

EngineeringUK 2023/24 programme evaluation results

A summary of key learnings and
individual programme evaluations



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EngineeringUK 2023/24 programmes

Over the last academic year, we collaborated with partners and teachers to **deliver a total of over 120,000 engagements for young people.**

This summary covers 5 of our core engagement programmes and our EDI bursary scheme, offering **just under 70,000 individual engagements for young people from state funded secondary schools across the UK** to learn about engineering and technology and consider pursuing related careers.

Overarching aim

Our mission is **to enable more young people from all backgrounds to be informed, inspired and progress into engineering and technology.**

We used our **Impact Framework** to identify the key outcomes for young people and teachers who participate in our programmes.

This model states that **effective STEM engagement** not only increases opportunities for young people, but **instills the motivation and capabilities needed to succeed** in this field.

Programme aims

This is why our programmes focus on helping young people:

- develop and sustain an interest in STEM
- match their values, interests and personal characteristics to engineering and technology careers
- link their strengths and skills to engineering and technology careers
- make informed decisions that support engineering and technology career pathways

Programme activities

We directly support the development of young people's STEM identities by:

- showing what engineering and technology jobs can achieve
- making links between young people's interests/strengths and engineering and technology careers
- challenging stereotypes
- providing opportunities for young people to develop and use skills
- recognising and celebrating young people's skills

We also **indirectly support teachers and careers advisors** in their efforts to help students learn about STEM careers and make informed decisions.

Evaluation measures

Our evaluations explore the degree to which our programmes impact young people's...

- interest in STEM activities and careers
- awareness of what people working in engineering and technology jobs do and what they can achieve
- beliefs in their own abilities and skills
- links between their personal interests, characteristics and pursuing a career in engineering or technology

Evaluation measures

Our evaluations also consider...

- The impact of our programmes on teachers' and careers advisors' knowledge, confidence and motivation to discuss STEM careers with young people
- How we can continue to improve programme delivery

Our approach to evaluation

Our approach to evaluation is:

- **Theory-based:** with individual Theories of Change for each of our programmes undergoing evaluation
- **Multi-method:** including a range of both quantitative and qualitative methodologies depending on programme's size, maturity and audience
- **Iterative:** using findings to improve the next iteration of the programme and update its Theory of Change



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Programmes evaluated in 2023/24

This summary covers the following programmes:

- The Big Bang Fair
- Big Bang Blueprint
- Big Bang at School
- Climate Schools Programme
- Energy Quest
- EDI Bursary scheme

Key learnings from students

Student enjoyment and engagement

Enjoyment and engagement varied across programmes, with programmes delivered at external, facilitator-led events yielding particularly positive results. Newer or adapted programmes, such as the Climate Schools Programme and the teacher-led version of Energy Quest were also positively reviewed by teachers and students in terms of students' enjoyment and engagement. These findings highlight how programme's delivery methods are related to their impact.



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Key learnings from students

Inclusivity and accessibility

Most programmes were rated as accessible to students of all abilities. Ensuring this is carried through to the development of new or updated content is essential.

Programmes should be designed with diverse needs in mind, offering adaptations and accommodations to ensure equal participation opportunities for all students.



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Key learnings from students

Promoting diversity in STEM

Addressing disparities in knowledge and attitudes towards STEM, particularly among underrepresented groups, is important. While our results support a positive impact across all groups of students, pre-existing gaps related to students' level of STEM engagement and gender were still apparent in our samples.

Programmes should simultaneously encourage all students to explore STEM careers, while targeting specific audiences (such as those previously less engaged in STEM activities and girls).

Key learnings from teachers

Teacher support and resources

Providing comprehensive support, resources, and guidance to teachers enables programme delivery. Teachers value access to clear guidelines, online resources, and training to effectively deliver STEM activities in their classrooms. Flexibility to adapt resources to individual needs was highlighted as a particular strength.

Key learnings from teachers

Sharing best practices and collaboration

Facilitating collaboration among schools and sharing successful approaches could be a way to enhance the overall impact of STEM programmes.

Supporting teachers by helping them share knowledge and resources, like what we do on the Neon platform, will help schools overcome barriers, collaborate and maximise the effectiveness of their STEM initiatives.

The Big Bang Fair

The Big Bang Fair is the UK's largest free celebration of science, technology, engineering and maths (STEM) for schools. The Fair aims to inspire, inform and empower young people to consider engineering, technology and other STEM careers by showcasing a wide range of STEM employers and jobs.

A total of 20,608 young people and 2,625 teachers attended The Big Bang Fair in 2024.

We collected data from 2,414 students and 276 teachers through our evaluation surveys at The Big Bang Fair.

Sample characteristics

Of the 2,414 students who completed the feedback survey:

- 44% were girls
- 42% were from a UK minority ethnic background
- 17% identified as disabled
- 27% receive free school meals

Prior STEM engagement: students were considered to have low prior STEM engagement if they had not engaged in any of the STEM activities listed in the survey outside of school in the last 12 months (7% of students) or only 1 or 2 of these activities (46%).

Student experience

The Big Bang Fair was an engaging and enjoyable experience for students.

- **92%** of students enjoyed The Big Bang Fair
- **99%** of teachers agreed that The Big Bang Fair was engaging for their students
- **97%** of teachers agreed that The Fair is accessible to students of all abilities in STEM subjects

The stands that students found fun were those where they could learn something new, interact with the content and deemed interesting or 'cool'.



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Student experience

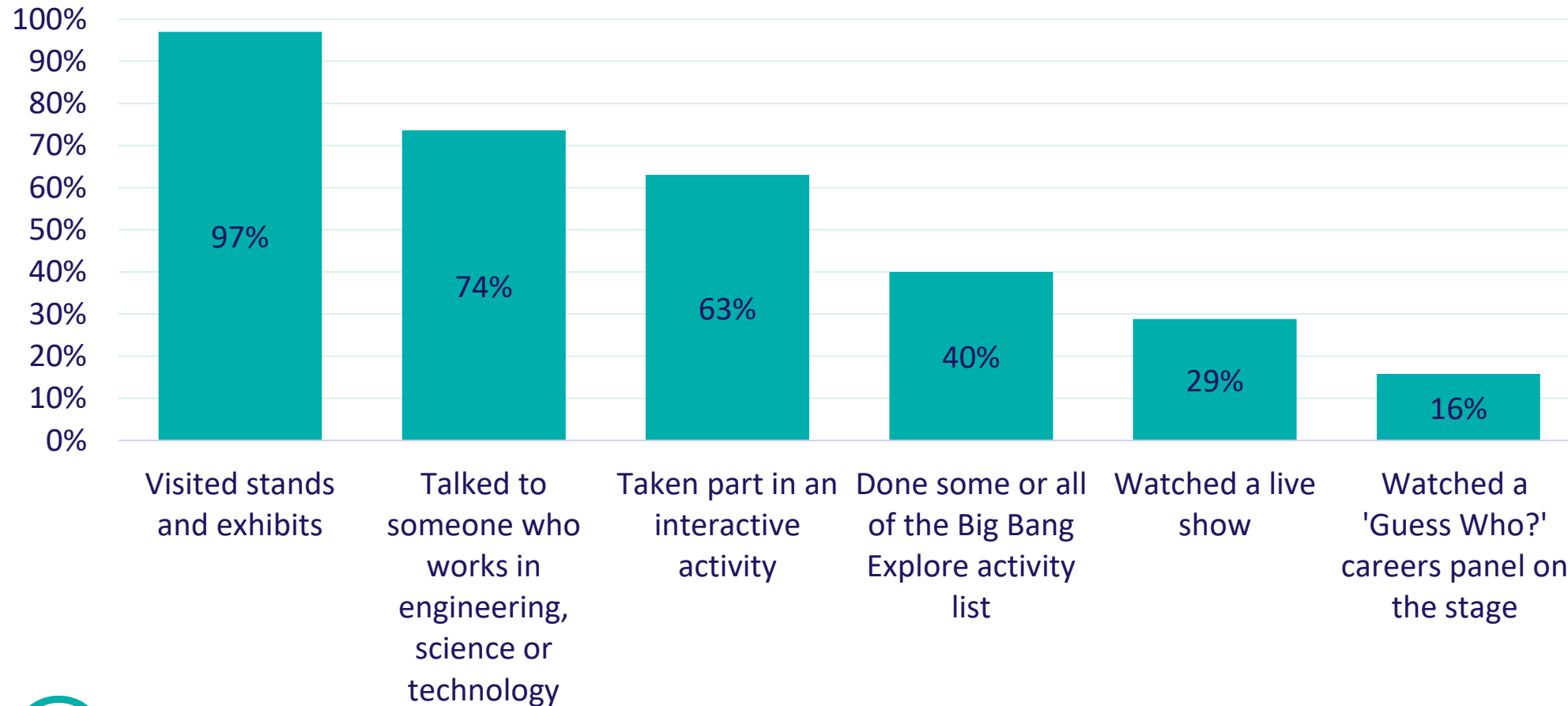
Encouragingly, findings suggest The Fair was equally enjoyable for students regardless of their gender, ethnicity, disability status and free school meal status.

For example, 93% of girls and boys agreed that they enjoyed The Big Bang Fair.

However, students already interested in STEM tended to enjoy the event more than those who were previously less engaged in STEM (97% compared with 90%, respectively).

Student experience

Activities students had taken part in (n = 2,327)



Demographic differences in experiences

Gender: girls were more likely to have talked to someone who works in STEM (78%) and to have done activities on the 'Big Bang Explore' list (43%), compared with boys (72% and 39%, respectively).

Ethnicity: students from UK minority ethnic backgrounds were less likely to have visited stands and exhibits (83%) or taken part in an interactive activity (60%), compared to white students (88% and 69%, respectively).

Free school meals: fewer students who receive free school meals visited stand (83%) or took part in an interactive activity (60%), compared with students who do not receive free school meals (87% and 66%, respectively).

Disability: significantly fewer disabled students visited stands and exhibits (83%), talked to someone who works in STEM (69%) or took part in an interactive activity (60%), compared with non-disabled students (87%, 76% and 66%, respectively).

Student motivation

The Fair inspired students to want to do more STEM activities and learn more about STEM careers.

- **83%** of students agreed that The Big Bang Fair made them want to do more engineering, science or technology activities in the future
- **78%** of students agreed that The Big Bang Fair made them want to find out more about engineering, science or technology jobs
- **83%** of students said that as a result of attending The Fair, they were more interested in a job involving engineering in the future



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Students' knowledge, feelings of inclusion and confidence

The Big Bang Fair also contributed to students':

- **Knowledge:** **73%** said that The Big Bang Fair taught them about what engineers do in their job and **79%** said The Fair had shown them solutions to environmental problems
- **Feelings of inclusion:** **65%** of students said that The Fair had shown them that engineering was 'a suitable job for someone like me'
- **Confidence:** **79%** believe they could become an engineer or work in a job involving technology if they wanted to



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Demographic differences

For the most part, there were very few significant differences related to students' ethnicity, free school meal status or disability status. For example, disabled students' ratings of how much they enjoyed The Fair were similar to those reported by non-disabled students.

In contrast, while there were significant differences related to students prior STEM engagement (i.e., how many STEM activities they have done outside of the classroom in the last 12 months) and gender, all groups were positive in their ratings of The Fair's impact on their motivation, knowledge and confidence.

Demographic differences

For example, students who had done more STEM-related activities outside of the classroom in the last 12 months were more likely to say that The Fair had made them more interested in a job involving engineering than students who had done fewer STEM-related activities (89% compared with 79%, respectively).

However, this is still 8 out of 10 students who were less engaged with STEM prior to The Fair saying that attending the event had inspired them. This suggests that The Fair's impact on increasing interest in engineering careers is not limited to those who are already aspiring to these.



Demographic differences

Similarly, while boys tended to be more positive than girls in their ratings of The Fair's impact, girls were still positive overall.

For example, 87% of boys said The Fair made them more interested in a job involving engineering. However, 82% of girls also agreed with this statement. While this difference is statistically significant, it is important to note that both groups responded positively overall.

There were also instances where girls were more positive than boys, such as 88% of girls saying that The Fair had taught them what engineers do in their jobs compared with 78% of boys.



Teacher experience

Teachers also had a positive experience of The Big Bang Fair.

- **96%** of teachers rated their overall experience of The Fair as being excellent (58%) or good (38%)
- **98%** of teachers agreed that The Big Bang Fair highlighted a variety of careers in engineering and technology
- **94%** of teachers agreed that The Big Bang Fair has clear links to the curriculum

Teacher experience

Teachers feel more confident to advise students about STEM careers having been to The Big Bang Fair.

- **73%** of teachers said they are more likely to suggest a career in engineering to a student after attending The Big Bang Fair
- **64%** of teachers felt more confident in speaking to their students about careers in engineering having attended The Big Bang Fair

What did we learn about delivery?

- The format and content of the Fair is very well received by teachers and students – students enjoyed activities that showed them something new and that they could do with friends
- The Fair is better at engaging and inspiring young people who are already highly engaged and interested in STEM
- The 2024 delivery model helped disabled students enjoy The Fair, but some disabled students said they could not access all they wanted and may have benefitted from more quiet spaces or hands-on support for the teachers' bringing groups of disabled students

What did we learn about delivery?

- Share a list of the stands and map of the venue in advance to help students maximise their time spent at The Fair
- Although The Fair had a positive impact on girls' motivation and interest in engineering jobs, it was less pronounced than that recorded for boys. Future evaluations and research should explore how The Fair (and other programmes) can mitigate this and amplify the content for girls in particular.

Big Bang Blueprint

Big Bang Blueprint is a STEM initiative designed for schools, providing them with the tools to organise a customised event within their own educational institutions. The overarching aim is to showcase the diversity of STEM careers and engage students in hands-on STEM activities.

Blueprint events are organised by the schools with support from EngineeringUK.

In 2023/2024, approximately 27,629 students from 66 schools from across the UK took part in Blueprint. 17 of these schools received a bursary to help run their Blueprint event.

26 teachers completed a feedback survey, 3 of which were interviewed in-depth. 4 Blueprint events were observed by a member of the evaluation team. Student experiences were measured using the teacher feedback survey, interviews and observations.



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Student experience

Teachers were mostly positive when describing their students' experiences:

- **88%** said the programme was engaging for students (23 out of 26 survey respondents)
- Schools **maximised engagement by including students in the delivery** of the event (for example, having older students run stands to provide them with practical experience)
- Teachers appreciated the range of these activities as they were particularly engaging and helped students **increase their knowledge around STEM careers**
- Teachers' reflections noted how these events exposed students to **new types of STEM careers**



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Teacher experience

Blueprint made teachers feel more confident to advise students about STEM careers and more likely to suggest a career in engineering to their students.

- Of the 26 teachers surveyed, 19 (73%) said that they were **more likely to suggest a career in engineering** to their students after taking part in Blueprint
- 17 (65%) said that they **felt more confident in speaking to their students about careers in engineering** after taking part in Blueprint

What did we learn about delivery?

The format and content of the individual Blueprint events varied considerably.

EngineeringUK's support was described as an enabling factor in an event's success, but teachers made some recommendations for improvement:

- EngineeringUK to act as champions for schools, helping them establish contact with external organisations and STEM ambassadors
- Creating a forum for teachers to share ideas and best practice
- Connecting new schools planning their first event to schools who have run previous events
- Developing information packs for organisers that do not have a STEM background
- Reviewing the timing and amount of the Blueprint bursary
- Signposting specifically to engineering content on Neon and in the Climate Schools Programme
- Develop additional resources about entry routes for SEN students

Big Bang at School

Big Bang at School is a STEM initiative designed for schools, providing them with the tools to organise a customised event within their own educational institutions. Participating schools gain access to various resources, including support from an external partner to scope, design and deliver the event. The overarching aim is to showcase the diversity of STEM careers and engage students in hands-on STEM activities.

Around 16,603 students at 83 schools from across the UK took part in Big Bang at School in 2023/24. All 83 schools were priority schools and 74 of these received a bursary.

The student portion of the evaluation only included schools who worked with our new delivery partner, STEMunity. 6 schools completed both pre and post surveys, yielding 221 matched student responses. We interviewed 4 teachers and 3 STEMunity regional leads.

Across all schools running a Big Bang at School event, 50 teachers completed a teacher feedback survey (36 from STEMunity schools, 14 from other delivery partners).



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Sample characteristics

Of the students who completed both the pre- and post-survey:

- 51% were girls
- 38% were from a UK minority ethnic background
- 14% identified as disabled
- 28% receive free school meals

Roughly 3 in 5 students said they had not engaged in any STEM activities outside of school in the past 12 months (20%) or had only done 1 or 2 of these activities (41%).

Student experience

The majority of young people who took part in our evaluation reported they enjoyed taking part in Big Bang at School:

- **63%** of students enjoyed Big Bang at School
- **94%** of teachers agreed that Big Bang at School was engaging for their students
- **94%** of teachers agreed that Big Bang at School is accessible to students of all abilities in STEM subjects

Student motivation

Having taken part in Big Bang at School, around one third of students surveyed were inspired to do more STEM activities and learn more about STEM careers.

- **32%** of students agreed that Big Bang at School made them want to do more science, engineering and technology activities in the future
- **31%** of students agreed that Big Bang at School made them want to find out more about science, engineering and technology jobs



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Impact of Big Bang at School

Across the pre- and post-surveys, there were modest increases¹ in students' knowledge and interest in engineering jobs:

	Pre	Post
Know about the kind of things that engineers can do in their jobs	41%	48%
Know about the role engineers play in finding solutions to environmental problems	44%	43%
Believe they could become an engineer if they wanted to	34%	34%
Are interested in a future job that involves engineering	35%	40%

Impact of Big Bang at School – pre and post

Comparing students' pre- and post- event survey responses showed that having taken part in Big Bang at School:

- 29% of students reported an increase in knowing about the types of things engineers do in their jobs
- 28% of students reported an increase in their interest in a future job that involved engineering
- 28% of students reported an increase in their perceived ability to become an engineer

Impact of Big Bang at School – pre and post

The positive impact of taking part in Big Bang at School was echoed by the teachers in their interviews, noting that running the event helped them:

- engage students in STEM and getting them excited about STEM jobs and pathways
- broaden students' knowledge of jobs available in the STEM sector
- raise students' aspirations for a career in STEM

“They [students] don’t understand the importance of STEM. So, by having such events in school, it’s got them excited and it’s opened up a pathway that was originally closed for them.”

Demographic differences

There were no significant differences in students' experiences related to gender, ethnicity, disability or free school meal status.

However, compared with students who were previously less engaged with STEM, students with high prior STEM engagement were more likely to say that:

- they enjoyed the event
- it made them want to do more STEM activities
- it made them want to find out more about STEM jobs



Teacher experience

Teachers had a positive experience of Big Bang at School.

- **94%** of teachers rated their overall experience of Big Bang at School as being 'excellent' (82%) or 'good' (12%)
- **94%** of teachers agreed that Big Bang at School has clear links to the curriculum

Teachers feel more confident to advise students about STEM careers having taken part in Big Bang at School.

- **82%** of teachers said they are more likely to suggest a career in engineering to a student, after taking part in Big Bang at School
- **76%** of teachers felt more confident in speaking to their students about careers in engineering, having taken part in Big Bang at School



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What did we learn about delivery?

- Start planning earlier in the academic year, contacting schools in September to schedule their event instead of January
- Create a 'menu' with the different types of workshops on offer, their duration, and cost
- Provide examples of how Big Bang at School has been delivered successfully in other schools
- Increase the variety of activities
- Create a network for teachers delivering the events
- Provide clearer instructions on how to apply for funding
- Provide additional funding (STEMunity and EUK)

Climate Schools Programme

The Climate Schools programme aims to inspire students to explore green engineering careers and tackle climate change, now and in their future career.

It is a set of English, geography, and science resources that teachers from state-funded secondary schools can adapt to use in their lessons.

In 2023/24, 248 schools downloaded the resources. Those who consented to evaluation participated in classroom observations ($n = 13$), pre- and post-session interviews with teachers ($n = 11$ and $n = 15$, respectively), and a teacher feedback survey ($n = 21$).

As this was a pilot, student experience was measured through the teacher feedback survey and interviews to minimise the data collection burden on participating schools. The interviews were particularly helpful in contextualising teachers' interpretations of their students' experiences and engagement with the programme content.

Student experience

Teachers were mostly positive when describing their students' experiences:

- 76% said the programme was engaging for students (16 out of 21 survey respondents)

In the interviews, teachers said that the programme:

- Engaged students because they could see career paths that they would be able to follow in their future
- Gave students the opportunity to learn about something they would not normally learn about
- Helped students gain more context around the subjects and how these link with careers



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Teacher experience

Teachers had a positive experience of the Climate Schools Programme:

- 95% rated it as 'good' or 'excellent' (20 out of 21 survey respondents).
- 86% agreed it had clear links to the curriculum (18 out of 21)
- Most shared careers information (16 out of 21, 76%)
- However, less than half of the teachers rated it as accessible to students of all abilities (10 out of 21, 48%)

Teacher experience

90% of teachers said they would deliver the same sessions again (as is or with minor changes).

More than half of the teachers said that they would like to share the resources with colleagues, suggesting that the reach of the programme may extend beyond the number of downloads recorded on the EUK website.

For example, 57% of teachers said they intended to ask other teachers in their department to deliver the programme, while 19% had already taken this step

Teacher experience

The general support for continued engagement with the programme materials was echoed in the teacher interviews:

- 5 participants shared that they wanted to incorporate the lessons into the formal lesson structure and share them with other teachers in their departments
- 1 teacher planned on using the resources for career days or during tutor time that focuses on careers

“They're definitely really good resources that we would like to make sure that we use next year”

- Geography teacher

Recommendations for delivery

Help teachers learn and support one another:

- Create a teacher 'hub' or community so they can share ideas and ask questions
- Leverage spaces teachers already use to network and share resources

Connect with schools in other ways, through:

- Careers, STEM or climate action leads so it can be organised centrally
- Local councils who can encourage multiple schools in a single area

Supplement materials with additional resources:

- For example, a script, additional worksheets or the contents needed for the science practicals

Energy Quest

Energy Quest is a curriculum-linked, in-school workshop for state-funded secondary students aged 11 to 13 about sustainable energy and associated engineering careers. For Summer term 2023/24 and Autumn term 2024/25, Energy Quest was adapted to a teacher-led approach, having previously been facilitator-led, to help create a long-lasting legacy for this programme.

315 teachers from 284 schools registered on the Energy Quest webpage over the course of both terms, with an estimated 109 of these being unique users representing around 90 schools. From the data available, we estimate 51% of these were priority schools.

Engagement in the evaluation was limited with only 7 responses to the teacher survey and 101 responses from students. Three teachers participated in a follow-up interview, and we observed two lessons being delivered at one of the schools. Due to the small number of teachers participating in the survey, we have prioritised the qualitative data instead of presenting percentages.

Student sample characteristics

Of the students who completed the feedback survey:

- 44% were girls
- 22% were from UK minority ethnic backgrounds
- 70% receive free school meals

It is also worth noting that:

- students reported particularly low levels of prior STEM engagement (48% had done none of the activities listed and only 25% had done more than 1 of these outside of school in the last 12 months)
- responses are from 3 schools, making the results highly context-dependent

Student experience and knowledge

Energy Quest was an engaging and enjoyable experience for students.

- **43%** of students enjoyed Energy Quest
- **72%** said that Energy Quest increased their knowledge of the types of things that engineers do
- Teachers noted that students:
 - Applied themselves and got creative in the hands-on activities
 - Were interested in problem solving and acquiring these new skills

Student motivation

Having participated in Energy Quest, roughly one quarter of students were inspired to do more STEM activities and learn more about STEM careers.

- **26%** said they would like to **do more engineering, technology and science activities**
- **21%** said they were inspired to **find out more about engineering careers**
- **19%** said they were **more interested in engineering careers** because of taking part in Energy Quest



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Teacher experience

Teachers were positive about their experience and noted many benefits:

- The content fits in extremely well with the curriculum and makes science relevant and interesting to young people
- It is an opportunity for students to gain soft skills used in STEM activities, such as innovative thinking, which are “minimal in the curriculum so it’s important we do on off-curriculum days”
- The mixed ability, small group work met the needs of students who are not necessarily in top sets – “even the least able were able to access it”

What did we learn about delivery?

Despite limited participation in the evaluation, there are key messages:

1. Teachers and students enjoyed Energy Quest and especially liked the problem-solving aspect. The programme succeeded in raising awareness of the breadth of engineering careers and gave students the opportunity to develop skills relevant to engineering and wider STEM careers.
2. Energy Quest materials are high-quality and flexible, covering aspects of science education that teachers value but find difficult to provide (real-world applications, careers education, and opportunities for practicals).
3. When providing teacher-led content, additional measures need to be put in place to ensure consistent delivery and engage participants in the evaluation.

EDI Bursaries

The aim of the EDI bursary scheme is to encourage greater participation of young people from typically underrepresented groups in STEM activities and inspire their interest in STEM career. In total, 470 bursary applications were made in 2023/24 across all schemes, with 146 bursaries offered (a 31% application-to-offer rate). Of those offered a bursary, 62% (90 out of 146) completed their Neon or Big Bang at School activity.

There are five types of bursary:

- Neon primary bursary (£550) – Approximately 1,500 students across 12 schools
- Neon secondary bursary (£550) – Approximately 3,500 students across 30 schools
- Big Bang at School bursaries:
 - Big Bang at School Blueprint bursary (£500) – 3,509 students across 20 schools
 - Big Bang at School delivery partner bursary (£500) – 2,291 students across 19 schools
 - Big Bang at School enhanced bursary (£1,250) – 3,088 students across 9 schools

The impact of the bursaries was assessed in two ways: (i) the proportions of students from underrepresented backgrounds reached by the bursaries; and (ii) a follow-up survey with teachers after their Neon or Big Bang event had been delivered.

Bursary reach to underrepresented groups

The majority (77%) of schools completing a bursary programme in 2023/24 were based in England, 11% from Wales, 7% from Scotland, and 4% from Northern Ireland. Student demographic data was only available for Neon bursary holders.

On average, 63% of bursary awardees completed their activity, although completion rates varied across bursary types:

- Neon primary – 40%
- Neon secondary – 73%
- Big Bang at School Blueprint – 57%
- Big Bang at School (delivery partner) – 68%
- Big Bang at School (enhanced) – 75%

Bursary reach to underrepresented groups

One third (33%) of schools awarded a bursary had above average proportions of students eligible for FSM and from UK minority ethnic backgrounds.

However, compared with national averages¹, students' demographic data revealed:



An overrepresentation of FSM students at Neon primary (30%) and secondary events (47%) (national average = 25%)



An underrepresentation of UK minority ethnic students at both Neon primary (30%) and secondary events (23%) (national average = 37%)



Similar proportions of girls at Neon primary and secondary events (51% and 52%, respectively) (national average = 50%)



Comparable proportions of disabled students at Neon primary (22%) and secondary events (28%) (national average = 28%)



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¹ [ONS. Students, pupils and their characteristics, 2023/2024](#)

Teacher experience

Teachers were very positive about the impact of the additional funding.

On average, 9 out of 10 teachers agreed that the bursary had:

- Motivated their school to take part in that STEM activity (93%)
- Improved their students' experience of the activity (93%)
- Allowed them to involve more students from underrepresented backgrounds (92%)
- Enabled them to take part, as without the funding they would not have been able to run that activity (91%)

"Without the bursary the event would not have occurred. ... We have noticed a drop in STEM A-level uptake at our sixth form and believe it is partly due to the fact STEM subjects have not been as engaging to our students as they have in the past."

- Big Bang at School Teacher

What did we learn about delivery?

- The EDI bursary scheme **offers a substantial degree of flexibility that motivates and enables schools to run STEM engagement activities** with students who otherwise may not have had access to these.
- **Future iterations should focus on the following to broaden the impact:**
 - Increasing the funding amount to meet high demand
 - Increasing the bursary amount to a minimum of £650
 - Exploring barriers faced by primary schools allocated Neon bursaries
 - Targeting schools with higher proportions of UK minority ethnic student groups to address their underrepresentation in the 2023/24 scheme