ideas. The afternoon began with the students exhibiting their products to the IET judges and peers, and then the students voted for their favourite product. The team with the most votes received the 'Aspiring Engineers Choice Award'.

There were speeches from Dawn Childs, Group Engineering Director for Merlin Entertainments and Trudy Kilcullen MBE, CEO at the Jack Petchey Foundation before the award ceremony took place. During the ceremony, teams were awarded on their success in seven different categories.

And the winners are:



Team Spirit
Harris Academy Rainham

Innovation
Chase High School

Product Design
Chislehurst and Sidcup Grammar School

Most Promising Engineers
Chiswick School

Best Pitch
Wallington High School for Girls

Team We Would Most Like To Spend a Day With
Park High School

Aspiring Engineers Choice Award
All Saints Catholic School

Science & Technology Facilities Council

Science & Technology Facilities Council

Date (2018)	Host school
26th February	Rutherford Appleton Laboratory
26th June	Daresbury Laboratory

No. of events: 2 No. of students: 71 No. of schools: 11

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 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

- "Excellent level of challenge; good task set with a suitable theme. Students responded really well"
- "Really enjoyed the challenge and thought the students benefitted from the involvement"

Student quotes

- "I'd love to be able to do this again, I found it very interesting"
- "It was very enjoyable and interesting and I'd love to do it again"

Student feedback

Age: 12: 2 (7%), **13:** 26 (90%), **not specified:** 1 (3%)
Gender: Male: 17 (59%), **Female:** 11 (38%), **not specified:** 1 (3%)

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 **100%**
- I have a better idea about what engineers do and the skills they need **100%**
- Before today I was considering studying or working in engineering **24%**
- Following this event I am now considering studying or working in engineering **41%**
- I'd like to do something like this again **97%**

Faraday Challenge Days really do inspire students and raise the profile of STEM overall

> I wish I could have done this when I was 13!

Let's hear from the teachers...

> Faraday regional day really got the students excited & competitive to get into the final. A brilliant way to get students captured by engineering, its excellent being able to see & talk to real engineers & see real-life examples of what you can do with success in STEM

> Absolutely amazing opportunity to explore engineering in a hands-on way which we are unable to do in the classroom setting. Thank you so much IET.

Thank you for inspiring our future engineers

The Institution of Engineering and Technology

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