

Focus of the Month February 2018

Girls' participation in Advanced Mathematics

Our focus for this month is the information and guidance that the Further Mathematics Support Programme (FMSP) provides relating to girls' participation in AS and A level Mathematics and Further Mathematics. The FMSP believes that it is important to alert schools, colleges, girls and parents to the wide range of skills developed through the study of mathematics and the utility of the subject across a wide range of careers.

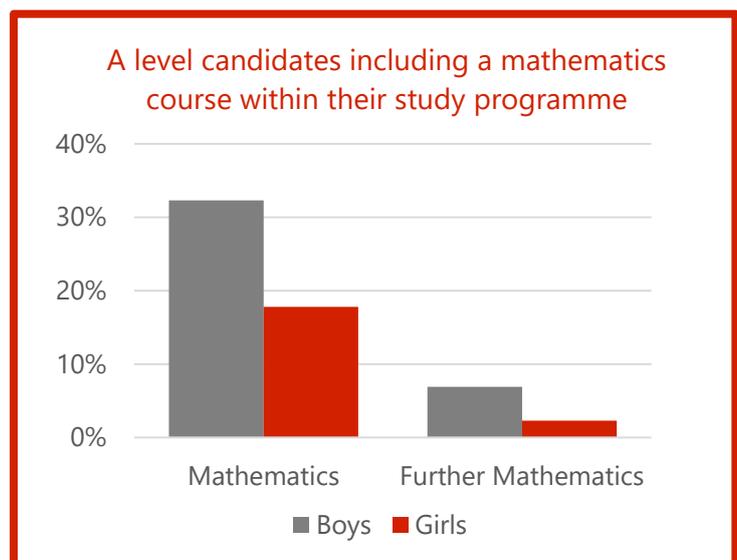
What is the current picture?

The number of girls studying mathematics has continued to rise in recent years, with over 37,000 girls in the UK completing a course in A level Mathematics in summer 2017, of whom around 4,400 also completed A Level Further Mathematics. At AS level, girls accounted for around 63,000 entries for Mathematics and over 8,000 entries for Further Mathematics.

Whilst the numbers of girls participating in Mathematics and Further Mathematics in the UK has grown substantially in recent years, the proportion of A level Mathematics students that are girls is 39% and for A level Further Mathematics the figure is 27%.

Data published by the Department for Education shows that in 2016/17, for students who had chosen to do A levels, 32% of boys took A level Mathematics compared to only 18% of girls; for Further Mathematics the figures were 7% and 2% respectively.

The proportion of both female and male A level students studying A level Mathematics and Further Mathematics has increased, however boys are still around twice as likely to continue with A level Mathematics and over three times as likely to take Further Mathematics as girls.



What factors affect girls' participation in Advanced Mathematics?

The FMSP has worked with the UCL Institute of Education (IoE) to research the factors affecting girls' decision making relating to A level Mathematics, resulting in the publication of two reports:

- [Gender literature review](#) - a report summarising the outcomes of previous research studies. This identifies a range of issues that affect girls' decision making, including: their enjoyment of mathematics; the effective use of role models; mathematical anxiety; and the importance of teacher encouragement and informal support.
- [Gender case studies](#) - a report summarising five case studies of schools and colleges with relatively high levels of girls' participation in A level Mathematics. Some of the key findings include: the importance of having a culture which encourages girls to aspire to continue with mathematics post-16; promoting mathematics as a subject with wide applicability; the importance of support by senior leadership in promoting mathematics; and families and teachers instilling a belief in girls that they can succeed in A level Mathematics / Further Mathematics.

Unconscious bias and implicit association

When asked why they choose not to pursue A level Mathematics, girls often reveal a perception that teaching in STEM subjects seems to be targeted at boys. Whilst most teachers would never actively discourage girls, it can be worth taking time to reflect on unintentional signals that might be picked up by students. Are both genders equally represented in images on display around the

department? Have teaching colleagues used peer observation to monitor the proportion of questioning directed towards girls?

[The Whole School Equality Programme](#)

undertaken by the Institute of Physics found that unconscious bias training was the main driver in schools

becoming more proactive in tackling gender imbalance in the uptake of physics and maths.

Harvard University's [Project Implicit](#) offers a short online test that allows teachers to investigate their own levels of unconscious bias. The data from this project also provide an interesting stimulus for statistical discussion.



Promoting girls' participation in Advanced Mathematics

The FMSP has published the [*Girls' participation in A level Mathematics and Further Mathematics*](#) briefing document, which was sent to all FMSP registered schools and colleges. The document summarises:

- The current picture relating to girls' participation
- The findings of the FMSP/loE research
- Recommended strategies for schools and colleges to promote greater gender balance in A level Mathematics

The FMSP has also developed resources to encourage girls to study A level Mathematics. These include:

- [*Teacher resources*](#) for enrichment sessions which highlight applications of mathematics in a wide range of contexts, for example *Decision Trees*, which is designed to show how mathematical techniques can be used to make business and other decisions. New for 2018, there are also extension materials designed to provide GCSE students with an insight into topics that they will encounter at A level.
- [*Why Study Mathematics?*](#) – A presentation and set of accompanying notes for teachers to use at open evenings and promotion events.
- [*Student resources*](#) providing information on careers; profiles of female mathematics students; information about the mathematics in other subjects and society; and recommended reading and useful website links.

