Executive Summary

This paper analyses multiple public data sources, including those from the Department for Education and UCAS, alongside findings from a bespoke survey of girls' school alumnae conducted by the GSA. The analysis overwhelmingly highlights the strong representation of girls' school students in STEM education and careers. Specifically, the findings show:

STEM Subject Participation at A-Level

Girls attending all-girls' sixth forms are significantly more likely to study mathematics and science at A-level than their counterparts in co-educational schools.

- They are **2.9 times more likely** to take Further Mathematics.
- They are **2.3 times more likely** to take Physics at A-level.
- They are also more likely to take other sciences:
    - Biology (**38% higher**)
    - Chemistry (**83% higher**)
    - Computer Science (**79% higher**)

STEM Subject Participation at University

Girls from all-girls' sixth forms are significantly more likely to pursue mathematics and science degrees at university compared to the national average for girls.

- They are **more than four times more likely** to apply for mathematics courses.
- They are **twice as likely** to apply for physical and biological sciences.
- They are **40% more likely** to apply for engineering degrees.

The finding regarding engineering is particularly noteworthy, as Engineering UK[1] reports that the sector accounts for **20% of UK jobs and 25% of vacancies**, underscoring the importance of encouraging more women into this field.

[1] Engineering UK: Key stats references

STEM Careers

Graduates from all-girls' schools are also significantly more likely to enter STEM careers.

- **50% of alumnae** have worked in a STEM-related field at some point in their careers, despite women currently making up only **8% of the overall STEM workforce**[2].
- The most popular STEM career paths among alumnae were **finance, medicine, and computing**.
- **1 in 6 girls' school alumnae** have worked in a finance related role. Nationally, **only 3% of working women currently work in finance.**

Academic Performance

The analysis also confirms that girls in single-sex schools consistently **outperform their peers in co-educational schools** at both Key Stage 4 and Key Stage 5.

Findings Across the UK

Unfortunately, the devolved nations do not publish performance tables at a school level, meaning it's not possible to ascertain STEM uptake and academics for girls in girls' schools in Wales, Scotland and Northern Ireland. Further, only two schools from these regions have been included in both the UCAS Analysis and the Alumnae Survey, making it difficult to draw meaningful conclusions. For future research, our aim is to engage more representatives from the devolved nations.

[2] Updated Workforce Statistics – September 2023 - WISE

1. Data Sources and Methodology

Three key data sources have used in this analysis and paper:

- **The DfE School Comparison dataset:** Provides detailed school performance metrics for all schools in England, including A-level subject choices and attainment levels at KS4 and KS5. This dataset enables a comparative evaluation of academic trends among different school types, and particularly those for girls' schools.[3]

- **UCAS Applications Data:** This dataset extracts UCAS's ASR (Application Status Reports) for 32 Girls' Schools Association (GSA) schools covering 12,968 applications. Whilst it's not a complete GSA dataset, it is broadly representative, though there is a slight skew towards large London schools, and as such, the results have been adjusted accordingly. The combined dataset includes application numbers and offer rates for GSA students broken down by course and university. For the purpose of this paper, we have extracted courses relating to STEM based subjects. The findings are compared with national UCAS application trends to assess differences in subject preferences.

- **GSA Alumnae Survey Results:** A dedicated Alumnae Survey was conducted to examine career pathways of former students of girls' schools. Respondents were asked about their involvement in STEM industries to understand the impact of their school experience on career choices. A total of 249 girls' school alumnae responded to the Survey. The respondents were weighted towards alumnae from larger schools and certain regions, and as such the results have been adjusted accordingly.

The methodology employed in this report involved detailed statistical analysis of the datasets, including comparisons of subject uptake, performance trends and post-secondary applications.

2. Structure of the Report

This report is organised into several key sections, each focusing on a critical aspect of girls' education and academic choices:

- **Girls' Representation in STEM:** This section examines A-level STEM subject choices, UCAS applications for STEM subjects and the career trajectories of alumnae working in STEM industries.

[3] DfE data is available here https://www.compare-school-performance.service.gov.uk/download-data

- **Girls' Academic Achievement:** Comparing those attending girls' schools versus co-educational settings. A detailed analysis of academic performance at both Key Stage 5 (A-levels) and Key Stage 4 (GCSEs), with comparisons between different school types.

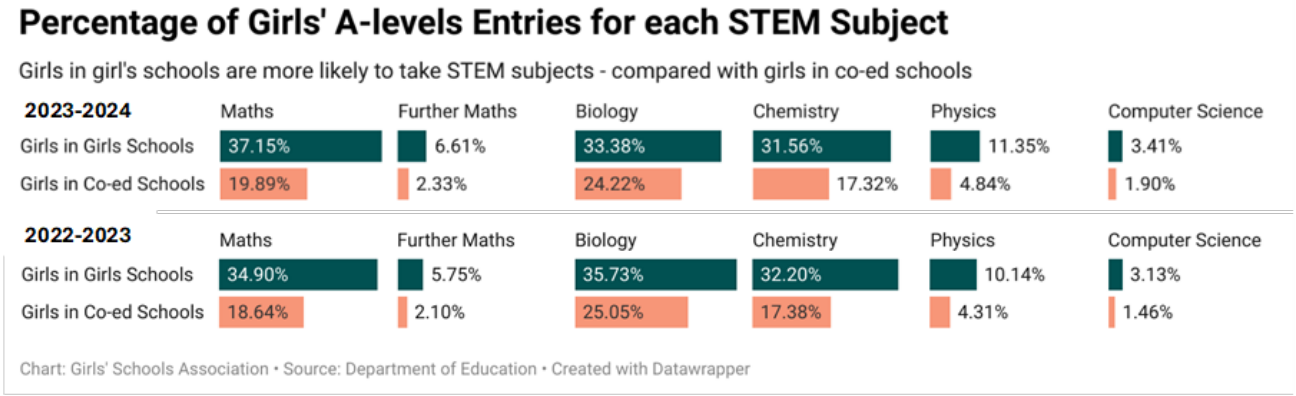
3. Importance of the Analysis

This study contributes to ongoing discussions about gender representation in STEM and the impact of school environments on academic and career choices. By examining new data from 2023-2024 and comparing it with previous years, the report provides insights into the effectiveness of girls' schools in fostering STEM engagement and academic success. It also identifies potential areas for future research and policy development, ensuring that educational institutions continue to support female students in achieving their full potential.

4. Girls' representation in STEM

4a. Girls' A-level Entries in STEM Subjects

DfE release KS5 (A-levels) entries by school for Maths, Further Maths and Science subjects, split by gender and type of school, allowing us to analyse the subject choice of girls by the type of school they attend.



Biology, Maths and Chemistry continue to be the most popular STEM subjects for girls at A-levels.

Girls in girls' schools are 2.9 times more likely to take Further Maths and more than twice as likely to take Physics at A-level – compared with girls in co-ed schools.

The uptake of other sciences is also higher with Biology 38% higher, Chemistry 83% higher, Computer Science 79% higher and Maths 87% higher in girls' schools compared with girls in co-ed schools.

The percentage of subject entries in Maths, Further Maths, Physics and Computer Sciences have increased for girls in both types of schools since 2022-2023, while we see decreases in Biology and Chemistry.

Computer Science continues to have the largest growth in uptake for girls (although relatively, it remains low). The percentage of girls taking Computer Science is 12% higher in girls' schools and 23% higher in co-ed schools, compared with the 2022-2023 academic year.

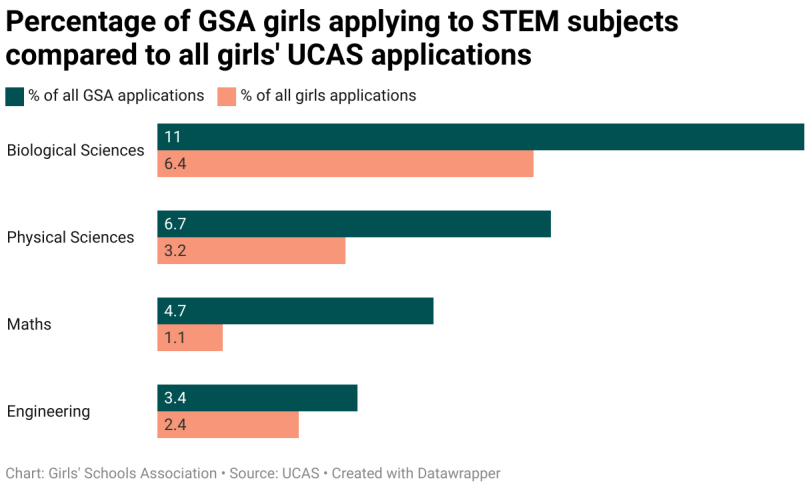
The gap between girls in girls' school and girls in co-ed schools is widening for Maths, Further Maths and Physics, but shrinking for Biology, Chemistry and Computer Science.

4b. Girls' UCAS Applications for STEM Subjects

Our findings indicate that 25.8% of GSA girls in the UCAS sample applied to mathematics or science subjects, compared to only 12.2% of girls nationally. This suggests that girls in GSA schools are more than twice as likely to apply to STEM subjects compared to their peers in other schools.

Breakdown by Subject

To gain deeper insights, the results were further analysed by subject, with the findings displayed in the graph below



As we can see, girls in girls' school sixth forms are more than 4 times as likely to apply to study maths, twice as likely to apply to study physical and biological sciences, and 40% more likely to apply to study engineering.

The engineering finding is particularly interesting. According to Engineering UK[4], the engineering sector accounts for a fifth of UK jobs and a quarter of vacancies.

However, it is important to consider sample representativeness. Our sample was slightly skewed towards larger schools in London. Allowing for this skew, the 26% above for all girls moves closer to 25%. Therefore, whilst the statistics alter slightly, the conclusions remain as they are.

4c. Girls' Alumnae: Careers in STEM Fields

As part of our research, we surveyed 248 alumnae of Girls' Schools Association (GSA) institutions to explore their career pathways and perceptions of single-sex education across different eras.

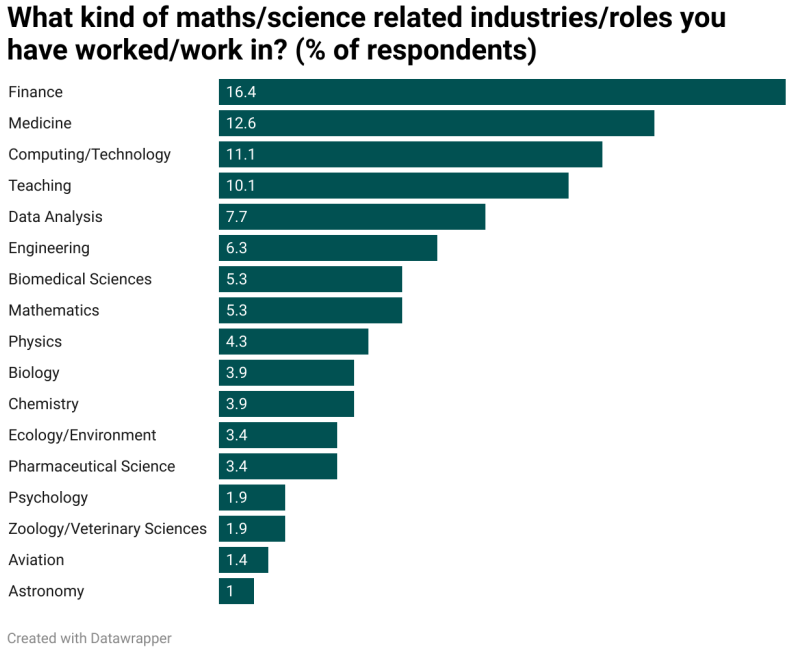
Career Pathways

Our survey revealed an even 50/50 split between alumnae working/having worked in science or mathematics-focused industries, and those in other fields. The most recent data from WISE[5] found that 1.31 million women worked in STEM, out of a working population of 16.06 million[6], or just 8% of the working female population. Whilst this is not a direct comparison - as our survey assesses the percentage working in STEM at **any point -** 8% is significantly lower than our 50% and further supports the dominance of girls' school alumnae in STEM.

Finance was the most popular career path for GSA alumnae, with 16.4% working/having worked in the industry. This is compared to just 3% of women nationally.[7]

Among those in science and mathematics-related industries, you can see the full industry breakdown in the figure below. Again, engineering is the 6th most popular career path.

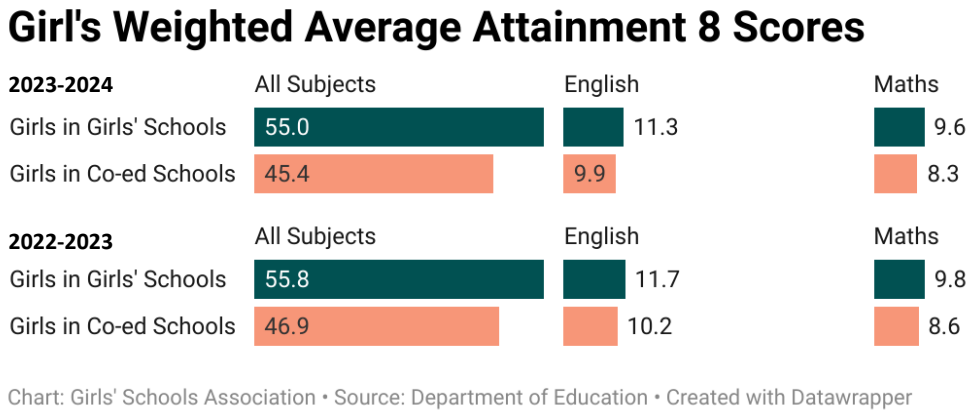
[4] Engineering UK: Key stats references
[5] Updated Workforce Statistics – September 2023 - WISE
[6] Labour market overview, UK Statistical bulletins - Office for National Statistics
[7] UK: number of jobs in finance by gender 2024 | Statista



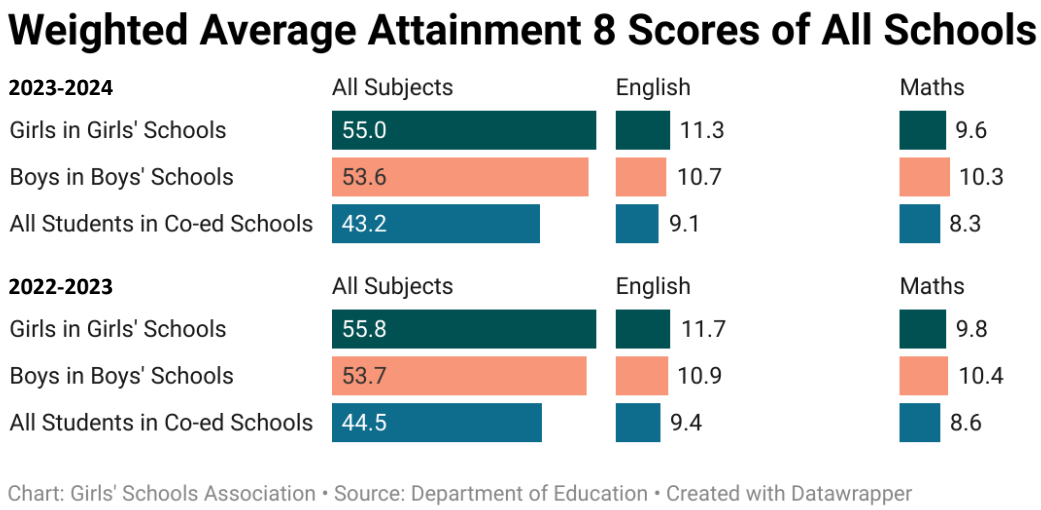
5. Girls' academic achievement

5a. KS4 Attainment Data

The Key Stage 4 (KS4) data reports the achievements of students using the Attainment 8 measure, which allocates points according to grades achieved by pupils in their best 8 subjects at GCSE level (including Maths and English).



Girls perform better in girls' schools than in co-ed schools, looking at all subjects, and for Maths and English separately.



Higher attainment continues to be seen at single-sex schools, compared with co-ed schools when looking at all subjects, and when looking at Maths and English separately.

However, overall, there is a decline in the weighted average Attainment 8 scores across the board compared to 2022-23.

Girls' schools average Attainment 8 scores have declined by 0.8% since 2022-23, compared with 0.1% for boys' schools, and 1.3% for co-ed schools. It would be interesting to understand this national trend in more detail.

5b. KS5 Attainment Data

The DfE 16-18 performance tables report achievements of students aged 16 to 18 who are at the end of advanced level study (the end of Key Stage 5 or KS5). The following analysis uses the average point score A-levels entry for students who were entered for at least one AS or one A-level qualification.

KS5 A-Levels Data

	2023-24			2022-23		
	Girls in girls' schools	Boys in boys' schools	All students in co-ed schools	Girls in girls' schools	Boys in boys' schools	All students in co-ed schools
ALL SCHOOLS						
Weighted average point score per A level entry	41.7	43.5	34.4	41.7	43	34.2
Average point score per A level entry expressed as a grade	B+	B+	C+	B+	B+	C+
INDEPENDENT SCHOOLS						
Weighted average point score per A level entry	45.3	46.6	41.5	44.8	46.6	41.2
Average point score per A level entry expressed as a grade	A-	A-	B	B+	A-	B

Table: Girls' Schools Association • Source: Department for Education • Created with Datawrapper

On average, students in single-sex schools continue to outperform those in co-ed schools.

Girls in girls' schools continue to perform better than students in co-ed schools across all schools, and when looking at independent schools only.

Overall, there is an increase in the weighted average point score for all students, although boys in independent boys' schools and girls in all girls' schools have remained static.

Boys in all boys' schools and girls in independent girls' schools have seen the biggest improvement since 2022-2023 with 0.5%.