

IET Education Impact Report 2022-2023

Key findings and case studies from
our IET Faraday® Challenge Day and
FIRST® LEGO® League programmes.



Introduction

To help the Institution of Engineering and Technology (IET) demonstrate the impact our educational programmes are having on young people, schools, teachers and adults, we commissioned SHIFT insight to conduct a research project on our behalf. The findings have demonstrated that our IET Faraday® Challenge Day and *FIRST*® LEGO® League programmes have a number of key impact areas.



The research methodology was designed to capture the impact of each of our STEM programmes.

Online, in-depth interviews were conducted with 19 teachers to create the case studies throughout this report.



Interviews were carried out prior to schools participating in either the IET Faraday® Challenge Day or *FIRST*® LEGO® League. This was to set a baseline to follow-up with participants; and demonstrate the impact the programmes had on the schools and children following their participation in our educational programmes.

Key areas of impact

This research found that teachers were incredibly passionate about their involvement in both IET Faraday® Challenge Days and *FIRST*® LEGO® League. Many also reported seeing an immediate increase in passion and excitement in STEM among students – as well as increased confidence in their abilities. We identified six key areas where IET activity was seen to have impact, evident across a range of school settings:

Supporting disadvantaged children.

Increasing STEM engagement.

Broadened perspectives on STEM careers.

Helping students with special educational needs focus in school.

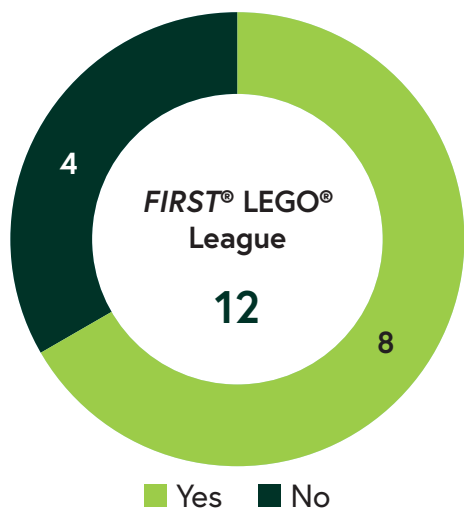
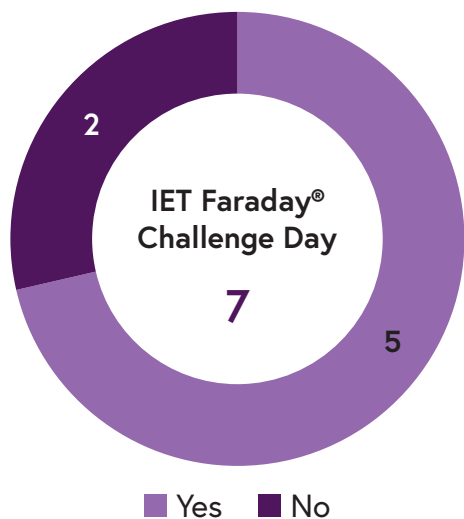
Supporting development of more broadly transferable and interpersonal skills.

Generating excitement and engagement with STEM across the whole school, not just on those took part in activities.

Profile of respondents



Previous involvement



Key stage/Age group

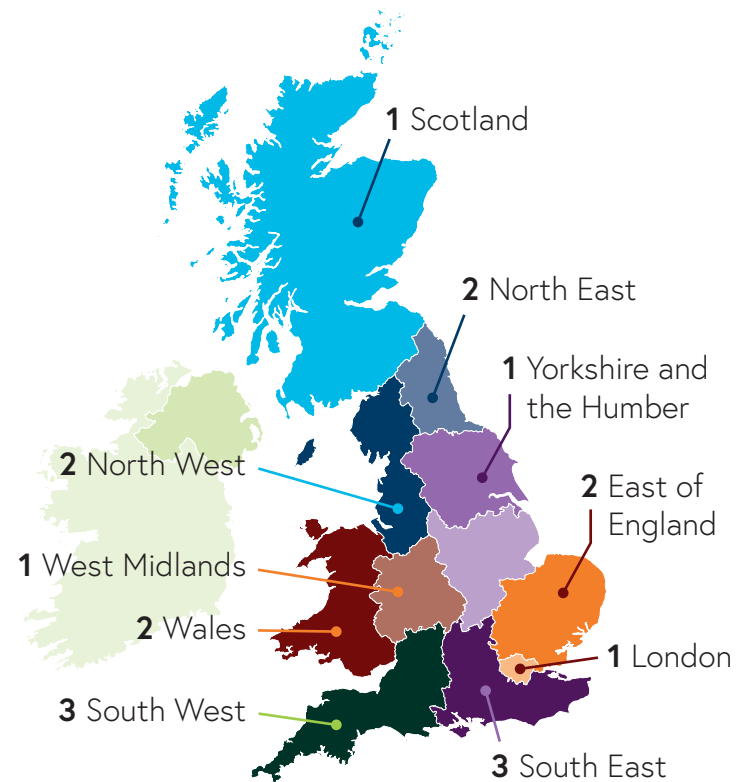
- KS2 (7-11 years) – 3 respondents
- KS3 (11-14 years) – 12 respondents
- KS4 (14-16 years) – 4 respondents

Some schools had teams participating in more than one *FIRST® LEGO® League* division across different key stages/age groups.

Job role

- 10 science teachers or technicians
- 5 ICT, computing or D&T teachers
- 2 teaching assistants
- 1 commercial manager
- 1 private coding club teacher

Region



Ofsted rating

- 5 Outstanding
- 8 Good
- 1 Requires improvement
- 5 Unsure*

*Unsure respondents were outside of England, independent schools or private clubs – not inspected by Ofsted

Overview of case studies

As a result of this research and our findings, we've developed eight theme-based case studies, which outline the respondents experiences of taking part in *FIRST*® LEGO® League and IET Faraday® Challenge Days. These focus on the benefits of participation and the key impact areas.

IET Faraday® Challenge Days: Encouraging process-driven thinking

Impulsive thinkers were taught the value of approaching challenges step by step.

(see pages 6-7)

IET Faraday® Challenge Days: Developing resilience and making mistakes

Traditionally high attainers developed the resilience to continue trying to problem-solve in the face of challenges and failures.

(see pages 8-9)

IET Faraday® Challenge Days: An entry point to further STEM engagement

The Challenge Day is an exciting entry point into accessing further STEM opportunities.

(see pages 10-11)

***FIRST*® LEGO® League: Demonstrating STEM career pathways for young girls**

Younger girls on the Explore team were shown a range of career pathways, linking *FIRST*® LEGO® League with their new career knowledge.

(see pages 13-15)

***FIRST*® LEGO® League: Addressing behavioural issues through STEM enthusiasm**

Students with behavioural issues were given an outlet through their commitment to, and passion for *FIRST*® LEGO® League.

(see pages 16-17)

***FIRST*® LEGO® League: Helping provide focus for students with special educational needs**

For some students with educational needs, *FIRST*® LEGO® League provides the focus they need to bring to school to concentrate more widely.

(see pages 18-19)

***FIRST*® LEGO® League: Inspiring students in areas of high deprivation**

IET funding allow students in higher deprivation areas to get access to exciting *FIRST*® LEGO® League opportunities, building a passion for STEM that otherwise may not be possible.

(see pages 20-22)

***FIRST*® LEGO® League: Building interpersonal and transferable skills**

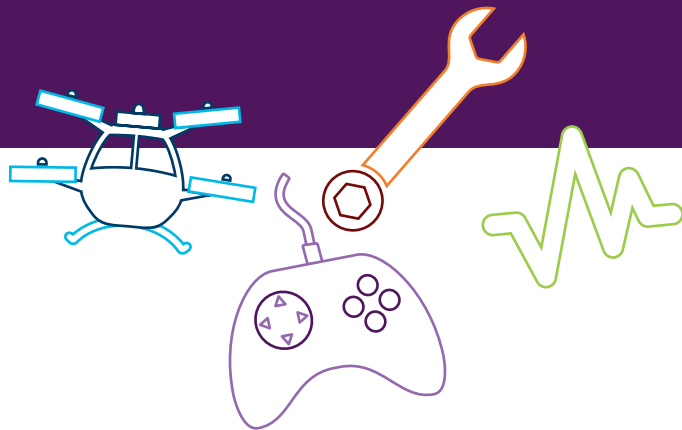
Students learned how to assign roles and scaffold responsibility to build a stronger team.

(see pages 23-24)

IET Faraday[®] Challenge Days

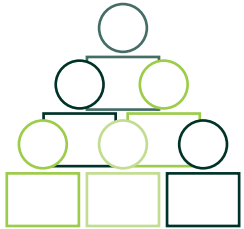


Impact case studies



1. IET Faraday® Challenge Days: Encouraging process-driven thinking

The team



Andrew at Schools at Somerhill in the South East didn't want to include the typically high-attaining STEM students in the IET Faraday® Challenge Day this year – instead he included students with different skills, in the hopes they would work together better and develop different ways of thinking.

"I didn't go for the classic, high-achieving student from engineering. I picked those I thought would work better as a team and who were a little bit more creative rather than just the high academics."

Andrew Leach, Head of Engineering, Schools at Somerhill

The challenge



While the students on the team had a range of skills, they were creative and worked well together. However, in engineering lessons they tended to make impulsive decisions without thinking through the design consequences or implications – they were then unprepared to deal with any issues that arose down the line.

"The younger boys like to get stuck in quite quickly, they're quite impulsive and want to get things sorted quickly."

The impact



On both this year and the previous year's teams, Andrew noted how students were increasingly willing to spend time planning and designing – organising their thoughts and taking a more considered approach to engineering and problem-solving more generally.

"I think slowly we're tackling the impulsivity. For the boys taking part in the IET Faraday® Challenge it has that impact, they see that the design phase has a value to it. They see where they're going, much further down the road, from earlier on."

1. IET Faraday® Challenge Days: Encouraging process-driven thinking

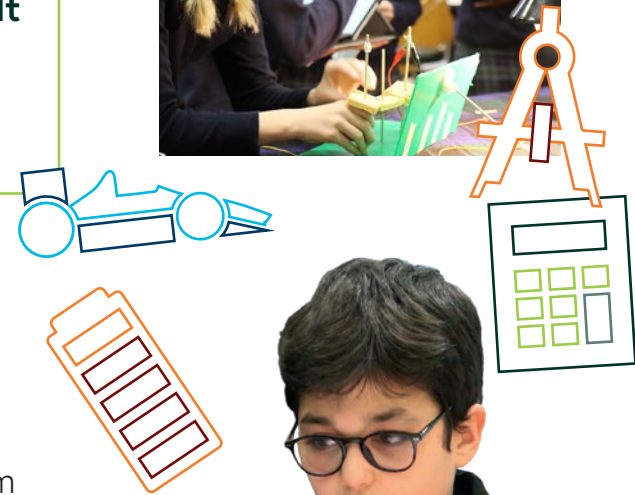
Ideation

"We introduced a shop element to our STEM day designed challenge for the older ones, because we felt that it adds a realistic element to STEM challenges – the fact that it's not just about designing a solution, it's resource management as well."



Drawing and designing

The team working on the IET Faraday® Challenge Day developed a more organised and practical approach to pre-empting potential problems, as well as a more considered approach to planning and thinking ahead.

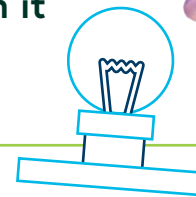


Role and responsibility allocation

This process-driven thinking stayed with the student team even after the Challenge Day was over. Andrew recounted how this approach to thinking through problems beforehand has been applied by students in his engineering lessons:

Execution

"I've found that the focus seems to have come across into lessons a bit more. In fact, even the project we're working on now, one of the boys project is very ambitious but he's now giving up his break times to come and work on it because he wants to get it finished to a fairly high standard."



2. IET Faraday® Challenge Days: Developing resilience and making mistakes

Some IET Faraday® Challenge Day teams consisted of students who were typically more high achieving – but overall teams were designed to allow different strengths to shine through. Some students were more confident with practical or technical skills, while others were more confident with presentation and speaking elements. One key impact here was a significantly increased enthusiasm and confidence, which has led students, even the higher-attaining ones, to be more willing to make mistakes.

"So there were certain aspects they were very good at, and then there were other areas where the more confident ones would push the rest of the team along in certain areas."

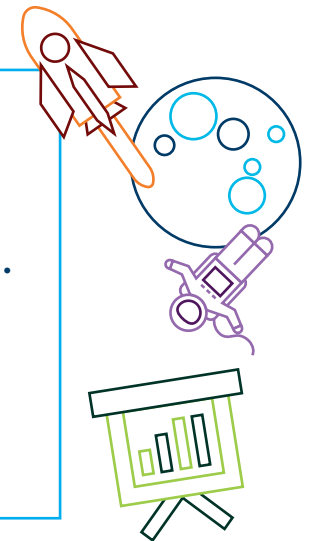
Adam Higgins,
Science Teacher,
The Royal Liberty
School

"Last week we had lots of primary schools visiting and there's one boy who took the lead on certain things, where in previous years he wouldn't have. He's developed more confidence in terms of public speaking and also in what he's doing – there's also more conviction in the way he's demonstrating things and helping others to achieve their tasks as well."

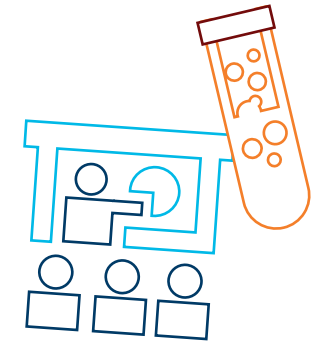
The student team at the Royal Liberty School was picked on a rewards-based system. Attending the IET Faraday® Challenge Day was seen as a reward for good behaviour at school – but didn't necessarily link to higher STEM attainment.

As a result of the IET Faraday® Challenge Days, Adam told us he had noticed his students are more willing to get stuck in to new challenges and have developed a confidence in approaching problems that wasn't present before.

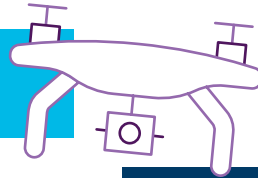
"Definitely for the quieter ones, confidence has developed – they're more happy to speak out now, and they're more confident to make mistakes as well. In terms of doing practicals in school, they won't be too hesitant if they think they're going to get it wrong; they'll just go for it and problem-solve afterwards."



2. IET Faraday® Challenge Days: Developing resilience and making mistakes



Developing resilience in lessons



The impact in this case was twofold, but interconnected: students were happier trying out new ideas and were more willing to make suggestions, even if this led to failure. But following things going wrong, the students developed resilience engaging with these failures, becoming far more ready to address the issue and carry on.

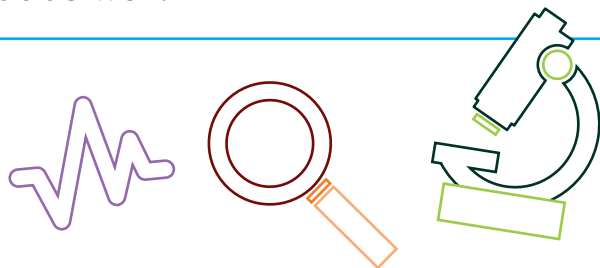
Longer-term impact

Adam felt that the resilience his students developed as a result of the IET Faraday® Challenge Day would go on to have a longer-term impact, in terms of their commitment to STEM careers.

"I don't know whether it's because there were just boys there, or whether there was any other reason, but they did work really well together. They relied on each other quite a bit, which helped them and improved their teamwork as well. Resilience is probably the main thing. With experiments and tasks, just realising that if something goes wrong it's not the end of the world, and they can still go forward with that as well."

"There's an impact on their aspirations ... opening up their eyes to what they can be. They're looking at other routes into what they can do when they're older, and they're having higher aspirations and wanting to go on to further education, wanting to look into say apprenticeship degrees as well."

"It's the continuation of that confidence and resilience that I think will feed through, not just in lesson times, but within different subjects through the wider curriculum, so there will be other opportunities they can take up in the future."



3. IET Faraday® Challenge Days: An entry point to further STEM engagement

Teams were picked based on enthusiasm and commitment

Some schools don't offer engineering as a subject (this was fairly typical for state schools in the sample), so students were picked for the team based on their general enthusiasm and commitment to learning across science. This commitment could be demonstrated in a number of different ways, but it was important for Pauline at Faringdon Community College that the teams represented students who were willing to engage.

"We were simply going on the enthusiasm that they show in science lessons: are they engaged in science lessons, do they appear to have a wide knowledge of science out of what we teach them in lessons? Do they seem to be doing some independent work and it might even be things like watching programmes on TV."

Pauline Forbes, Second in Science,
Faringdon Community College

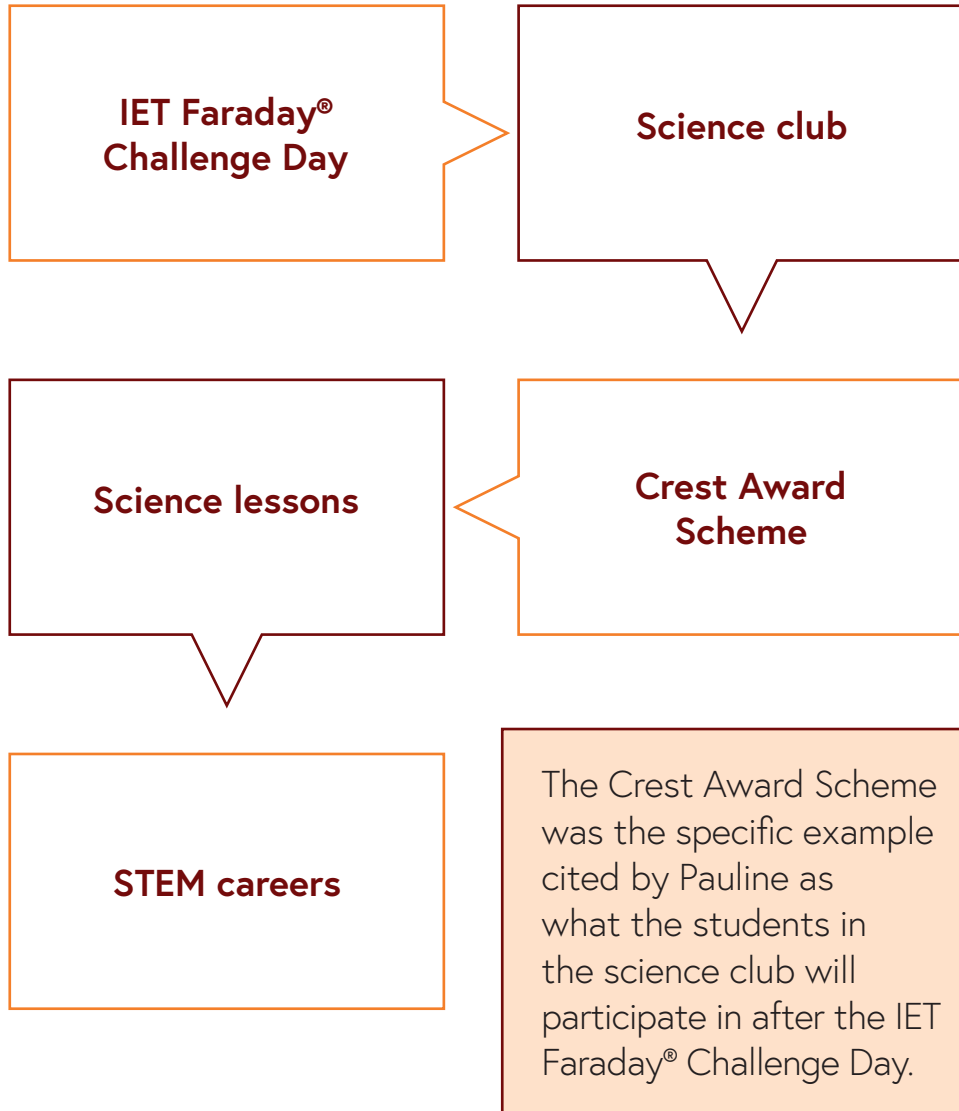
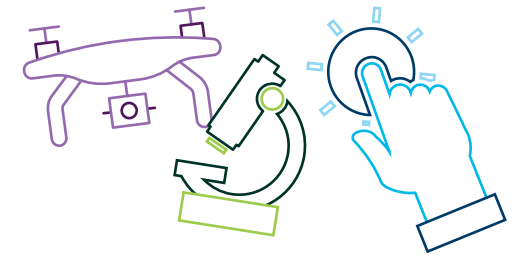
Ensuring pupil premium students get access to opportunities

At Faringdon Community College, the school is particularly focused on trying to address the imbalance in attainment between pupil premium students and others – so intentionally included a higher proportion of pupil premium students across the teams. The school hosted the event, and participated for the first time – and included the entirety of their pupil premium students in Year 8, filling the remaining slots with other students who were enthusiastic about science lessons.

"At the moment our whole school drive is on pupil premium children and increasing the engagement of these children and trying to have their academic achievement more in line with non-pupil premium children."



3. IET Faraday® Challenge Days: An entry point to further STEM engagement



For many schools, the IET Faraday® Challenge Day's main impact was introducing many young students to a more engaging world of STEM. The Challenge Day was an exciting opportunity for young people to be involved especially pupil premium students who may typically be less likely to be selected for opportunities. At Pauline's school in the South West, the excitement of attending the Challenge Day had led to increased attendance of the regularly run science club, which in turn gives students access to the Crest Award Scheme. This has a wider impact on interest and engagement in school science lessons.

The IET Faraday® Challenge Day is a crucial part of this engagement journey, and in increasing access to opportunities.

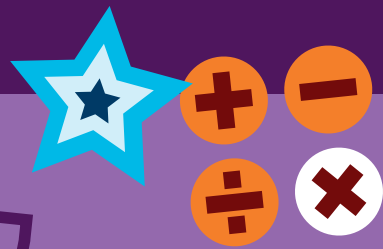
This accumulative engagement with STEM (for many students starting with their involvement in the IET Faraday® Challenge Day), works to ultimately enable them to see STEM as a viable career pathway.

For most students, seeing a STEM career as a viable option comes when there are multiple opportunities for engagement over a year or their school career – capitalising on the excitement of the previous event or opportunity.

FIRST[®] LEGO[®] League



Impact case studies



1. *FIRST*[®] LEGO[®] League: Demonstrating STEM career pathways for young girls

Connecting with local businesses to ground the *FIRST*[®] LEGO[®] League experience in real world career pathways

At St Thomas' CE Primary School in the North West, the students on the *FIRST*[®] LEGO[®] League team were mostly girls. At this school, the staff focus on introducing the girls to a range of local engineering and industry organisations; they invite in local speakers and take trips to local businesses. They have done this historically with previous *FIRST*[®] LEGO[®] League Challenge teams – and feel this is a highly impactful part of introducing students to local businesses and industries.

At this school, they tie the activities undertaken as part of the *FIRST*[®] LEGO[®] League Club, with experiences at local business – trying to ensure that any skills developed during *FIRST*[®] LEGO[®] League are linked to their real-world applicability.

After taking a trip to a local business, the students on the *FIRST*[®] LEGO[®] League team gave a presentation on what they learned to the wider student body. This was important to David for a number of reasons: for one, it helps the student team work on their presentation skills (an important part of the *FIRST*[®] LEGO[®] League competition) – which is also a crucial skill for accessing opportunities further into their academic careers and beyond. The presentation was also important in giving other children access to the same opportunities: the school can't invite all students to participate in the *FIRST*[®] LEGO[®] League team, and this is a crucial way of sharing information and widening access.

"I said 'Look, we're doing this project, would you be happy to speak to us?' and I was just expecting a Zoom call and instead he invited us up to the wind-farm. We went up there, had a look at the turbines up close, had a proper field trip and they said it is the first time we have ever had school-children on one of our sites. The children had to go through a health and safety process, it was really nice for them to see what a professional world looks like."

David Davies, HLTA,
St Thomas' CE Primary School



1. *FIRST*[®] LEGO[®] League: Demonstrating STEM career pathways for young girls



Access to STEM careers can be found locally

"You don't have to travel to a big city or to Manchester or to London to work. There's stuff going on right in your community. Just opening their eyes to those experiences."

Preconceptions around STEM careers as white or male were challenged through *FIRST*[®] LEGO[®] League

"It wasn't white British men, it was other people all over the world. So, their perception of STEM has definitely changed in that sense. At the start of each *FIRST*[®] LEGO[®] League season, I always ask "What type of things would you like to do in the future?" After taking part in the competitions and speaking with local experts, they say, 'I want to work on a wind turbine, I want to work at Euro Garages, I want to work for these big companies.' Especially this year as our topic was looking at energy and how we use it. They go and pester their parents, to become greener and buy an electric car. It has definitely inspired them to open their eyes a little bit and see what is out there for them."



1. *FIRST*[®] LEGO[®] League: Demonstrating STEM career pathways for young girls



The skills they learn during *FIRST*[®] LEGO[®] League support them later in their academic career

"I'm fortunate enough that we have children who have taken part in *FIRST*[®] LEGO[®] League in the past who have gone on to use their skills at high school, college, university and the wider world. It's great to hear about what they have been doing and how we helped set them up for their journey.

Some of our current children at school know them from previous *FIRST*[®] LEGO[®] League teams. They ask 'Do you remember this person who was on the team? They are now doing X, Y, Z at university, they are a doctor, they are doing this.' It's amazing that they have these role models who at one point were just like them. The children who take part in the *FIRST*[®] LEGO[®] League team do seem to excel in high school and go on to achieve. Not everyone, but we have had many who have gone on to have standout careers. Just through the way *FIRST*[®] LEGO[®] League works and what it pushes you to do and also, I feel, the way we run our team. I feel that what we do really sets them up for high school with the extra work they need to do to be successful. They have to become more independent."



2. *FIRST*® LEGO® League: Addressing behavioural issues through STEM enthusiasm



Students with behavioural issues were given an outlet through their commitment to, and passion for *FIRST*® LEGO® League

Craig Walton, Science Teacher and STEM Lead at Deepings School in the East of England, gave an in-depth account of how participation in *FIRST*® LEGO® League has engaged team members with STEM, increased their confidence and made them eager to learn more. Craig's all-girl KS3 team showed a real commitment to the competition element, and this had a knock-on effect to their wider school experience. This was the school's first time competing in *FIRST*® LEGO® League. This case study demonstrates the potential for positive impact on older girls.

Improvements in behaviour across all lessons

Craig noted how one girl with a history of behavioural issues, relating to her ADHD diagnosis, had been recommended to join the team. The student was enthusiastic about participating in *FIRST*® LEGO® League, and her behaviour across her time in school improved dramatically. Ongoing participation in the *FIRST*® LEGO® League team was used as a reward for good behaviour. Misbehaviour would mean that she would be unable to attend the team's meetings for a week. *FIRST*® LEGO® League gave her something positive to focus on.

"One of the girls has ADHD and is quite a handful. But when we got her engaged we noticed the change in her behaviour, which also changed across the whole school. She was one of the people that did so much work behind the scenes, she did a lot of the presentation work. Even her parents have noticed a change in terms of her behaviour and her general activity level. She was so engaged it made her focus."

Craig Walton,
Science Teacher and STEM Lead, Deepings School



2. *FIRST*[®] LEGO[®] League: Addressing behavioural issues through STEM enthusiasm

Inspiration and motivation

The Deepings School team was run by one of the school's sixth-formers, who was a long-time advocate of using LEGO[®] as part of their education. Other team members were high academic achievers. Two of these held career ambitions to work in robotics. The example set by these students during their time competing in *FIRST*[®] LEGO[®] League was inspirational to others in the school, leading to students regularly participating in extra-curricular STEM clubs and activities.

Interest was so high that the school ran an internal competition with six teams. Three of these had entered *FIRST*[®] LEGO[®] League, finishing in first, second and third place. This had in turn set an example and increased motivation to take part across the school.

"Tonight, there were 22 kids at the club, even though they are not working to anything or a competition, you can see the eagerness to learn... One girl tonight, oh my god, I've never seen anybody jump so high. She solved one of the missions and she nearly hit the ceiling, she was that pleased with her progress."

Increased performance in science subjects

Craig noticed improvements in attainment from the three girls that took part in the UK final:

"I teach two of them, and you can see that their enthusiasm for science has improved. They're getting better assessment scores, they're actually making more progress now"

Increased research and presentation skills

Other skills emerged from the process of taking part in the competition:

"They are a better bunch of kids when they work together, they've developed a more inquisitive nature for problem-solving. They have learnt how to research, to use the facilities that are out there to help them with their project, to help them with what they have got to do in the future."



3. *FIRST*® *LEGO*® League: Helping provide focus for students with special educational needs



Previous IET Education impact studies have highlighted how students with special education needs (SEN) have greatly benefited from participating in *FIRST*® *LEGO*® League. Luke Hall, Team Leader and Computing Teacher from King Edward VI School in the South East, described one such case, with a team featuring several autistic members.

Developing critical personal and soft skills in SEN students

The impact of participation from SEN students goes well beyond technical skills like programming. Team leaders mentioned these students developing various personal qualities, such as resilience and confidence, as well as transferable skills, such as communication, teamwork and problem-solving.

"I would say that because *FIRST*® *LEGO*® League is team based, it encourages communication. It means that some of these kids that normally work well independently are being forced to work in groups and they've got on better... Most subjects don't encourage teamwork unless you're on a sports team."

"One of the best things about *FIRST*® *LEGO*® League is that it builds resilience. When they're trying to solve some of those missions, they keep trying until they get it right. When they do, they are elated."

Developing critical personal and soft skills in SEN students

Luke stated how being a *FIRST*® *LEGO*® League team member had allowed young autistic people to feel at home in an environment where they could sometimes feel uncomfortable or out of place. The experience matched well with their particular needs, allowing them to feel part of a team of likeminded individuals, while also helping to develop skills.

"If you like coding, if you like *LEGO*®, then you belong here, and this is for you. I don't think kids find that in all schools... They need the opportunity to be part of a team and take part in competitions as much as the kids who are good at sports."

Luke Hall, Team Leader and Computing Teacher,
King Edward VI School

3. *FIRST*® *LEGO*® League: Helping provide focus for students with special educational needs



We heard one particularly impactful story:

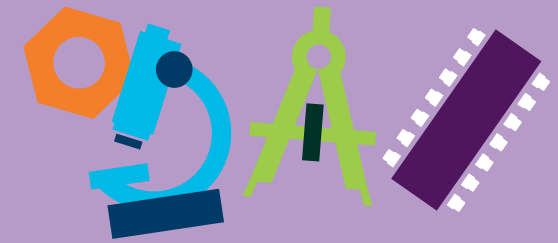
"There's one kid who had a very nervous first couple of months here at school, he was scared of the bell, he'd have headphones on, his mum nearly took him out of the school. She said to me 'the only reason he comes into school is for *FIRST*® *LEGO*® League; it's the only thing he looks forward to.'

"I get emotional talking about that. I said to her it'd be devastating for him to leave the school. She was so close to taking him out of the school. I just said this is the right school for him, we just need to give him a bit more time.

"Gradually things were getting better, and he's doing so well now, he's a great kid. That was a tough few months. Reflecting on his success through the year is great. It's things like this that have kept him in school.



4. *FIRST*[®] LEGO[®] League: Inspiring students in areas of high deprivation



This research highlighted the benefits of participation in *FIRST*[®] LEGO[®] League for students in areas of high deprivation – particularly at schools with a large number of lower-ability and SEN learners. One strong example of this was Malpas Court Primary in South Wales. Pupil premium students were in the majority, and very few learners tended to stay in education beyond secondary school. Terri Jones, TA and ICT lead led the team, explained its value.

"Anything that we can do that inspires them to go a bit further, to leave our area is a benefit. A lot of them haven't been outside of Malpas, let alone outside of Newport."

Terri Jones, TA/IT, Malpas Court Primary

After the competition, the students noticeably improved in coding, and general enthusiasm for STEM increased – which otherwise was fairly limited at the school. Key areas of impact included:

Access and equal opportunity

The school had limited budget, and had never participated in anything like *FIRST*[®] LEGO[®] League before. Terri explained how funding and grants from the IET had allowed them to take part in the competition. Access would have been impossible otherwise.

"We couldn't have done it without the funding and grants. It's something we'd have never been able to afford to do."



The team was made up of Year 5 pupils, three of whom had additional needs and one looked-after child (i.e. within the care system). The students became invested in *FIRST*[®] LEGO[®] League – and an air of excitement built around the competition. They were shocked and proud to win the Rising Stars trophy.

4. *FIRST*[®] *LEGO*[®] League: Inspiring students in areas of high deprivation



Increased engagement with STEM across the school

This entry point allowed students on the team already interested in STEM to step up their game and tackle content and tasks at a higher level than would otherwise have been possible. But impact wasn't just limited to the team – word quickly spread around and other pupils who previously had no interest or knowledge in STEM wanted to become more involved in available opportunities, including extra-curricular sessions. They also started a fundraising campaign to buy the equipment required to compete in 2023-2024.

"I run Code Club a couple of break times a week, and I'm getting a lot more interest now – they want to see what we're doing. It's not even just that they want to use the robot, they want to see what is available to them, they want to be more involved."



Confidence

Confidence in themselves, and the school, was a key positive outcome for the team. Terri explained how the school didn't have a reputation for winning anything, and that some learners and their families had low expectations, or didn't value a school education. The award had had a profound effect on both the team and the student body more widely – showing how they could participate, succeed and feel proud.

"It was a really uplifting experience as a school to say we'd won something amazing. That definitely transferred. As a school we had a bit of worth and value, we weren't the poor school down the road... they've been able to come back and say maybe I can do that, I'd like to try this, how do I do it. We're steering them in the right direction."

4. *FIRST*[®] LEGO[®] League: Inspiring students in areas of high deprivation

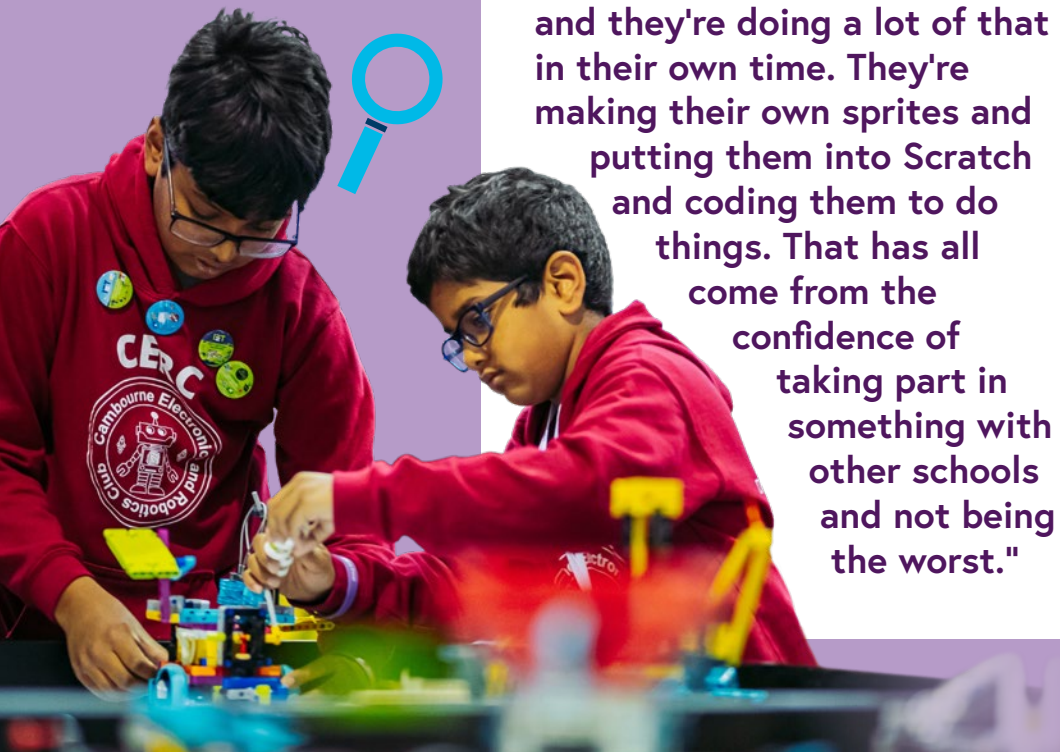


Independence

This newly found confidence has led to some learners starting up independent projects.



"I've got a couple who have come from the *FIRST*[®] LEGO[®] League project who are quite interested in game and design and they're doing a lot of that in their own time. They're making their own sprites and putting them into Scratch and coding them to do things. That has all come from the confidence of taking part in something with other schools and not being the worst."



Opportunity

Terri highlighted how participation has provided team members – including SEN pupils and those with poor literacy and numeracy skills – with a unique outlet for success, visible to all pupils. Students developed teamwork and problem-solving skills through the competition, which will help to support success in the long-term – allowing learners to flourish academically and socially.

"These additional needs children that are shoved to the side are now being asked by other kids to help them on computers with their projects because they can see they've not got no ability, they know some things that we don't. It's been nice to highlight that for them."



5. *FIRST*[®] LEGO[®] League: Building interpersonal and transferable skills



Aston University Engineering Academy in Birmingham is a University Technical College with a particular focus on STEM, and enrichment through its employer linked project curriculum. Led by Andrew Hewitt, Subject Lead of Design & Technology, six Year 10 students took part in the school's first entry into *FIRST*[®] LEGO[®] League, many of whom were already engaged with STEM, and familiar with the core skills required by the challenge. However, they were able to build on these – developing both technical and interpersonal skills. The structure of the programme helped them to develop these in a number of ways.

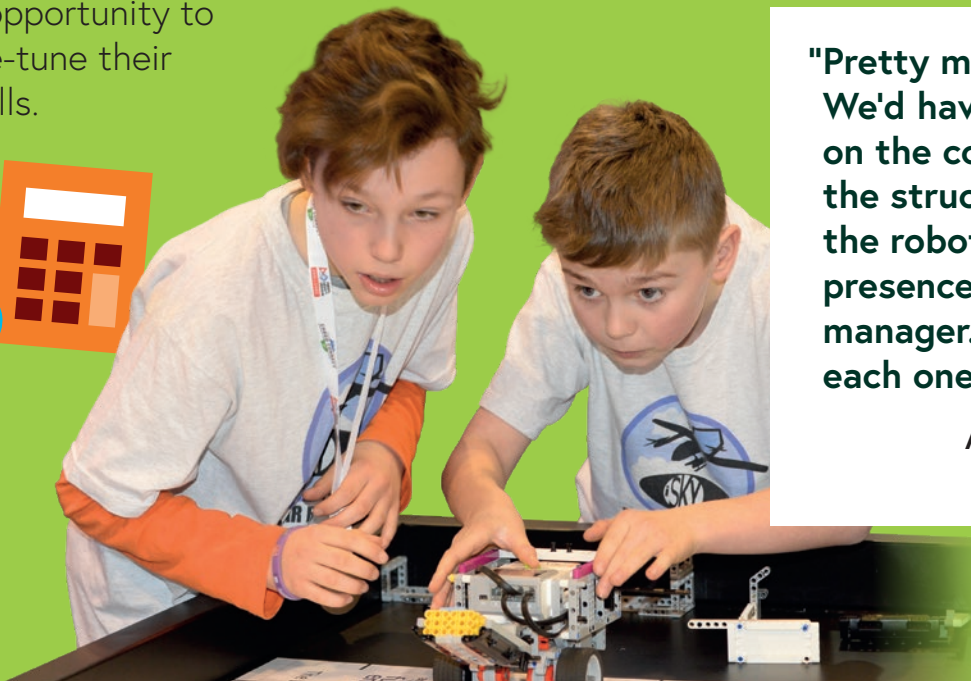
Building skills though scaffolding responsibility and assigning job roles

Students who may have had some skills in building/constructing, or previously been higher achievers in STEM, were given the opportunity to practice and fine-tune their interpersonal skills.

Some students would take the lead on coding, some more practical engineering skills, others were project managers, and others worked on social media presence. Assigning job roles involved students identifying their own strengths and weaknesses, as well as those of others – and working together towards a common goal.

"Pretty much each team member had a specific role. We'd have two students who would take the lead on the coding, two that would take the lead on the structural engineering side and manipulating the robot, one of them worked on the social media presence and one of them became the project manager. They naturally developed those roles and each one had a responsibility in the club."

Andrew Hewitt, Subject Lead of Design & Technology,
Aston University Engineering Academy



5. *FIRST*[®] LEGO[®] League: Building interpersonal and transferable skills



While some students had no issues making friends with people they'd never met before, they struggled with some aspects of the club, such as building kits together. On the other hand, others were highly skilled at construction and manipulation, but less adept socially. Collaboration, planning and thoughtful sharing of skills helped them to progress.

"You saw over the few weeks that each student had their own hurdles that they needed to work on. They were collaborating and overcoming it along the way. There were a lot of challenges that they had to face but they did really well."

Working together to build new skills

Despite already being skilled in many areas, the team had less expertise in coding. Teamwork meant that they could progress quickly.

"They had to be trained up on those skills, but they did really well, and they were at the point where they grew their confidence and they were doing some really complex things, they even got to a point where they uncovered the musical tone features, and they were completing challenges and doing their own little themes when they did each one. It was really good to see."

Providing real-world applications for academic, technical content

Participation allowed students to understand key concepts, and hone skills they would use in later school years.

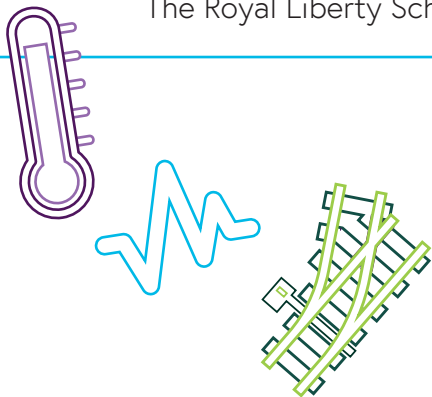
"*FIRST*[®] LEGO[®] League has given them a real-life application to the theory that they have learnt. It was a really engaging programme for them to showcase those skills. If they understood how to code something, the robot would do what they programmed it to do. If they didn't understand it, then the robot would not move or function. I'd say it allowed them to apply their theory in a practical outcome that was both fun and informative."

Quotes from teachers

On IET Faraday® Challenge Days developing independence:

"I think what it's doing at the moment is good, because it encourages everyone to take part, and they're sort of shoehorned into doing things without realising it. The structure of it is good because it's gradually ramping up that independence throughout the day as well. There's also that support too."

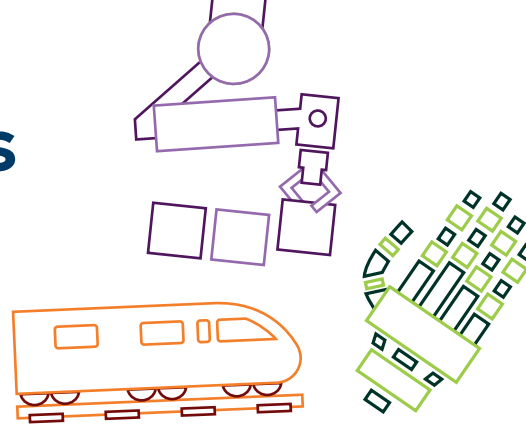
Adam Higgins,
Science teacher,
The Royal Liberty School



On mentoring opportunities for older students:

"We had three sixth-formers come and help us this year, so that's like an additional three students that are benefiting, not necessarily competing, but are getting something that they can use on their UCAS statement, or something to say that they've had an impact elsewhere. It's an experience to discuss, and having gone through the competition themselves and then gone into the position of mentorship."

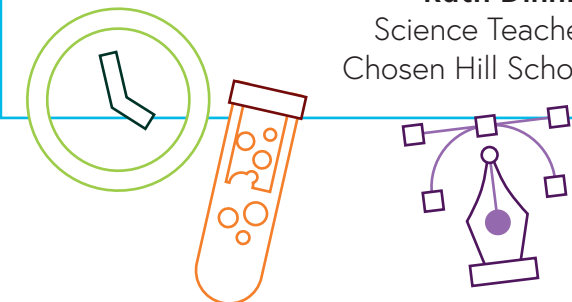
Amanda Jones,
Science teacher,
Beaumont School



On IET Faraday® Challenge Days supporting with wider STEM engagement:

"We're trying to really push science and engineering at the moment and we have recently just gone to the Big Bang Fair, that is a science and engineering fair and a careers fair. In previous years we have had trouble filling the trip because the students don't want to go. This year we didn't, we had a massive uptake, we had a waiting list of students wanting to go. So, I think that the IET Faraday® Challenge has helped that because a lot of the students that did the IET Faraday® Challenge also put their name forward to go to the Big Bang Fair."

Ruth Dinnis,
Science Teacher,
Chosen Hill School



Quotes from teachers

On *FIRST*® LEGO® League bringing young people together:

"I took a group of kids who weren't the brightest of the bright kids that you'd take to do this. We were the youngest team to compete in our regional one. Some of the kids there, mine were 9 and 10, and some were 12/13 years old, and we walked in, and they were in their smart high school uniforms. Everyone there was so lovely.

"We probably looked like frightened rabbits. Kids were coming over and talking to us, one of them was a private school and they said, "Come and see our robot, we'll show you how it works" and not even in a show off way, they understood that they were older and knew more, and they wanted to show the kids what they'd done.

"It was amazing, they were so friendly, and my team wanted to go and talk to people, and that is the whole purpose, to meet people. We'd gone out and done something cool, and they loved it, we were going into competitions, they were saying good luck and cheering each other on. It was lush."

Terri Jones, TA/IT,
Malpas Court Primary



On *FIRST*® LEGO® League's lasting impact:

"The lasting impact is a number of things. I think they definitely feel like they can achieve more than they thought. I think they were super proud of what they did in the end, they surprised themselves. There was a definite lasting impact on their ability, and on their interest in STEM, especially from the engineering side which comes through more on the innovation challenge, whereas the robotics is the fun computer science side. I think it has opened their eyes to the possibilities of what they can do with engineering and apply that to real world situations.

Luke Hall, Computing teacher,
King Edward VI School



Quotes from teachers

On *FIRST*® LEGO® League's impact on confidence and supporting students to develop as people:

"One of the young ladies is very shy, and I mean shy. She would never, ever speak out in public, and we persuaded her, just very gently, to try and take part in the presentation at the first regional. You could tell that she was dreading it. She said her words and you could see the relief on her face, once she had done it.

"Then the judges started asking questions at the end, and my God, she went off on one, it was amazing. This young lady, she had never, ever ventured forward, she wouldn't even speak to me in the club, and she was very quiet, very shy. They asked a question and she started answering, and I wish I had videoed it because it was absolutely amazing, just the transformation of that day.

"She brought that back with her, she's now talking to us at the club, she's now interacting with us. She will come up and ask for help. That is probably the most major change I have seen. It was really, amazing to see. I couldn't believe what she did. When she started my face dropped, it was amazing, it was absolutely brilliant."

Craig Walton, Science Teacher and
STEM Lead, Deepings School

On *FIRST*® LEGO® League giving disadvantaged children a platform to shine:

"The demographic for where we are in the UK is a very, very poor area. The children I work with, most of them, could be classified as being disadvantaged in some way. Again, the main impacts of them taking part in the *FIRST*® LEGO® League team is confidence. There are two current members of the team who are bright as buttons, yet everything is stacked against them. Being able to provide them with a platform to go and express themselves and achieve what I believe they can, is so rewarding. I tell them that yes, there are things in life that are hard and you may feel inferior. But you have been to the headquarters of a multi-billion-pound company to educate them about your project. You have been to a major car manufacturer to question them and tell them what you have learned. You have been to a wind farm and learned about the inner workings and complexity of them. You have spoken in front of hundreds of people...

"All of this through *FIRST*® LEGO® League and when they look back on what they have done, they are the ones who are privileged, they are the ones who have experienced things others never will. Giving those experiences and showing the children that they can do amazing things is what *FIRST*® LEGO® League is all about.

David Davies, HLTA,
St Thomas' CE Primary School



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