

# THE BIG BANG FAIR

2023 evaluation report



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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.

## ABOUT THE FAIR

The Big Bang Fair aims to inspire the next generation with hands-on activities, careers panels and workshops. In 2023, we had over 50 activities for the young people to engage with, as well as a schedule of wow-factor science shows on a main stage. The event, aimed at 10 - 13 year olds, is designed to last no more than 3 hours for school groups and showcases a wide range of STEM employers and career possibilities.

### Accessibility

The Big Bang Fair's mission is to inspire young people across the UK to pursue STEM careers, and we're dedicated to making the event inclusive and accessible for everyone. We provided schools and visitors with a comprehensive accessibility guide, which includes a visual story designed to support autistic young people in preparing for the event. We worked closely with the venue, our event agency, and supporters to ensure physical accessibility throughout The Fair. To make the experience more comfortable, we created a designated calm area with cushions, soothing lighting, and fidget toys for those who may find the event overwhelming. Additionally, we made sunflower lanyards available for disabled attendees and volunteers, allowing them to access queues and calm areas more easily.

### Sustainability

In 2023, we took several steps to improve the sustainability of The Big Bang Fair, including adding water refill points to limit single-use plastics on site and ensuring all our printed materials are on recycled, FSC certified and carbon balanced paper. We monitored our own carbon footprint and developed a guide to share with schools and supporters to help them limit theirs when attending the event as well as providing guidance on how to design and build stands to make sure they are as environmentally friendly as possible.

## ABOUT THIS REPORT

Almost 16,000 young people and 2,300 teachers attended The Big Bang Fair in 2023. This report provides findings from surveys conducted with students and teachers who attended The Fair. The purpose of the surveys was to collect feedback from participants, with the aim of gaining a better understanding of their experiences of The Fair and whether it influenced their interest in pursuing more STEM activities or careers in engineering and technology.

In this report we explore young people's experience of The Fair and whether there are any differences in experience based on demographic characteristics and prior STEM engagement. Furthermore, we seek to understand students' interest, views, and knowledge of STEM related careers to find out more about who is participating in The Big Bang Fair.

This information allows us to gain an understanding of the extent to which we are meeting the aims of The Big Bang Fair in terms of informing and inspiring young people into further STEM education and careers. It also contributes to our ongoing efforts to improve and develop future programmes, as well as to support EngineeringUK's wider work on STEM engagement.

In June 2023, we collected data from more than 2,400 students and nearly 300 teachers through our evaluation surveys at The Big Bang Fair. The findings from our evaluation are presented in this report.

## DELIVERY: CHANGES TO THE FAIR

In 2023, changes were made to the way The Fair was delivered following feedback from teachers, students and other stakeholders to improve the event and ensure it meets its objectives.

- **Half-day sessions:** School groups could now attend The Fair in half-day sessions instead of full days, creating a more condensed experience and accommodating more students
- **State-funded schools:** Only state-funded schools could attend The Fair, with the intention of reaching more young people from groups underrepresented in engineering professions
- **Lower age range:** The age range was adjusted to include year 6 primary students, based on feedback from teachers and acknowledging that these students would soon be transitioning into secondary school
- **Smaller group size limits:** Group sizes were capped at 75 visitors per session to ensure that all students could partake in shows, workshops, and activities
- **Teacher Hub expansion:** The Teacher Hub which is an area designed to give the visiting teacher's an opportunity to network with each other, as well as find out more from teacher-facing organisations, such as Neon and STEM Learning, was expanded.

## Attendance rates

In 2023, we saw an unexpectedly high number of schools make bookings and then either cancel at the last minute or not attend The Fair. The young person attrition rate for 2023 was 39%, meaning almost 40% fewer young people attended than we were expecting. This is much higher than the attrition rate for The Big Bang Fair 2022, which was 23%. In order to gain some insight into this trend, we reached out to all those who didn't attend, asking them why and for some more information. The survey findings indicated that the main barriers to attendance were:

- Coach, parking and attendance costs
- Getting staff resource to effectively cover the trip
- Getting sign-off by Senior Leadership Team
- Coach companies cancelling bookings
- Organising the trip internally

Some of these reasons for schools not being able to attend the event are out of our control and more related to the local context. However, there are areas where EngineeringUK may be able to provide additional support or information that may be helpful for teachers - for example in organising the trip internally or getting sign off by their Senior Leadership team.

## EVALUATION: KEY FINDINGS

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

- 88% of students agreed with the statement “I am enjoying The Big Bang Fair”, with 57% strongly agreeing
- 97% of teachers agreed that The Big Bang Fair was engaging for their students
- 91% of teachers agreed that The Fair is accessible to students of all abilities in STEM subjects

**Having spent time at The Fair, students were inspired to do more STEM activities and learn more about STEM careers.**

- 71% of students agreed with the statement “The Big Bang Fair has made me want to do more science, technology and engineering activities in the future”
- 73% of students agreed with the statement “The Big Bang Fair has made me want to find out more about engineering, science or technology jobs”

**Teachers also have a positive experience of The Big Bang Fair.**

- 96% of teachers rated their overall experience of The Fair as being excellent (63%) or good (33%)
- 95% of teachers agreed that The Big Bang Fair has highlighted the variety of careers in engineering and technology
- 92% of teachers agreed that The Big Bang Fair has clear links to the curriculum

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

- 70% of teachers said they are more likely to suggest a career in engineering to a student after attending The Big Bang Fair
- 67% of teachers felt more confident in speaking to their students about careers in engineering having attended The Big Bang Fair

## RECOMMENDATIONS

**These findings highlight the success of The Big Bang Fair's current format and content, with positive feedback from teachers and students.** While no major changes are necessarily required, the evaluation did highlight some areas to consider for future delivery. The following recommendations are based on the findings and conclusions presented in this report:

1. **Enhance engagement across student groups.** Acknowledging varying levels of prior STEM engagement among young people, strategies could target those less involved or new to STEM initiatives. Tailored activities and messaging could enhance engagement across diverse backgrounds and prior STEM engagement levels.
2. **Promote inclusivity and support underrepresented groups.** Continue efforts to support students from underrepresented backgrounds in STEM, fostering their confidence and motivation to pursue STEM careers. Provide additional guidance and resources tailored to STEM career paths, with an emphasis on supporting girls and building their confidence in STEM skills.
3. **Enhance accessibility and inclusivity.** To improve the experiences of disabled students, consider feedback from teachers, such as including advance warnings about loud noises or offering noise-cancelling headphones. Ongoing efforts should continue to enhance accessibility and ensure an inclusive experience for all participants.
4. **Support schools in overcoming barriers to participation.** Understanding the reasons behind schools' inability to attend and taking steps to support and encourage participation is crucial. Continued efforts should be made to identify and address specific challenges faced by schools and students, utilising insights to achieve higher attendance rates and a more inclusive event.

These recommendations aim to build on the strengths of The Fair, ensuring an inclusive, inspiring, and effective STEM engagement event for all participants.

# ABOUT THE EVALUATION

## BIG BANG FAIR ATTENDANCE

- 15,738 young people from 348 schools and 2,384 accompanying adults attended The Big Bang Fair, held across 3 days in Birmingham in June 2023
- The Big Bang Fair was open to students in Years 6, 7, and 8, as well as equivalent years in Northern Ireland and Scotland.
- 58 employer and STEM outreach organisations were present at The Fair and interacted with young people during this time

## STUDENT EVALUATION PARTICIPATION

This report provides findings of surveys conducted with students and teachers at The Big Bang Fair in 2023.

The surveys aimed to understand students' and teachers' experience of The Fair and their attitudes towards STEM careers.

- 2,456 young people attending The Big Bang Fair school days completed the evaluation survey, 16% of the total attending The Fair
- Over half (58%) of students surveyed were from EngineeringUK's priority schools
- There was close to equal proportion of boys and girls participating in the evaluation (48% male and 47% female)
- The proportion of students of ethnic minority backgrounds participating in the evaluation is slightly higher than the proportion attending state secondary schools in the West Midlands (39% compared to 37%)
- 23% of students who took the survey said they receive free school meals, compared to 27% of students in state secondary schools in the West Midlands
- 11% of students participating in the evaluation consider themselves to have a disability

How was data collected?

The student survey was conducted using iPads at a stand on the show floor. Students were encouraged to complete the survey after spending some time exploring The Fair.

The table to the right provides a breakdown of the demographics of students who attended The Fair and who completed a survey.

STUDENT CHARACTERISTICS		
	Attended The Fair % <sup>1</sup>	Completed survey N (%)
<b>Total</b>	<b>15,738</b>	<b>2,456</b>
<b>School type<sup>2</sup></b>		
Priority	53%	1,338 (58%)
Non-EDI criteria meeting	32%	802 (35%)
Primary	15%	181 (8%)
Missing	-	135
<b>Year group</b>		
Year 6	15%	161 (7%)
Year 7	33%	851 (35%)
Year 8	52%	1,256 (52%)
Another year <sup>3</sup>	Unknown	166 (7%)
Missing	-	22
<b>Gender</b>		
Male	49%	1,153 (48%)
Female	50%	1,136 (47%)
Non-binary or self-described	1%	106 (5%)
Missing	-	61
<b>Ethnicity</b>		
Asian/Asian British	25%	510 (22%)
Black/Black British	12%	117 (8%)
Multiple ethnicities	7%	153 (7%)
White	54%	1,392 (61%)
Other ethnic identity	3%	64 (3%)
Missing	-	160
<b>Free School Meals</b>		
Yes	40%	549 (23%)
No	60%	1,681 (71%)
Don't know	-	138 (6%)
Missing	-	88
<b>Disabled</b>		
Yes	10%	252 (11%)
No	-	1,742 (75%)
Don't know	-	319 (14%)
Missing	-	143

<sup>1</sup> Demographics for students attending is based on what teachers report at the time of registration and is not complete for all attending students. Percentages are based on the information provided by teachers.

<sup>2</sup> EngineeringUK defines as priority the secondary schools who meet our Equity, Diversity and Inclusion (EDI) criteria, based on student population with higher numbers of groups typically underrepresented in engineering. Primary schools were not included in the EDI criteria in 2023. For more detail, see EngineeringUK EDI Criteria - Tomorrow's Engineers ([tomorrowsengineers.org.uk](http://tomorrowsengineers.org.uk)).

<sup>3</sup> "Another year groups" denotes students outside The Big Bang Fair target year groups of 6, 7, and 8 (or their equivalents).

### STUDENTS' PRIOR STEM ENGAGEMENT

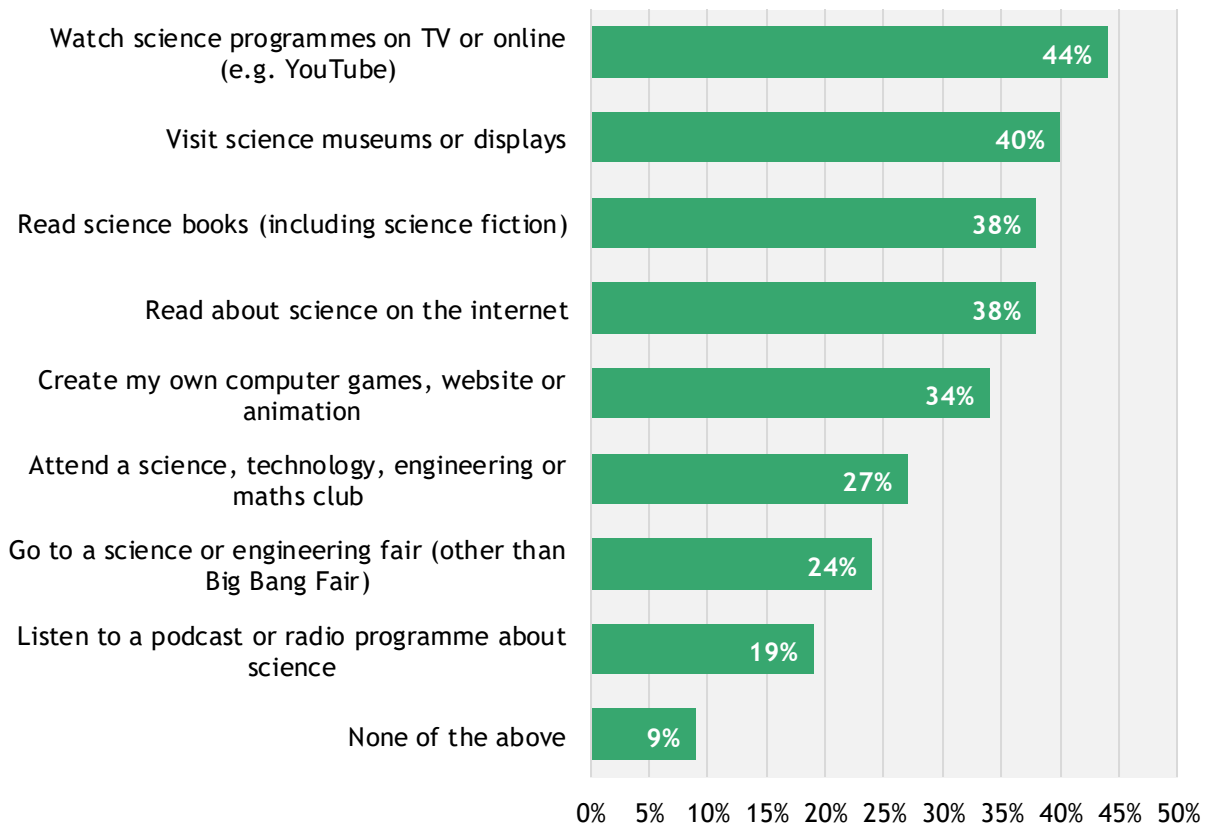
In addition to considering students' demographic characteristics, we aimed to understand young people's prior engagement with STEM before attending The Fair. This approach enables us to analyse survey findings and gain a better understanding of how they may vary based on students' previous exposure to STEM.

To gather this information, we asked students to select science-related activities they participate in outside of school from a provided list. The top 5 ways in which students engage with STEM beyond school include watching STEM content online (44%), visiting museums or displays (40%), reading science books (38%), reading about science on the internet (38%) and creating their own computer games, websites or animations (34%).

### KEY FINDING:

- The top way students engage with STEM outside of school is watching science content on TV or online (such as on YouTube)
- On average, students engaged in 2.5 of the 8 activities listed

Science related activities students do outside of school (n=2,348)





## STEM ENGAGEMENT SCORE

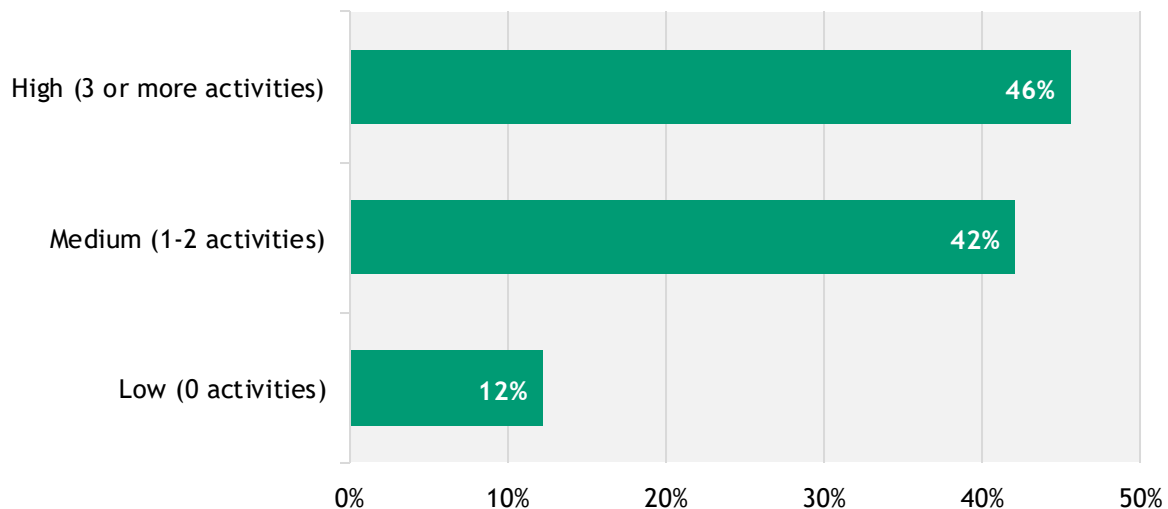
We gave students a STEM engagement score categorised as low (no STEM activities reported), medium (1 to 2 types of activities), or high (3 or more types of activities) based on the number of different types of science-related activities they reported doing outside of school. This is based on the activities we asked about on page 8. Throughout the report, we refer to the score as their level of prior STEM engagement.

It's essential to clarify that this score serves primarily as a tool for further analysis in our evaluation, offering insights into potential variations in survey responses based on students' previous exposure to STEM. While the activities we asked about vary in terms of intensity, our assumption here is that students engaged in multiple types of STEM-related activities outside of school may already possess higher levels of STEM engagement.

## KEY FINDINGS:

- **88% of students attending The Fair have medium (42%) to high (46%) levels of prior STEM engagement**
- **Students who know someone who works in STEM are more likely to have higher levels of prior STEM engagement**

Students' level of prior STEM engagement (n=2,348)



## Predictors of prior STEM engagement

Our analysis found that knowing someone who works in STEM and year group were predictors of STEM engagement, when all other characteristics are taken into account.<sup>4</sup>

- Students who know someone who works in STEM are more likely to have higher STEM engagement compared to those who don't. <sup>a</sup>
- Students in year 6 are more likely to have higher STEM engagement score than students in year 7. <sup>b</sup>

Our analysis suggests that gender, ethnicity, disability, receiving free school meals and attending a priority school were not significant predictors in levels of young peoples' prior STEM engagement.

<sup>4</sup> Logistic regression in this report controlled for student characteristics, including gender, ethnicity, year group, disability, prior STEM engagement, receiving free school meals, whether they know someone working in STEM and whether they go to a priority school

**Ordinal regression output:** <sup>a</sup> Coefficient = 0.7049, SE = 0.1176, z = 5.99, p < 0.001; <sup>b</sup> Coefficient = 0.779, SE = 0.3952, z = 1.97, p = 0.049)

## TEACHER EVALUATION PARTICIPATION

In total, 291 teachers and other accompanying adults completed the teacher survey, 16% of total attendees. **Over two-thirds (68%) of respondents work at a priority school** whereas 29% came from schools outside of our priority groups.

- **Teachers from primary schools were underrepresented in the survey** - this may be because they needed to supervise their students more closely during The Fair
- **Around half of respondents to the survey are subject teachers (47%)** and one-fifth are heads of departments (21%)
- The other half of respondents were made up of pastoral leads, technicians, senior leadership team members, careers leads, teaching assistants, administrators and STEM coordinators
- **92% of subject teachers surveyed teach STEM subjects.** Science teachers were most likely to be accompanying students to The Fair, followed by a smaller proportion of maths (16%) and Design and Technology (8%) teachers

For the purpose of this report, we will be using the term teachers to refer to any accompanying adult who responded to our teacher feedback survey.

### How was data collected?

Similarly to the student evaluation, the teacher survey was conducted using iPads in the designated teacher zone on the show floor. Teachers were encouraged to complete the survey after spending some time exploring The Fair.

The table to the right provides a breakdown of the demographics of teachers who attended The Fair and who completed a survey.

TEACHER CHARACTERISTICS	
	Completed survey N (%)
<b>Total</b>	<b>291</b>
<b>School type</b>	
Priority	186 (68%)
Non-EDI criteria meeting	80 (29%)
Primary	6 (2%)
<b>Role</b>	
Subject teacher	136 (47%)
Head of department	62 (21%)
Other role	35 (12%)
Pastoral lead	29 (10%)
Technician	23 (8%)
Senior leadership team	19 (7%)
Careers lead/advisor/	16 (5%)
<b>Subject taught</b>	
Combined science	103 (54%)
Biology	84 (44%)
Chemistry	81 (42%)
Physics	78 (41%)
Maths	31 (16%)
Non-STEM subjects	15 (8%)
D&T	15 (8%)
Computer Science	10 (5%)
Other STEM subjects	9 (5%)
Engineering	6 (3%)

## METHODS

### Research questions

Our evaluation of The Big Bang Fair aims to answer the following key questions:

- How is The Big Bang Fair experienced by students and teachers (enjoyment, engagement and relevance)?
- How successful is The Fair in increasing students' motivation to do more STEM activities and/or pursue STEM careers?
- How successful is The Fair in increasing teachers' knowledge of and confidence in providing STEM careers advice?
- How can The Fair be improved in future years?

### Presentation of findings

To answer these questions, we analysed the data from the student and teacher surveys. For each survey question, we provide an overview of findings in this report, with comparisons with the previous year where relevant.

We also present findings from our additional analysis of the associations between respondents' characteristics, such as gender, ethnicity, eligibility for free school meals, disability status, level of STEM engagement and personal connections to STEM professionals, and their survey responses from the student survey. The findings of this analysis are only reported if they are statistically significant (meaning at the  $p < .05$  level as a minimum) and are presented in order from the most to the least significant throughout the report.

It's important to note that while our analyses highlight statistically significant associations, they do not explain the reasons behind these differences, which is beyond the ability of a survey to capture. Some disparities may be addressed through adjustments in The Fair's delivery based on feedback from teachers and students, while others may be influenced by external factors beyond our control.

Our aim is to identify disparities and work collaboratively to ensure an equitable and enriching experience for all students attending The Big Bang Fair.

### Limitations of the evaluation

The findings presented in this report are based on data collected at one point in time, limiting our ability to compare students' views before and after taking part in The Big Bang Fair. Consequently, any conclusions related to students' views, interest or knowledge of STEM careers cannot be solely attributed to their participation in the event.

Additionally, it is important to note that our evaluation only focuses on students and teachers who attended The Fair in 2023. We did not explore in detail the barriers preventing some registered schools from attending or challenges faced by schools not engaging with The Fair at all.

As shown in this report, students on average engaged in 2.5 STEM related activities out of the 8 we asked about, and some knew a STEM professional, suggesting they possibly were more likely to be already interested in engineering, technology and science related jobs. We know from the latest Engineering Brand Monitor<sup>5</sup> that engagement and interest in STEM is likely lower for students who do not participate in STEM initiatives.

Similarly, the teachers who took part in our evaluation are likely among the most engaged and supportive educators arranging STEM engagement opportunities for their students. Further, it is possible that the responses we received were primarily from teachers who could afford to take time away from their students at The Fair, potentially excluding teachers with primary-aged students, those from SEND schools, or those working in alternative provision centres.

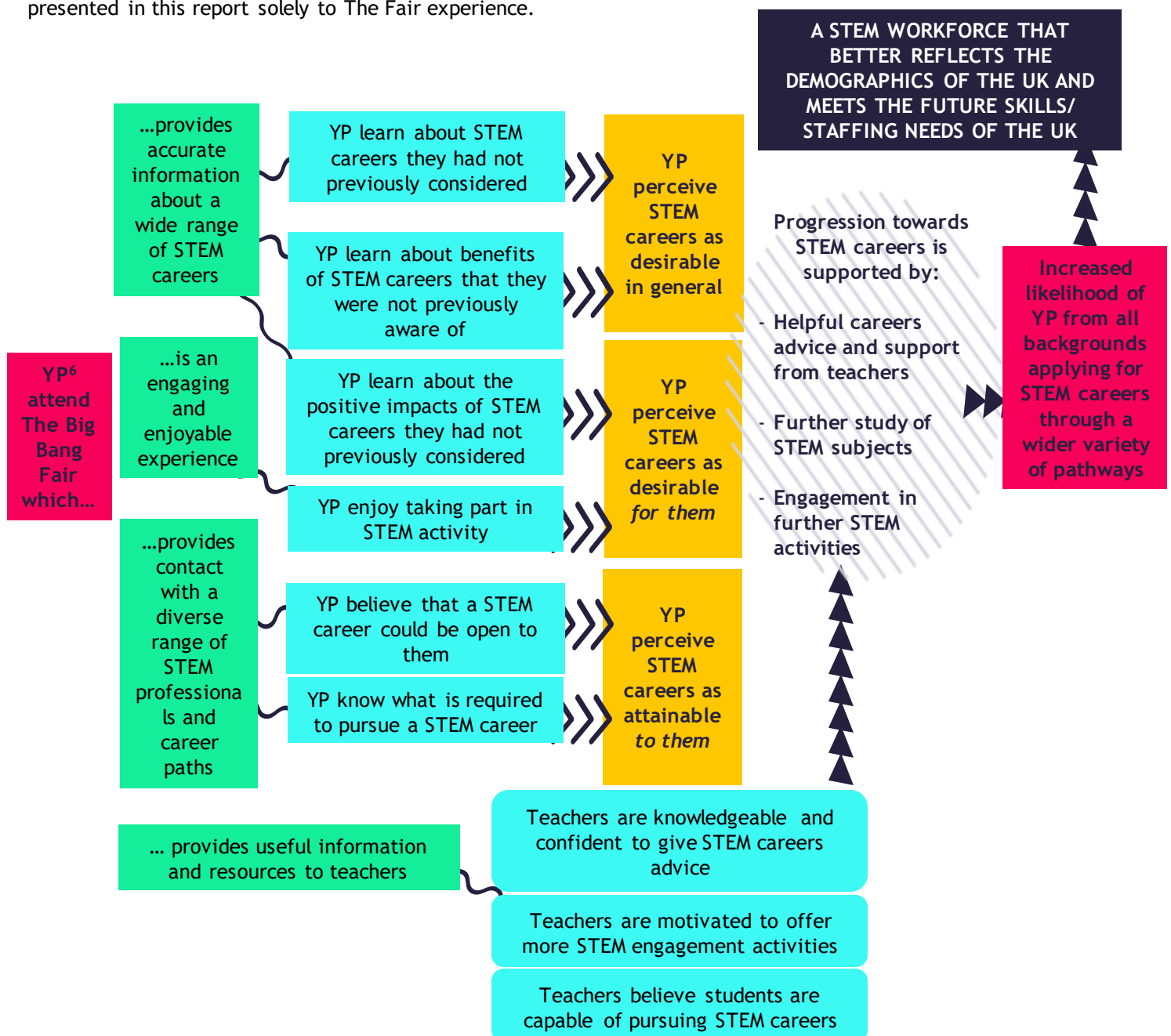
<sup>5</sup> Engineering Brand Monitor 2021, EngineeringUK

### THE BIG BANG FAIR THEORY OF CHANGE

The diagram below illustrates the theory of change behind The Big Bang Fair, outlining the process for achieving long-term impacts on young people’s career aspirations and choices. The findings from our evaluation enable us to explore the extent to which this data supports this theory of change.

Since we collected data only during The Fair and not before the event, we cannot make direct comparisons of student opinions before and after attending. Consequently, we cannot attribute the outcomes presented in this report solely to The Fair experience.

Nonetheless, the theory of change offers a useful framework for interpreting the data collected from surveyed attendees. These findings can contribute to an overarching narrative that may align with expected impacts or highlight areas where the theory lacks support from the available data.



<sup>6</sup>. YP is used as abbreviation for ‘young people’

# STUDENTS' EXPERIENCES OF THE BIG BANG FAIR

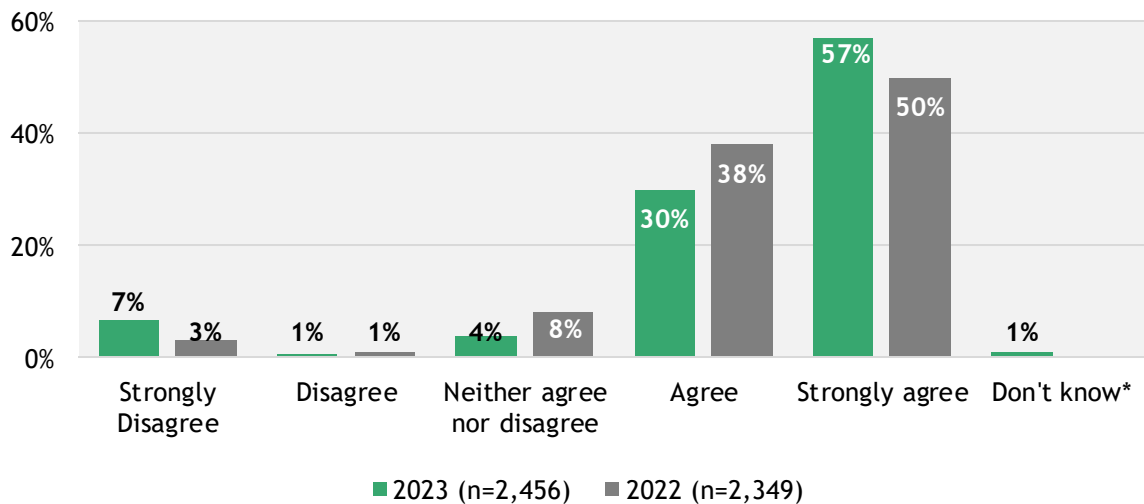
## ENJOYMENT OF THE FAIR

The Big Bang Fair aims to inspire young people towards STEM study and careers through an enjoyable and engaging experience. We asked students about their experience and looked at various factors that could predict their enjoyment of The Fair.

### KEY FINDING:

- **88%<sup>7</sup> of students agreed or strongly agreed that they enjoyed The Big Bang Fair, the same proportion as in 2022**

"I am enjoying The Big Bang Fair"  
2023 and 2022



\* Note: Please be aware that in the 2023 survey, we introduced a new response option, 'Don't know,' which was not available in the 2022 survey. Caution is advised when comparing responses between the 2 years.

## Predictors of enjoyment

Overall enjoyment was high, with nearly 9 out of 10 participants reporting they enjoyed The Fair. We wanted to understand more about the relationship between student characteristics and their level of enjoyment. Our analysis found that disability status, receiving free school meals and year group were all predictors of enjoyment of The Fair when taking into account all other characteristics.<sup>8</sup>

- Non-disabled students were about twice as likely to enjoy The Fair compared to disabled students<sup>a</sup>
- Students in year 7 were slightly more likely to enjoy The Fair compared to students in year 8<sup>b</sup>

- Students who do not receive free school meals were slightly more likely to enjoy The Fair of those who said they do receive free school meals<sup>c</sup>

Encouragingly, findings suggest that The Fair may be equally enjoyable for students of different genders, ethnicities, whether they go to a priority school, their prior level of engagement in STEM and whether they know someone working in STEM.

<sup>7</sup> Rounding Note: All figures presented in this report have been rounded to the nearest whole number for ease of presentation and readability. When these rounded figures are summed, slight discrepancies may occur due to the rounding process.

<sup>8</sup> Logistic regression in this report controlled for student characteristics, including gender, ethnicity, year group, disability, prior STEM engagement, receiving free school meals, whether they know someone working in STEM and whether they go to a priority school

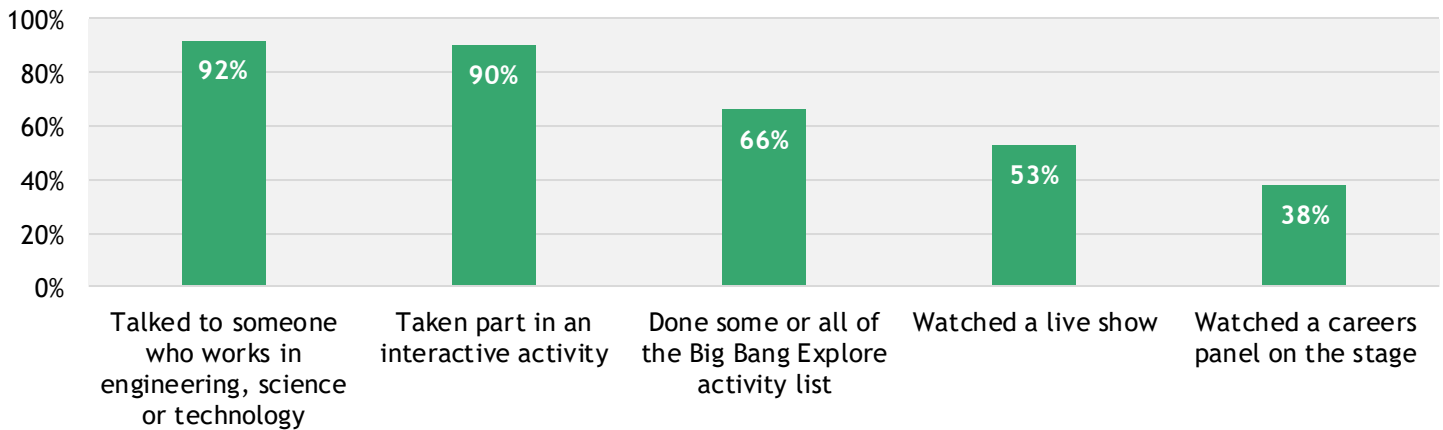
Logistic regression outputs: <sup>a</sup>OR=1.98, 95%CI 1.16-3.3.37, p<0.05, <sup>b</sup>OR=1.75, 95%CI 1.16-2.62, p<0.05; <sup>c</sup>OR=1.69, 95%CI 1.11-2.58 p<0.05,

**ENGAGING EXPERIENCES FOR STUDENTS**

The evaluation stand opened for data collection one hour after the opening of The Big Bang Fair sessions and remained accessible throughout the remainder of each session, allowing students time to explore the show floor before sharing their feedback. The chart below presents the wide array of activities that young people reported engaging in during The Fair. It is worth noting that some students might not have finished exploring the show floor at the time they participated in the survey.

**KEY FINDING:**

**Over 90% of students talked to someone who works in engineering, science or technology or took part in an interactive activity at The Big Bang Fair**

**Activities students had taken part in (n=2,444)**


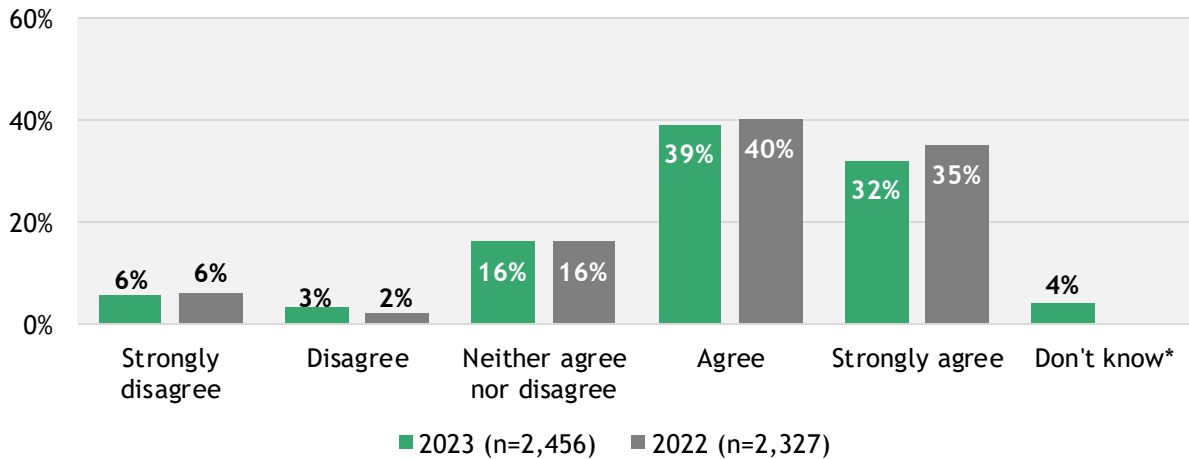
## INSPIRING STUDENTS TO DO MORE STEM ACTIVITIES

While the primary goal of The Fair is to inspire students to pursue further STEM studies and careers, in the short-term, it's more likely to influence their immediate interest in STEM activities. Therefore, we asked students whether The Fair made them want to do more activities in engineering and technology.

### KEY FINDING:

- 71% of students agreed that the 2023 Big Bang Fair has made them want to do more STEM activities, a similar proportion as in 2022

**“The Big Bang Fair has made me want to do more science, engineering and technology activities in the future”**  
Responses in 2023 and 2022



\* Note: Please be aware that in the 2023 survey, we introduced a new response option, 'Don't know,' which was not available in the 2022 survey. Caution is advised when comparing responses between the 2 years.

## Predictors of wanting to do more STEM activities

Overall, there were high levels of students wanting to do more STEM activities following The Fair. Our additional analysis found that level of prior STEM engagement, year group, type of school attended and knowing a STEM professional were all predictors of wanting to do more STEM activities, when taking into account all other student characteristics.

- Students with high prior STEM engagement were over 4 times as likely to say that The Fair made them want to do more STEM activities compared to those reporting low STEM engagement <sup>a</sup>
- Year 7 students were slightly more likely to want to do more STEM activities compared year 8 students <sup>b</sup>

- Students from schools outside of our priority groups were slightly more likely to want to do more STEM activities following The Fair compared to students from priority schools <sup>c</sup>
- Knowing someone who works in STEM slightly increased the odds of wanting to do more STEM activities compared students who don't know a STEM professional <sup>d</sup>

Gender, ethnicity, disability, and receiving free school meals were not found to significantly change the odds of students wanting to do more STEM activities following The Big Bang Fair.

Logistic regression outputs: <sup>a</sup>OR=4.62, 95%CI 3.11-6.85, p<0.001, <sup>b</sup>OR=1.68, 95%CI 1.25-2.25 p<0.05, <sup>c</sup>OR=1.48, 95%CI 1.08-2.14, p<0.05, <sup>d</sup>OR=1.43, 95%CI 1.06-1.91 p<0.05, <sup>d</sup>



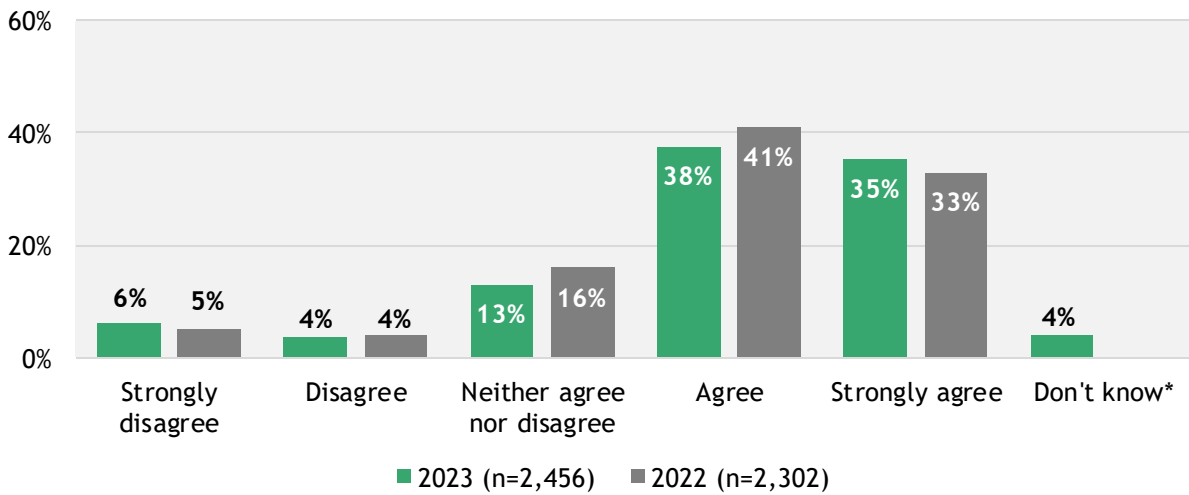
## INSPIRING STUDENTS TO FIND OUT ABOUT CAREERS IN STEM

For students who may have been inspired to explore careers in STEM, taking the next step to learn more about how to pursue such careers is crucial. We asked students whether The Fair made them want to find out more about a career in STEM.

### KEY FINDING:

- 73% of students agreed that The Big Bang Fair 2023 has made them want to find out more about STEM careers, a similar proportion as in 2022.

“The Big Bang Fair has made me want to find out more about engineering, science or technology jobs”



\* Note: Please be aware that in the 2023 survey, we introduced a new response option, 'Don't know,' which was not available in the 2022 survey. Caution is advised when comparing responses between the 2 years.

### Predictors of wanting to find out more about STEM careers

Overall, nearly 3 in 4 students came away from The Fair wanting to find out about STEM careers. When taking into account all other student characteristics, our analysis found that the level of prior STEM engagement and type of school attended were predictors of whether students reported that The Fair made them want to find out more about STEM jobs.

- Having a high level of prior STEM engagement was found to increase the odds of wanting to find out more about careers in STEM by almost 4 times compared to students with low STEM engagement <sup>a</sup>

- Students from schools outside of our priority groups were slightly more likely to want to find out more about careers in STEM compared to students from priority schools <sup>b</sup>

No demographic characteristics were significant predictors of whether students wanted to find out more about STEM careers following The Big Bang Fair.

Logistic regression outputs: <sup>a</sup> OR=3.73, 95%CI 2.48-5.61, p<0.05, <sup>b</sup> OR=1.52, 95%CI 1.11-2.07, p<0.05

# ABOUT THE STUDENTS:

Their knowledge, interest and capability to pursue STEM careers

### STUDENTS' IDEAS OF THEIR FUTURE JOB

We asked students whether they had a clear idea of their future career aspirations and asked them to specify their desired profession. Surprisingly, more than half of the responding students (59%) already had a defined career in mind and shared their job of interest. To provide a clear overview, we categorized these open-text responses into broader occupational categories. The chart below shows the top occupations chosen by boys and girls.<sup>9</sup>

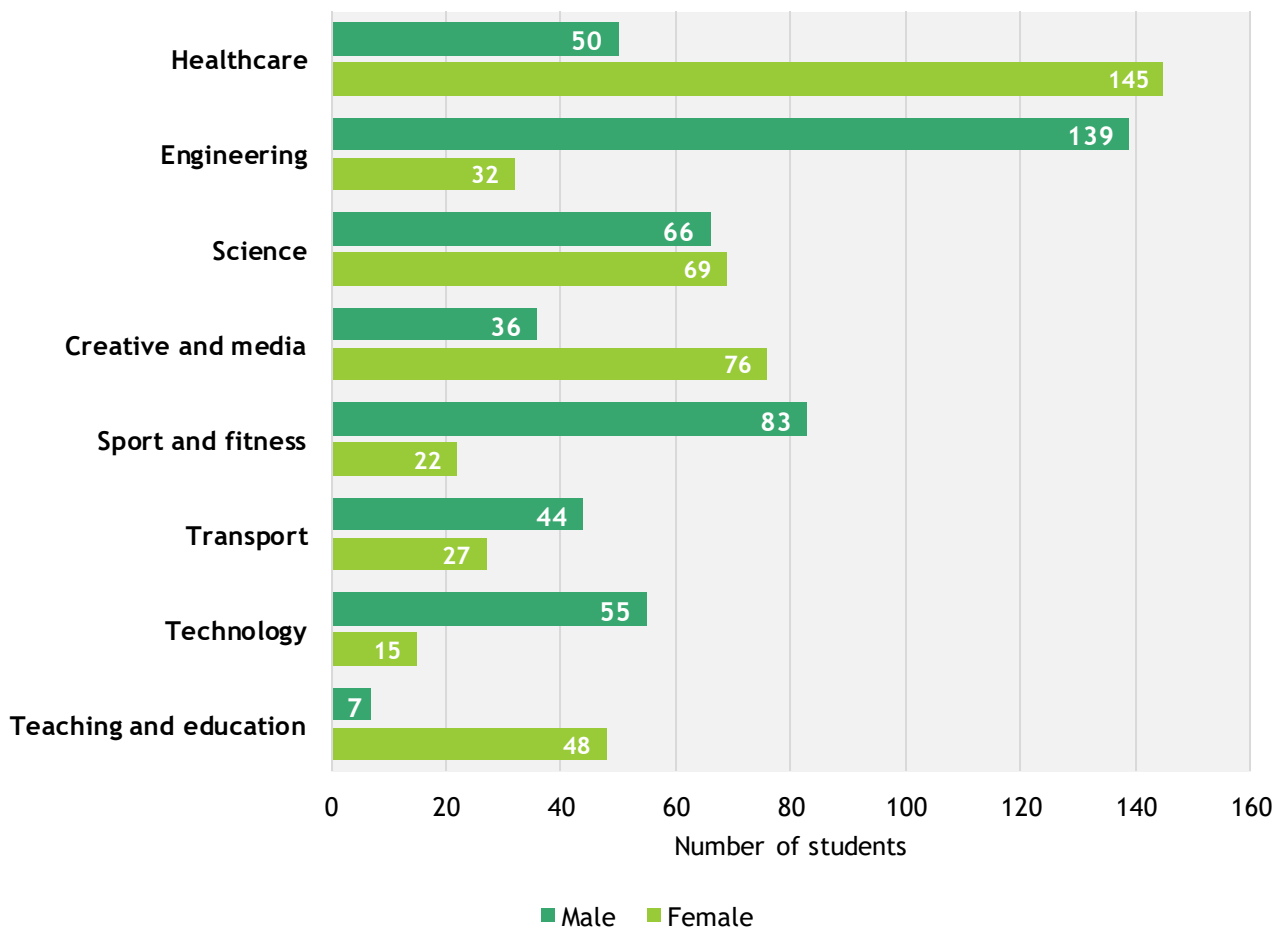
Notably, healthcare professions emerged as the most popular category overall. Nearly 3 times as many girls (145) than boys (50) expressed interest in healthcare professions. Engineering occupations came in second, with over 4 times as many boys (139) expressing interest in this field than girls (32).

It's worth noting that we asked students this question only at The Fair, so we cannot conclude whether these career preferences are affected by taking part in the event or whether they were pre-existing preferences.

#### KEY FINDINGS:

- **3 in 5 students (59%) said that they know what job they want to do when they are older**
- **More than 4 times as many boys than girls are interested in engineering occupations**
- **Science-related careers were the third most popular category, with roughly equal numbers of boys and girls showing interest**
- **More than 3 times as many boys aspire to technology-based jobs compared to girls**

Most popular occupations that boys and girls said they want to do when they're older



<sup>9</sup> Only categories with over 50 responses were included in the chart

## STUDENTS' INTEREST IN STEM CAREERS

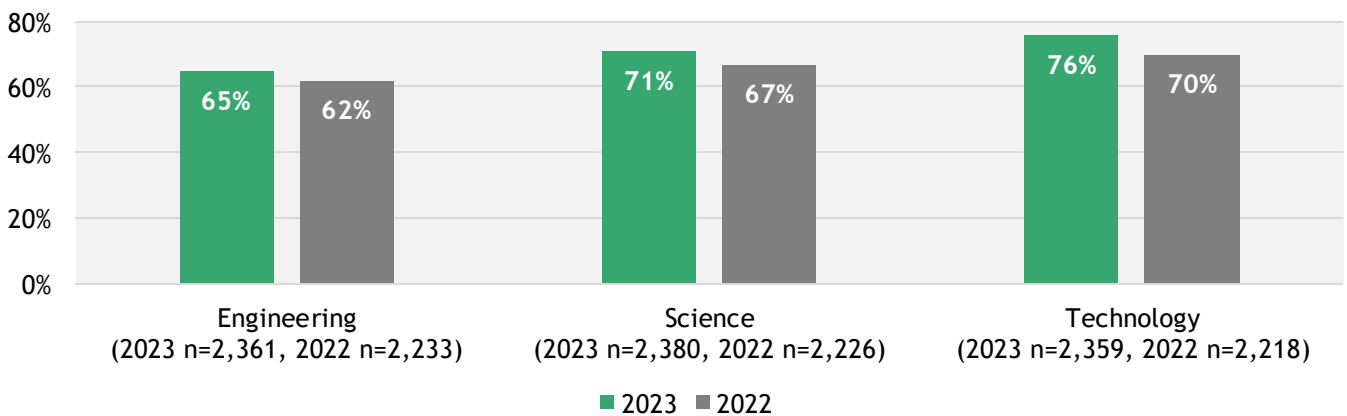
We asked students how interested they are in a career in science, engineering or technology related fields. Technology was the most popular with 76% of students being interested in a career in this area, followed by science (71%) and engineering (65%). There was a slight increase in interest in STEM careers in 2023 compared to 2022.

Young people attending The Big Bang Fair reported higher interest in engineering compared to participants of the most recent Engineering Brand Monitor (63% compared to 51%).

## KEY FINDINGS:

- 91% of students expressed interest in a career in at least one of science, technology and engineering
- 65% of students expressed interest in a career in engineering

Students reporting that they were interested or very interested in a career in STEM in 2023 and 2022



## Predictors of interest in STEM careers

Across the board, students showed higher levels of interest in STEM careers compared to the previous year. Our analysis found that prior STEM engagement and gender were significant predictors of students' interest in a career in at least one of science, technology or engineering, when taking into account all other student characteristics.

- Students with high levels of prior STEM engagement were 8 times more likely to be interested in a career in STEM compared to those with low STEM engagement <sup>a</sup>

- Boys were slightly more likely to be interested in STEM careers compared to girls <sup>b</sup>

Knowing someone who works in STEM, receiving free school meals, disability, year group, ethnicity and attending a priority school were not found to significantly predict young people's interest in careers related to STEM.

Logistic regression outputs: <sup>a</sup>OR=8.18, 95%CI 4.48-14.91, p<0.001, <sup>b</sup>OR=1.79, 95%CI 1.19-2.70, p<0.05

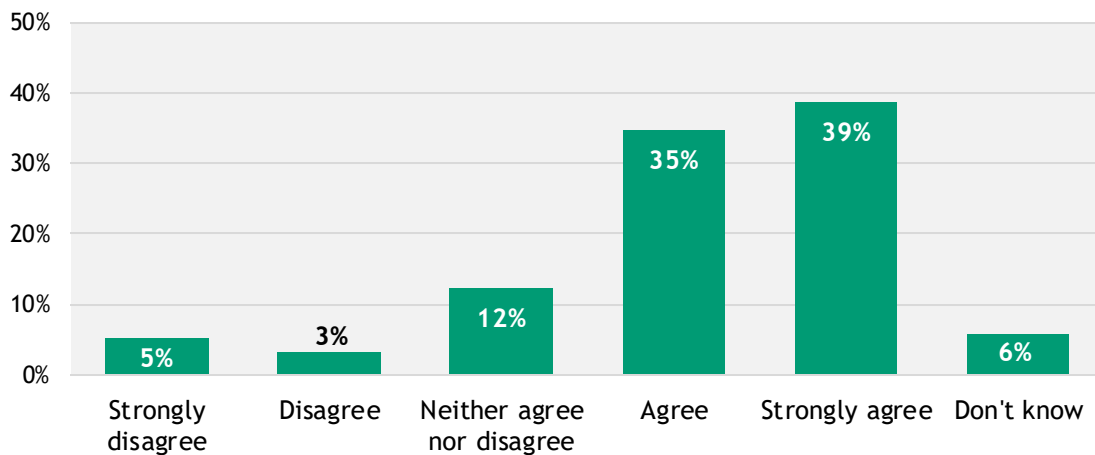
## STUDENTS' FUTURE USE OF SCIENCE

In 2023, we introduced a new survey question to gain insights into the presence of STEM identity among young people, in addition to or building on their interest in STEM careers. We aimed to determine whether students recognised the connection between their science learning and their future careers. Specifically, we asked students whether they believed that learning science would be beneficial for their future employment. The large majority agreed (35%) or strongly agreed (39%), while only a small proportion of students disagreed (8%).

### KEY FINDING:

- **73% of young people agreed that learning about science will be useful for their future job<sup>10</sup>**

**“Learning about science will be helpful for my future job”  
(n=2,423)**



## Predictors of students' views of science

**A high proportion of students agreed that learning about science will be useful in future.** Our analysis found that the level of prior STEM engagement and year group were significant predictors of the belief that learning about science will be helpful for a student's future job, when taking into account all other characteristics.

- Students with high levels of prior STEM engagement were about 3.5 times more likely to say that learning about science will be useful for their future job compared those with low STEM engagement <sup>a</sup>

- Students in year 7 were slightly more likely to say that learning about science will be useful for their future job compared to year 8 students <sup>a</sup>

Knowing someone who works in STEM, ethnicity, gender, receiving free school meals, disability and attending a priority school were not found to significantly predict young people's interest in careers related to engineering.

<sup>10</sup>. Rounding Note: All figures presented in this report have been rounded to the nearest whole number for ease of presentation and readability. When these rounded figures are summed, slight discrepancies may occur due to the rounding process.

Logistic regression outputs: <sup>a</sup>OR=3.75, 95%CI 2.43-5.79, p<0.001, <sup>b</sup>OR=1.41, 95%CI 1.03-1.92, p<0.05

## STUDENTS' KNOWLEDGE OF ENGINEERING CAREERS

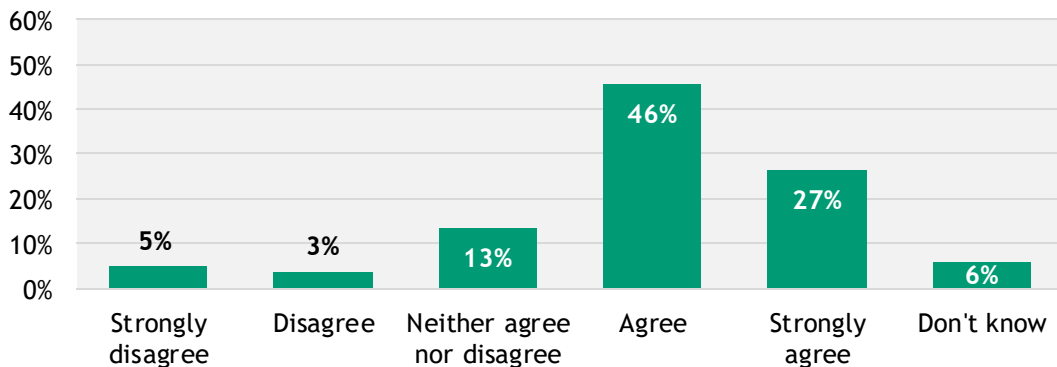
Knowing about the nature of engineering jobs is a key factor in informing whether a young person may choose to pursue educational or professional pathways in(to) the sector. As part of our evaluation, we asked students about their knowledge of engineering roles.

It's important to note that this question relies on self-reported measures, helping us gain insights into what students believe they know. However, it does not measure the depth of their actual knowledge. Furthermore, it's essential to acknowledge that our ability to definitively attribute any increase in knowledge to The Fair is limited since the data was collected only at a single point in time.

### KEY FINDING:

- 73% of students agree that they know about the different types of things engineers do in their jobs

**“I know about the different types of things that engineers can do in their jobs” (n=2,146)**



### Predictors of students' knowledge

A majority of students said that they know the kind of things engineers can do in their jobs. Our analysis found that knowing someone who works in STEM, receiving free school meals and the level of prior STEM engagement were significant predictors of self-reported knowledge of engineering careers, when taking into account all other student characteristics.

- Students with high levels of prior STEM engagement were twice as likely to say they know what engineers do in their jobs compared to those with low STEM engagement <sup>a</sup>
- Students who do not receive free school meals were slightly more likely to say that they know what engineers do in their jobs compared to students who do receive free school meals <sup>b</sup>

- Students who say they know someone who works in STEM were slightly more likely to say that they know what engineers do in their jobs, compared to students who do not know a STEM professional <sup>c</sup>

Gender, ethnicity, disability, year group and attending a priority school were not found to significantly predict young people's self-reported knowledge of engineering careers.

Logistic regression outputs: <sup>a</sup>OR=2.02, 95%CI 1.31-3.12, p<0.05, <sup>b</sup>OR=1.72, 95%CI 1.26-2.36, p<0.05, <sup>c</sup>OR=1.63, 95%CI 1.21-2.20 p<0.05

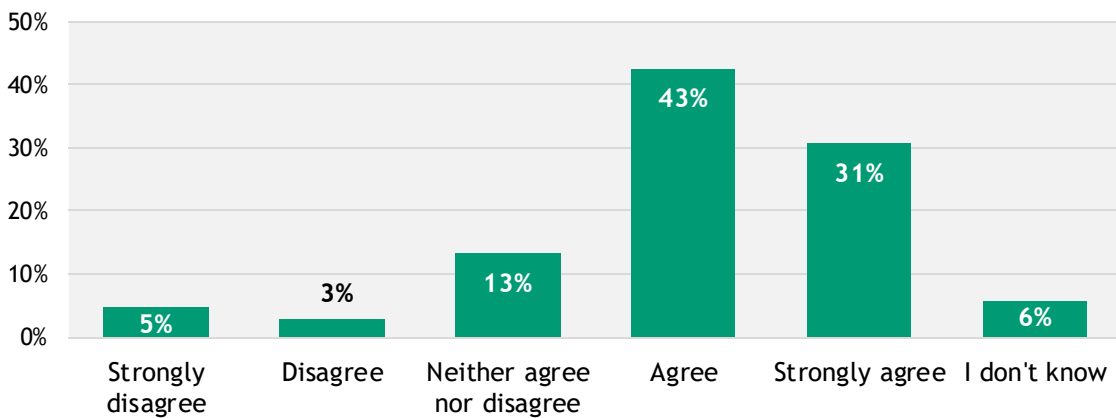
## STUDENTS' KNOWLEDGE OF ENGINEERS' ROLE IN CREATING GREEN TECHNOLOGIES

We asked students a question around their knowledge of the role engineers play in creating technologies that are better for the environment. This question is a self-reported measure which helps us understand what students think they know but is not a measure of how much they may actually know.

### KEY FINDING:

**Almost three-quarters (74%) of students surveyed agree that they know about the role engineers play in creating technologies that are better for the environment**

**“I know about the role engineers play in creating technologies that are better for the environment”  
(n=2,423)**



### Predictors of students' knowledge

**A large majority of students said they know about the role engineers play in creating green technologies.** Our analysis found that the levels of prior STEM engagement was a significant predictor of knowledge about the role that engineers play in creating green technologies, when taking into account all other student characteristics.

- Students with high levels of prior STEM engagement were twice as likely to say they know about the role engineers play in creating green technologies compared to those with low STEM engagement <sup>a</sup>

Knowing someone who works in STEM, ethnicity, gender, receiving free school meals, disability, year group and attending a priority school were not found to significantly predict young people's knowledge about the role of engineers in creating green technologies.

Logistic regression outputs: <sup>a</sup>OR=2.15, 95%CI 1.42-3.27, p<0.001

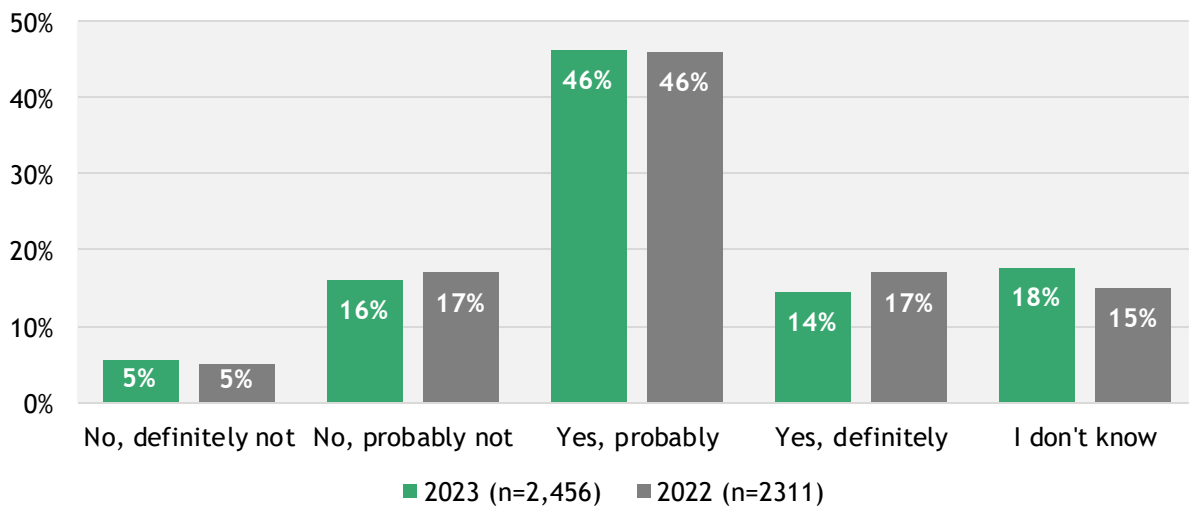
**STUDENTS’ CONFIDENCE IN THEIR ABILITY TO BECOME AN ENGINEER**

In addition to their interest in and knowledge of engineering careers, students also need to have the belief that pursuing a career in engineering is within their reach, that it is something they can achieve. We asked students whether they thought they could become an engineer if they wanted to.

**KEY FINDING:**

- **3 in 5 students (60%) think that they could be an engineer if that’s what they wanted to do**

**“If you wanted to, do you think you could become an engineer?” in 2023 and 2022**



**Predictors of students’ perceived capability**

**3 in 5 students believe they could become an engineer.** Our analysis found that level of prior STEM engagement, gender, ethnicity and knowing someone who works in STEM were all predictors of students’ confidence in their ability to become an engineer, when taking into account all other characteristics.

- Students with high levels of prior STEM engagement were 5 times as likely to think that they could be an engineer if they wanted to compared to students with low levels of STEM engagement <sup>a</sup>
- Boys were about 3 times as likely think that they could become engineers compared to girls <sup>b</sup>

- Students from an Asian background were twice as likely to think that they could become engineers compared to students from a white background <sup>c</sup>
- Students who know someone who works in STEM were slightly more likely to think that they could become an engineer compared to students who don’t know anyone who works in STEM <sup>d</sup>

Receiving free school meals, disability, year group and attending a priority school were not found to significantly predict young people’s interest in careers related to engineering.

**Logistic regression outputs:** <sup>a</sup>OR=5.5, 95%CI 3.56-8.48, p<0.001, <sup>b</sup>OR=2.89, 95%CI 2.14-3.91, p<0.001, <sup>c</sup>OR=2.03, 95%CI 1.37-3.01 p<0.001, <sup>d</sup>OR=1.47, 95%CI 1.06-2.04 p<0.05



### STUDENTS' PERCEIVED BARRIERS TO BECOMING AN ENGINEER

We asked students who answered that they did not think they could become an engineer if they could tell us what would stop them from becoming an engineer.

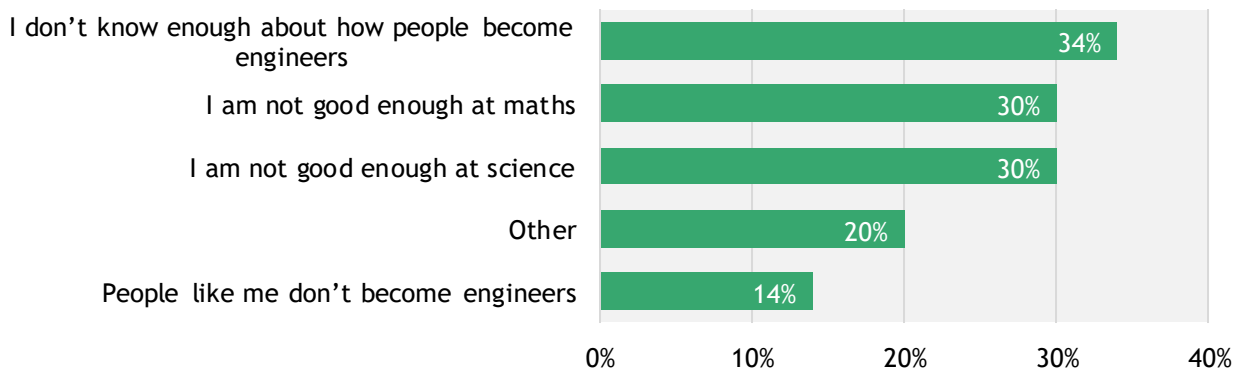
Roughly even proportions of students said it was because they do not know enough about how people become engineers (34%), because they are not good enough at maths (30%) or not good enough at science (30%).

A smaller proportion (14%) said it was because people like them don't become engineers.

### KEY FINDING:

Roughly a third (34%) of students who do not think that they could become an engineer say that they don't know enough about how people become engineers, or that they are not good enough in maths or science (30%)

**"What do you think would stop you from becoming an engineer, if that was what you wanted to do?" (n=487)**



Students who selected other as an option were asked to specify any additional reason for what would stop them from becoming an engineer. Their responses were related to:

- **Self-perceived Inadequacy**
  - “I’m not smart enough”
  - “I don’t have what it takes”
  - “I wouldn’t have the courage to”
- **Lack of interest or enjoyment in engineering**
  - “I’m interested in other careers that probably don’t involve engineering”
  - “I just don’t like the idea of engineering”
  - “I don’t really enjoy it as much as other things”

- **Concerns about difficulty or risk:**
  - “It could be hard and you might get hurt”
  - “Too much of a manual labor and also I don’t seem fit for it”
  - “It’s too much pressure”
  - “I might hurt myself”

# TEACHERS' EXPERIENCE OF THE BIG BANG FAIR

## TEACHERS' MOTIVATIONS FOR FAIR ATTENDANCE

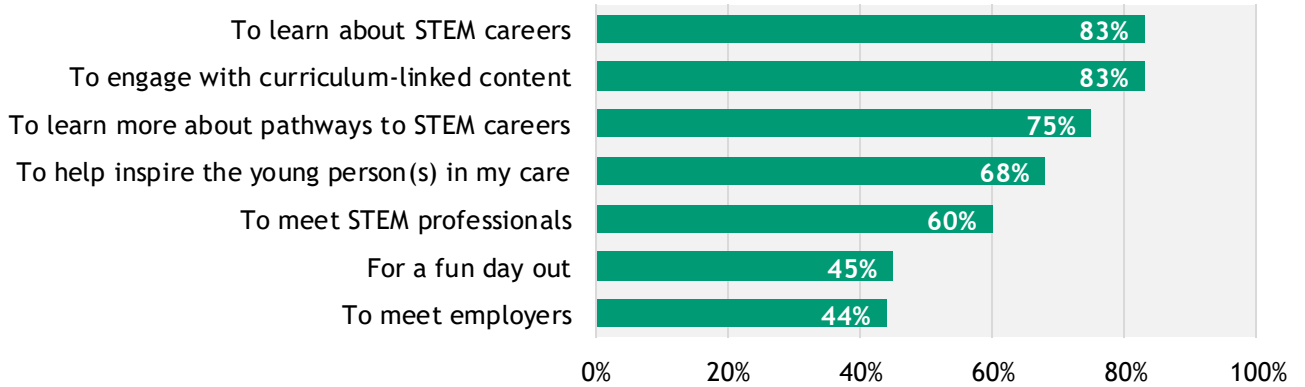
When teachers registered for The Fair, they were asked to indicate the motivations behind bringing their students to the event. Teachers expressed a strong interest in having their students explore the variety of STEM careers and various pathways into these fields. Additionally, they are motivated by the opportunity for their students to engage with curriculum-linked content.

### KEY FINDINGS:

Teachers' top 3 reasons for bringing their students to The Big Bang Fair were:

- To learn about STEM careers (83%)
- To engage with curriculum led content (83%)
- To learn more about pathways to STEM careers (75%)

### Teachers' motivations for bring students to The Big Bang Fair (n=350)



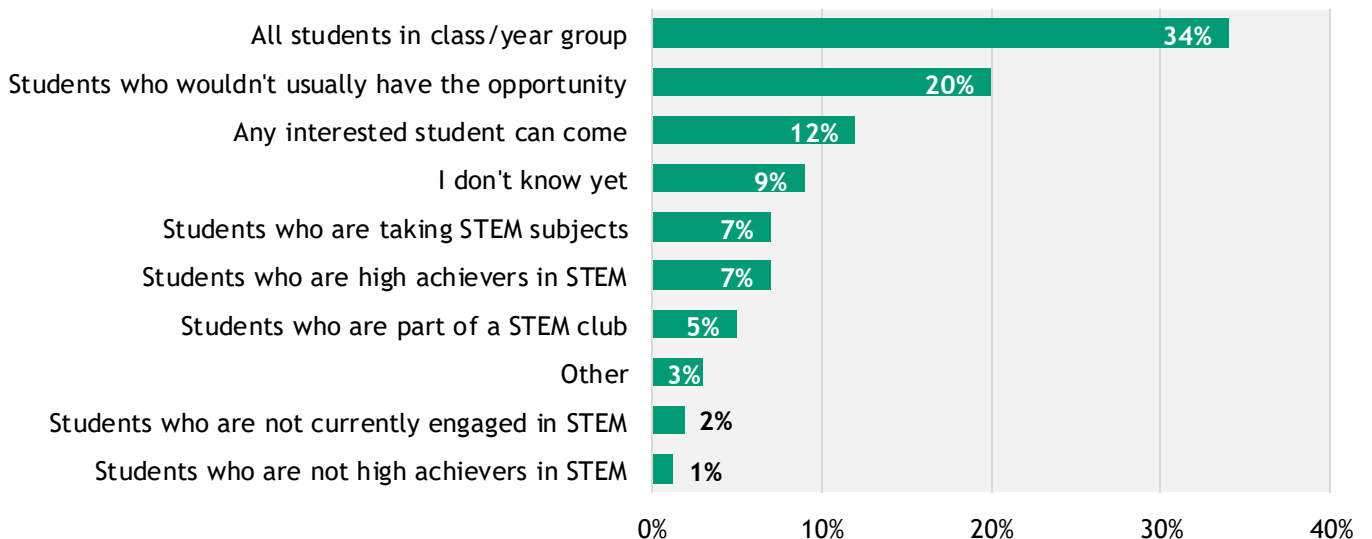
## How did teachers select students to attend The Big Bang Fair?

As part of the registration form, teachers were asked how they selected the students to attend. Schools took a range of approaches for selecting or inviting students to attend The Fair.

### KEY FINDING:

The most common way that teachers selected students to come to The Fair is by bringing a whole class or year group (34%)

### Teachers' approaches for selecting students to attend The Big Bang Fair (n=350)



## TEACHERS' EXPERIENCE OF THE BIG BANG FAIR

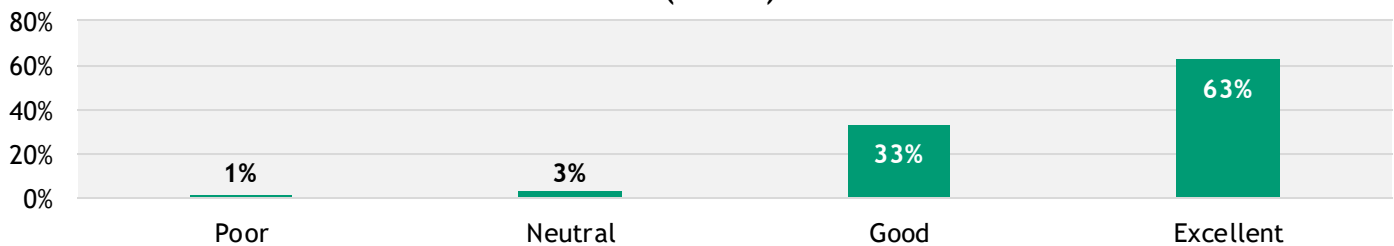
Teachers' experiences and views of The Fair are critical, not only because they play a key role in deciding future attendance but also for the valuable insights they can share about how effectively The Fair meets their needs and those of their students.

When asked how they would rate their experience of The Big Bang Fair overall Teachers responses were almost unanimously positive: 96% of teachers rated The Fair as excellent (63%) or good (33%).

### KEY FINDING:

- 96% of teachers rated their experience of The Big Bang Fair as good or excellent

“How would you rate your experience of The Big Bang Fair overall?”  
(n=291)



## TEACHERS' VIEWS OF THE FAIR

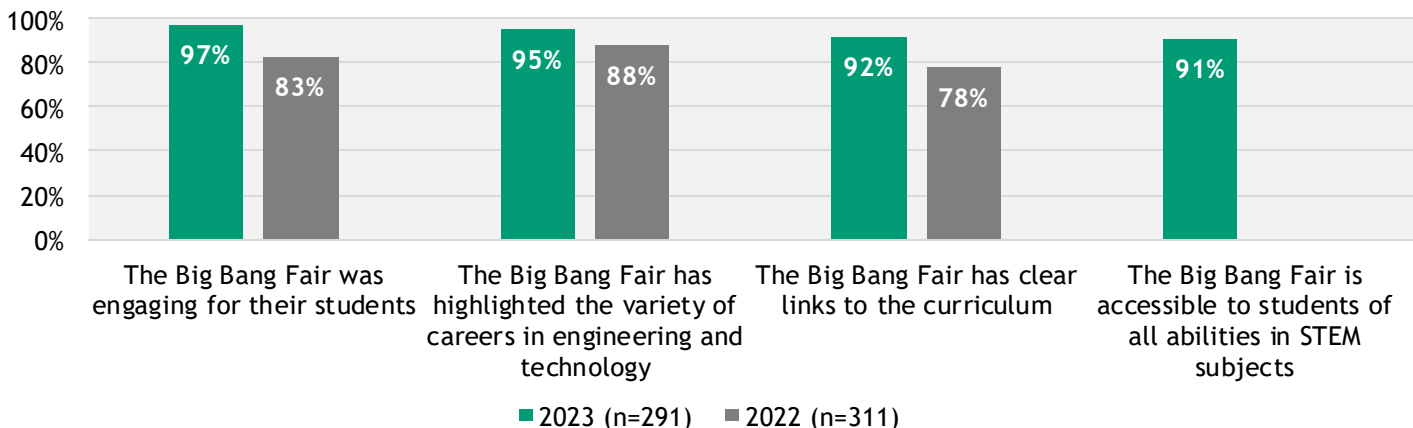
The content of The Fair aims to support schools' and teachers' objectives through providing clear curriculum links and showcasing various STEM careers.

Feedback from the teacher survey overwhelmingly supports that teachers felt that The Fair met these aims.

### KEY FINDINGS

An overwhelming majority of teachers (ranging from 91% to 97%) expressed high levels of agreement regarding The Fair's engagement, its ability to showcase diverse STEM careers, clear curriculum links, and accessibility to students of varying STEM abilities.

Proportion of teachers who agreed that The Big Bang Fair is engaging, accessible and relevant for students<sup>11</sup>



<sup>11</sup> The statement around accessibility was introduced in the 2023 teacher survey. There is no comparison for 2022.

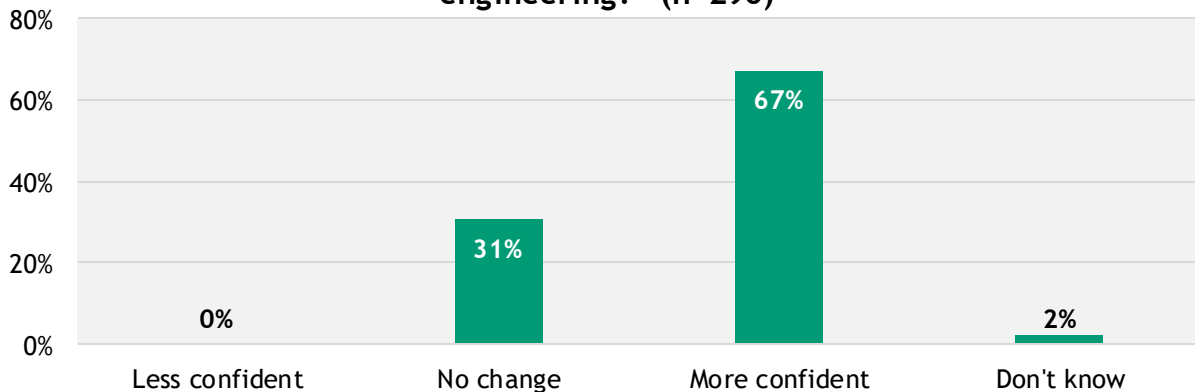
### IMPROVING TEACHERS' CONFIDENCE TO TALK ABOUT ENGINEERING CAREERS

Teachers play a pivotal role in advising and guiding students in their career choices. They need to understand STEM careers and have the confidence to offer STEM careers information in order to foster greater student participation in STEM fields. As such, we wanted to understand whether attending The Big Bang Fair made a difference to teachers' confidence in speaking about engineering careers with student.

#### KEY FINDING

**Around two-thirds (67%) of teachers reported feeling more confident in speaking to their students about careers in engineering after attending The Big Bang Fair**

**“Having attended The Big Bang Fair, do you feel any more or less confident in speaking to your students about careers in engineering?” (n=290)**



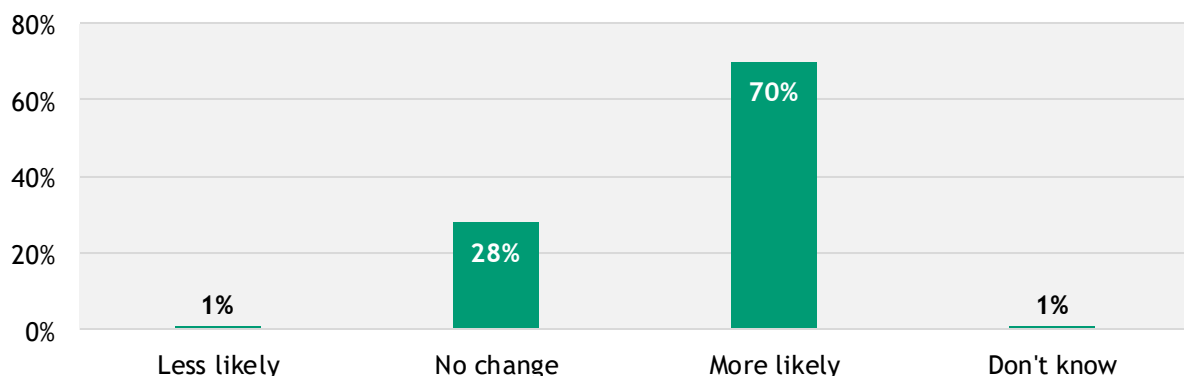
### IMPROVING TEACHERS' LIKLIHOOD TO RECOMMEND A CAREER IN ENGINEERING

We also asked teachers how likely they are to suggest a career in engineering to a student, following their attendance of The Big Bang Fair.

#### KEY FINDING:

- **70% of teachers reported being more likely to suggest to a student that they consider a career in engineering after attending The Big Bang Fair**

**“Having attended The Big Bang Fair, are you more or less likely to suggest to a student that they consider a career in engineering?” (n=290)**



# LEARNINGS FOR PROGRAMME DEVELOPMENT

## THE BIG BANG FAIR HIGHLIGHTS

We sought feedback from teachers to understand their favourite aspects of The Fair, aiming to ensure a consistent positive experience in future years. Teachers shared their views in the survey, and we have summarised key themes that emerged from their valuable input.

### Variety and range of activities

The most prominent theme throughout the feedback is teachers' appreciation for the wide range of activities, exhibits, stalls, and experiences available at the event.

- “The range of activities and themes”
- “Great range of presentations for the pupils to be inspired by”
- “The wide variety of activities and resources”
- “Lots of interactive exhibits”

### Showcasing of STEM careers and opportunities

Several teachers value the event for its focus on showcasing STEM careers and providing information on various career pathways and opportunities for students.

- “Enriched in career opportunities. Lots of discussions on careers and pathways available”
- “The large variety of companies here to showcase to pupils what options are available to them in the future”
- “Lots of information on careers in STEM”
- “Information [on] pathways regarding career development for students struggling to decide what career they want to pursue”

### Positive student experiences

Teachers express satisfaction with their students' positive experiences, excitement, and interest in exploring the different activities and opportunities available on the day.

- “The interactive activities to get the students involved brings STEM alive. Our students were really excited about trying EVERYTHING!”
- “Our students had [the] freedom to explore exhibits and develop their independence in a safe environment”
- “Seeing our children engaging with people and enjoying themselves”
- “The kids were enthralled and got involved with everything”
- “The chance for my students to explore and enjoy what their future could hold - will hold!”

### Organisation and atmosphere

Teachers appreciate the well-organised nature of the event and the friendly, helpful staff and exhibitors. They also mention the positive and inspiring atmosphere that encourages students to explore and learn.

- “Well organised and buzzing with youthful enthusiasm”
- “The friendly atmosphere from the stalls and workers”
- “The openness and friendly nature of all”

## SUGGESTIONS FOR IMPROVEMENTS

We sought feedback from teachers on how we could further improve the event. We present the main themes that emerged from the insightful comments and suggestions provided by teachers.

### Increase the number and variety of exhibitors

Some teachers expressed a desire for more hands-on exhibits and interactive activities for their students.

- “More hands-on exhibits maybe”
- “Was not as interactive as previous years”
- “Student feedback is asking for more stalls please as some stated they finished after an hour and were bored”
- “There could be more companies with booths”

### Provide a broader representation of STEM subjects and careers

Some teachers wanted more representation of specific STEM subjects and careers, such as medicine, biology, chemistry, and computer science.

- “More medical-based careers”
- “More variety of exhibitors, maybe more medical and biology-related contributors”
- “More computer science specific subject exhibits”
- “More chemistry opportunities”

### Improve inclusivity and diverse representation

Teachers emphasised the importance of promoting diversity and inclusivity at the event. They underscored the importance of avoiding stereotypes and highlighting the contributions of women in STEM.

- “Please do not have stereotypical looking scientist on stage lab coats and white hair”
- “Did not like that the ‘scientists’ in the demonstration shows were wearing wigs that made them look like old fashioned, typical, stereotypical science geeks. Also, that they were women, who then looked like men with the wigs! Promote the women!”
- “More targeted info for girls and children from less privileged backgrounds and maybe less traditional routes into science-based jobs”

### Improve communication and logistics

Some teachers raised concerns about logistics, such as clearer signage, improved show-floor maps, and more suitable timings for school visits.

- “I think a clearer introduction to the event which signposts key areas on the stage. This could start the schools’ session before they split off”
- “Clearer signs, warnings of loud bangs, quiet rooms to deliver presentations and take part in robot challenges. Somewhere to eat lunch on tables. Toilet signs”
- “More space, improve map to be easier to read”

### Consider limitations of half-day sessions

This was the first year that schools attended The Fair in half-day sessions rather than for a full day. Additionally, a cap in group size of 75 per session (this included students and teachers) was introduced. Some teachers highlighted the limitations that this new approach had on their schools’ participation.

- “Timings - 9am to 12pm means leaving before school starts / 1 to 4pm means getting back too late for after school clubs / childcare. It would be better within school day”
- “Splitting the day into am or pm meant less time here. Also 70 limit meant having to split the year in half”
- “More suitable times as we struggled to get here for 9 so have missed an hour”
- “Allow longer time slots for school groups taking into account travel time”

It is likely that the introduction of half day sessions was a barrier to some schools attending The Fair, particularly to schools from outside the Birmingham area who would need to travel further to attend.



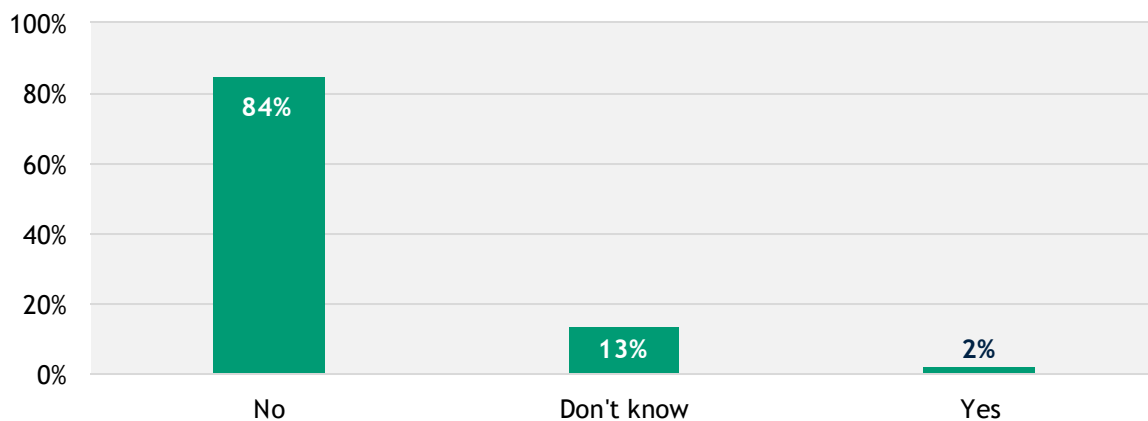
## TEACHERS' VIEWS ON ACCESSIBILITY AT THE BIG BANG FAIR

We wanted to understand how accessible The Big Bang Fair was for disabled students and the teachers who accompany them. We asked teachers whether any of the students they brought to The Fair were disabled and if there were any students who chose not to attend due to accessibility concerns.

### KEY FINDINGS:

- **45% of teachers said that one or more of the students they brought to The Fair were disabled**
- **2% of teachers said that there were students who did not come to The Fair because of concerns about accessibility**

**“Were there any students at your school who did not come because of concerns about accessibility?” (n=290)**



### How can The Fair be more accessible?

Additionally, we sought feedback from teachers on how we could make The Big Bang Fair more accessible. Many teachers acknowledged and commended the existing efforts made to improve Fair accessibility. They did provide further ideas for improvements, which included:

- **Noise cancelling headphones to borrow**
  - “Noise-canceling headphones to borrow, maybe a specific time at each stand for sunflower lanyard holders so it’s quieter”
  - “Headphones would be helpful for those who’ve forgotten”
- **Improved information and communication**
  - “Let us know beforehand about support so we can have conversations ahead of time”
  - “More details about the stalls would be good before arriving”
  - “I think a clearer introduction to the event which signposts key areas on the stage. This could start the schools session before they split off”
  - “Easy to identify SEN-friendly exhibitors”
- **Notice of loud noises**
  - “More notice of loud noises and more zones for quiet time”
  - “Let students know when there will be loud noises or have a countdown”
  - “Signs & subtitles on stage show”
- **Seating and mobility aids**
  - “Freely accessible wheelchairs (some injured, recovering, or disadvantaged students do not hold blue badge passes)”
  - “More seating closer to the display stalls”
  - “Making some pathways between stalls a little larger”
- **Accessible toilets**
  - “Have correct facilities in the toilets in the same hall as the big bang”
  - “When we arrived, the toilet facilities were not available where we were, so [student] had to be taken to another building”

# CONCLUSIONS AND RECOMMENDATIONS

The primary goal of The Big Bang Fair is to deliver an inspiring in-person event that sparks enthusiasm and curiosity among young people, encouraging them to discover exciting opportunities within STEM through high-quality interactions and engaging activities. Our evaluation findings clearly indicate that the programme has predominantly succeeded in achieving its immediate objectives. Both students and teachers reported high levels of engagement and enjoyment and a large proportion of students reported feeling inspired to do more STEM activities and learn more about STEM careers after attending The Fair.

## CONCLUSIONS FROM THE EVALUATION

The Big Bang Fair's theory of change (see page 9) outlines its strategy for creating lasting impressions on young people's career aspirations and choices. This strategy involves providing accurate information about a wide range of STEM careers, connecting young people with diverse STEM professionals, offering engaging and enjoyable STEM activities, introducing them to previously unconsidered STEM career options, and highlighting the benefits and advantages of pursuing such careers. Additionally, the theory emphasises the importance of equipping teachers with valuable information and resources to inspire and guide their students in the pursuit of STEM pathways.

Ultimately, the overarching goal is to make STEM careers more appealing, accessible and achievable to young people from diverse backgrounds, encouraging them to explore a broader array of routes into these fields. The findings from the evaluation, summarised below, suggest that The Big Bang Fair 2023 was largely successful in achieving these short-term outcomes.

### The Big Bang Fair is seen as enjoyable

Similarly to 2022, The Fair greatly appealed to students with 88% of evaluation participants reporting that they enjoyed the experience. However, it is important to note which student groups might not be experiencing the event as positively as others.

Encouragingly, as in 2022, there was no evidence of a significant gender gap in enjoyment of The Fair. There was also no evidence of significant difference in enjoyment between students of different ethnic backgrounds suggesting a universal appeal for young people, regardless of ethnicity. Younger students seem also more likely to enjoy The Fair.

In contrast, some young people, particularly disabled students or students eligible for free school meals, may not be finding The Fair as enjoyable. Efforts are needed to gain a deeper understanding of why this is the case to create a more positive experience on offer.

### The Big Bang Fair provides inspiration for a variety of STEM careers

The Fair showcased a diverse range of STEM fields and jobs. Students with a variety of interests found stands and activities that engaged them. Our findings show that 92% of students had the chance to speak to a STEM professional while at The Fair. Additionally, 9 in 10 students took part in an interactive activity during the event. Different activities appealed to female and male students, however it seems that a wide enough variety of activities was offered to provide something for everyone.

### Students are inspired by The Big Bang Fair

There was a strong indication that The Fair has potential to positively influence students towards further STEM engagement with over 70% of students saying they were interested in doing more STEM activities after participating in The Fair.

A similar proportion (73%) said that The Fair had made them want to find out more about STEM careers. This promising result underscores The Fair's effectiveness in achieving its primary objective of inspiring young people to consider careers in science, engineering and technology.

However, students from priority schools were significantly less likely to say that The Fair inspired them to find out more about STEM careers which reinforces the need to continue focusing support to these schools.

It is not surprising to note that students who were already highly engaged in STEM showed greater motivation to engage further. This implies that The Fair may be more effective in nurturing existing interest rather than generating new enthusiasm.

**Students who attend The Big Bang Fair are considering a future career in STEM**

The survey findings show that 59% of students have a sense of their future career aspirations, with an encouraging 91% expressing interest in careers related to science, technology, or engineering. Encouragingly, 65% demonstrate interest towards careers in engineering.

However, there's a notable gender disparity, as boys appear to be more interested in STEM careers than girls. Higher numbers of boys mentioned engineering roles when asked about their career aspirations, while girls seemed more inclined towards healthcare professions.

Additionally, students with high prior STEM engagement are 8 times more likely to show interest in STEM careers, highlighting the importance of nurturing STEM enthusiasm. Also, 73% of students recognise the value of learning about science for their future careers, with higher agreement rates among those with strong STEM engagement.

**There are varying levels of knowledge about engineering careers among young people**

Overall, nearly three-quarters (73%) of students indicated they know about the different things that engineers can do in their jobs. It's worth noting that students with high prior STEM engagement or those who know a STEM professional are more likely to report this knowledge, while those eligible for free school meals are less likely to agree they know about engineering roles. This highlights the importance of supporting students who aren't already engaged in STEM or who don't have contacts in related fields to gain knowledge about engineering careers.

Additionally, 74% of students are aware of the role engineers play in creating environmentally-friendly technologies, with those highly engaged in STEM more likely to agree. This underscores the importance of promoting environmental awareness in STEM education.

**There are notable disparities in students' confidence in their ability to become an engineer**

When it comes to confidence in pursuing a career as an engineer, 60% of students express belief in their ability to do so if they choose. Notably, students with high STEM engagement, boys, students of Asian ethnicity, and those who have connections with STEM professionals are more inclined to share this confidence. Boys are almost 3 times a likely to think they could become an engineer than girls. For those lacking confidence, the reasons typically revolve around not knowing how to embark on an engineering career and feeling inadequately skilled in science and maths. This underscores the need to concentrate efforts on improving knowledge and bolstering the confidence of female students, particularly in the field of engineering.

**Teachers find The Fair to be engaging, inspiring and relevant**

Impressively, nearly all teachers (96%) provided positive ratings of the event, deeming their experience at The Big Bang Fair as either good or excellent. Furthermore, an overwhelming majority of teachers, ranging from 91% to 97%, expressed strong agreement with The Fair's ability to engage students effectively, showcase a diverse array of STEM careers, establish clear curriculum connections, and accommodate students of varying STEM proficiency levels.

Teachers highlighted several aspects of The Fair that stood out to them, including the wide variety of activities available, the focus on presenting diverse STEM career opportunities, the ability of The Fair to engage and enthuse their students, and the well-organised and positive nature of the event.

Additionally, many teachers reported that The Fair has improved their confidence levels, with around two-thirds (67%) reporting increased confidence in discussing engineering careers with their students after attending. Moreover, 70% of teachers indicated that they were more likely to recommend a career in engineering to their students following their participation in The Big Bang Fair. These findings underscore the significant role The Fair plays in equipping teachers with the tools and inspiration needed to guide and motivate their students, especially in considering STEM career paths, notably in the field of engineering.

**Changes to the delivery approach of The Fair are encouraging**

In 2023, The Big Bang Fair saw some important changes in how it was delivered. The most significant change was that school groups could now attend The Fair in half-day rather than full day sessions, allowing for a more condensed experience aligning with the size and scale of the event and accommodating more students. School group sizes were limited to prevent overcrowding. Another change from the previous year was the inclusion of year 6 primary school students, recognising their upcoming transition to secondary school.

Given these changes, it is promising that the survey results showed that both students and teachers had a highly positive experience at The Fair. However, some teachers did mention challenges related to the half-day sessions around making the earlier start times and later finish times. Focusing on understanding more around these barriers may help in supporting school participation.

In 2023, The Big Bang Fair was structured in a new way, with half-day sessions and reduced group size limits. It also had a slightly different target audience from 2022, with only state schools attending, with pupils from years 6 to 8 (or equivalent). Findings broadly suggest there is no need to make major changes to this new approach. However, there are areas to consider for improving engagement and support for particular groups underrepresented in engineering as well as logistical improvements to ensure accessibility at the event.

## RECOMMENDATIONS

The overwhelmingly positive feedback from teachers and students suggests that format and content of The Fair is broadly well received. The evaluation has not highlighted a need for major changes to this approach. However, this section offers recommendations based on the findings and conclusions presented in this report.

Our findings suggest that The Fair is better at engaging and inspiring young people who are already highly engaged and interested in STEM. This could be related to how students are invited or selected to attend. Regardless, to build on the engagement of these students, it's important to consider strategies to increase engagement with young people who may have low prior STEM engagement. Tailoring activities and messaging to resonate with students from various backgrounds and prior levels of STEM engagement could help bridge this gap.

Disparities in knowledge and attitudes towards STEM, particularly among certain underrepresented groups in STEM professions, highlight the need for continued efforts to support students from these backgrounds. This evaluation did not explore reasons behind these differences or whether they have changed as a result of participating in the event. However, these findings underscore the importance of providing students opportunities to build their confidence, practice STEM and foster motivations towards pursuing STEM careers.

Notably, boys are more likely to believe they can become engineers than girls. Key reasons for students believing they couldn't become engineers include limited knowledge about how to become an engineer as well as a belief they don't have good enough skills in maths or science. Even though a majority of students reported already knowing what job they want to do when they are older, this finding suggests that there is an opportunity to provide additional guidance or resources on pathways to STEM careers. In particular, it would be worth considering approaches to improve girls' knowledge and build their confidence in STEM skills.

Another consideration worth focusing on is around enhancing accessibility and inclusivity at The Fair. This has been a priority in the delivery of the 2023 event. However, findings suggest that disabled students were less likely to say that they enjoyed The Big Bang Fair. The feedback teachers provided around improving accessibility could be taken on board to improve the experience for disabled students as well as continuing to seek guidance on ways to continue promoting accessibility in future years.

Recognising that some schools and students faced barriers in taking part, it is important to continue efforts to understand and address specific challenges that participants face. Additionally, given the higher attrition rates for 2023, work has already begun to better understand reasons why schools may not be able to attend. These should be taken into account to identify any potential areas for additional support that can be offered to schools.