

## **RSS SUBMISSION TO DFE CURRICULUM AND ASSESSMENT REVIEW CALL FOR EVIDENCE**

20 November 2024

*This is the Royal Statistical Society submission to the Department for Education Curriculum and Assessment Review call for evidence.*

### **10. What aspects of the current a) curriculum, b) assessment system and c) qualification pathways are *working well* to support and recognise educational progress for children and young people?**

Regarding statistics and data skills, we think that pupils should continue to have the option to select specific statistics and data skills options/pathways (eg at GCSE or A level). Having a discrete option separate from maths provides subject identity, allows for skills progression, and allows students to recognise the disciplines that they do and do not enjoy, which can inform their future choices and study. We think that the option to take statistics/data choices should be bolstered.

### **11. What aspects of the current a) curriculum, b) assessment system and c) qualification pathways should be *targeted for improvements* to better support and recognise educational progress for children and young people?**

- Regarding the maths, statistics and data curriculum, we believe that more data science and statistical skills (eg quantitative reasoning) are needed. Examples should be relevant to the real world, interesting and engaging. Technology and digital tools should be utilised, as they are in the real-world use of these subjects.
- Regarding the assessment of these subjects, we call for non-examination assessment to better reflect the practical nature of these subjects, and to better evaluate the skills that students have. Assessment should make use of coursework, and topics should be relevant and interesting. The examination burden should be reduced on students, and digital tools could be utilised to aid the assessment process. We believe that the requirement to continuously re-sit GCSE maths, for those who have not passed, is not helping students – alternative pathways should be developed.
- Regarding qualification pathways, we would like to see a clearer statistics and data pathway, to establish a coherent route that allows students to develop their statistical and data skills. We advocate for a refreshed Statistics/Data GCSE, and offering students the option to take two GCSEs in Maths and Statistics/Data, or one dual GCSE covering elements of both.

We outline the challenges we see with the current system here: <https://rss.org.uk/RSS/media/File-library/Policy/2023/RSS-Maths-to-18-proposals-final.pdf>

We expand on our recommendations for the curriculum, assessment, and qualification pathways here, including by reviewing the systems of other countries - such as New Zealand and the USA - that have been recognised for their approaches to statistics education: <https://rss.org.uk/news-publication/news-publications/2024/general-news/rss-publish-key-recommendations-for-the-teaching-o/>

A recent Royal Society report echoes our calls about a need for increased focus on statistics and data within mathematical sciences, to reflect the needs of our current data-driven era: <https://royalsociety.org/-/media/policy/projects/maths-futures/mathematical-and-data-education-policy-report.pdf>

### **12. In the current curriculum, assessment system and qualification pathways, are there any barriers to improving attainment, progress, access or participation (class ceilings) for learners experiencing socioeconomic disadvantage?**

The Maths Pipeline Report (<https://www.nottingham.ac.uk/research/groups/crme/documents/maths-pipeline-report.pdf>) shows that for pupils disadvantaged by socio-economic status, only half of those who



are high-attaining pupils in Maths at the end of primary school are achieving top grades in GCSE Maths. This suggests these pupils need more support during KS3 and issues around mathematics teacher recruitment and retention need to be addressed to ensure more equitable progress.

Limitless re-sits of GCSE Maths for those who have not passed only demotivates students further – an alternative qualification, which is more appealing and focusses on relevant skills to daily life should be developed and offered.

Care will also need to be taken, by ensuring that access to digital technologies necessary or helpful for learning is equitable and does not exacerbate inequalities.

**13. In the current curriculum, assessment system and qualification pathways are there any barriers to improving attainment, progress, access or participation which may disproportionately impact pupils based on other protected characteristics (e.g. gender, ethnicity)?**

Efforts should be made to minimise the gender gap in take-up of subjects including maths, statistics and data science. This could include by demonstrating the relevance of these subjects, by ensuring interesting and engaging contexts are used when they are taught (eg using examples from disciplines such as psychology and the social sciences, that have a higher proportion of girls taking these subjects at A level).

We note that there is already some success in minimising the gender gap in take-up in Core Maths, where there is near equality in uptake between males and females.

**14. In the current curriculum, assessment system and qualification pathways, are there any barriers in continuing to improve attainment, progress, access or participation for learners with SEND?**

Efforts should be made to increase parity for learners with SEND regarding the advantage brought by providing formulae sheets in exams – for students with challenges reading, it would be helpful if the option to print formulae on coloured paper was more widely available, or multiple coloured overlays could be allowed – currently students do not always have the option of coloured paper.

**15. In the current curriculum, assessment system and qualification pathways, are there any enablers that support attainment, progress, access or participation for the groups listed above?**

The current system is not sufficiently meeting the needs of these groups – meaning that external interventions (eg LMS Levelling Up scheme, and efforts by the RSS to inspire pupils from all backgrounds about the relevance and importance of statistics, eg the William Guy Lecturer scheme <https://rss.org.uk/policy-campaigns/policy-groups/education-policy-advisory-group/rss-william-guy-lecturers/>) are required.

**16. To what extent does the content of the national curriculum at *primary level* (key stages 1 and 2) enable pupils to gain an excellent foundation in a) English and b) maths? Are there ways in which the content could change to better support this aim? *Please note, we invite views specifically on transitions between key stages in section 9.***

A stronger emphasis on the use of information communication technologies, such as visualisation software (eg iNZight <https://lite.docker.stat.auckland.ac.nz/>), would be beneficial in primary school, along with increased use of real-world contexts and better connections between maths/statistics and other disciplines. The statistical investigative cycle (planning experiments, analysing data, drawing conclusions etc) should be emphasised, as should the importance of statistical literacy to understanding the world around students.



**17. To what extent do the English and maths *primary* assessments support pupils to gain an excellent foundation in these key subjects? Are there any changes you would suggest that would support this aim?**

The list of acceptable formal methods ('Examples of formal written methods for addition, subtraction, multiplication and division' [https://assets.publishing.service.gov.uk/media/5a7c5b95e5274a7ee501a6e5/Mathematics\\_Appendix\\_1.pdf](https://assets.publishing.service.gov.uk/media/5a7c5b95e5274a7ee501a6e5/Mathematics_Appendix_1.pdf)) could be expanded to include other valid methods which are used in secondary school, eg to introduce algebra.

**18. To what extent does the content of the a) English and b) maths national curriculum at *secondary* level (key stages 3 and 4) equip pupils with the knowledge and skills they need for life and further study? Are there ways in which the content could change to better support this aim?**

Regarding the maths and statistical/data curriculum, we do not believe that this equips students with the knowledge and skills they need for life and further study. This stage of education is crucial to stop pupils disengaging from mathematical subjects.

Content should change to include a greater focus on real-world relevant skills, including statistical literacy, knowing how to interrogate data and claims in the world around us, and the ability to make informed decisions based on data. These are relevant both for daily life as well as the world of work. This can include greater use of relevant and engaging examples and real-world data, as well as increased use of technology, as it is used in these subjects in the real world.

**19. To what extent do the current maths and English *qualifications* at a) pre-16 and b) 16-19 support pupils and learners to gain, and adequately demonstrate that they have achieved, the skills and knowledge they need? Are there any changes you would suggest that would support these outcomes?**

Pre-16, maths qualifications do not evidence the specific skills that students have – as students can skip questions and still pass the exam; the overall score does not reflect specific skills or knowledge.

An approach that enables students and external stakeholders (eg potential employers) to track specific skills could be beneficial. It would also be beneficial to decrease the high-stakes and high-pressure nature of the current system.

Similarly, a system to track data skills across different A levels, T levels, vocational courses and Core Maths could benefit the individual and give education leaders a more accurate reflection of the different contexts in which statistics and data skills are taught at level 3.

**20. How can we better support learners who do not achieve level 2 in English and maths by 16 to learn what they need to thrive as citizens in work and life? In particular, do we have the right qualifications at level 2 for these 16-19 learners (including the maths and English study requirement)?**

We believe that endless maths retakes are not the way to support learners – these only demotivate students further and are not successful in equipping students with the skills they need. An alternative qualification is needed, that focuses on functional skills for daily life and work, with relevant and engaging examples. Care should be taken so that this is not misunderstood as a lower-quality GCSE. Image problems have been an issue for BTEC and T-level qualifications when compared to A-levels.

**21. Are there any particular challenges with regard to the English and maths a) curricula and b) assessment for learners in need of additional support (e.g. learners with SEND, socioeconomic disadvantage, English as an additional language (EAL))? Are there any changes you would suggest to overcome these challenges?**



Regarding maths assessment, efforts should be made to increase parity for learners with SEND regarding the advantage brought by providing formulae sheets in exams – for students with challenges reading, it would be helpful if the option to have formulae printed on coloured paper was more widely available, or if multiple coloured overlays could be allowed.

**22. Are there particular curriculum or qualifications subjects where:**

- a. there is too much content; not enough content, or content is missing;**
- b. the content is out-of-date;**
- c. the content is unhelpfully sequenced (for example to support good curriculum design or pedagogy);**
- d. there is a need for greater flexibility (for example to provide the space for teachers to develop and adapt content)?**

*Please provide detail on specific key stages where appropriate.*

In maths, the content and examples are often out-of-date, focusing on topics or examples (eg pulling marbles out of a bag) that do not resonate or feel relevant to students. Technology should be incorporated into the curriculum, as it is used in daily life. The content that will help students navigate daily life and work should be prioritised to ensure students leave school with the skills they need to succeed.

At GCSE-level a greater level of flexibility with taking maths and statistics/data content, while ensuring that the core content is covered, could be offered by providing the opportunity for students to take two GCSEs (one in statistics and one in maths, allowing the inclusion of more content), but also that students have the option to take one dual GCSE in Maths and Statistics together, to allow core relevant content to be included in this dual option. This recommendation of ours, which modernises the mathematical curriculum for today's data-driven world, is detailed further here: [https://rss.org.uk/RSS/media/File-library/Policy/2024/Cover\\_recommendations-for-statistics-curriculum-in-the-UK\\_summary\\_1.pdf](https://rss.org.uk/RSS/media/File-library/Policy/2024/Cover_recommendations-for-statistics-curriculum-in-the-UK_summary_1.pdf)

**23. Are there particular changes that could be made to ensure the curriculum (including qualification content) is more diverse and representative of society?**

When teaching maths and statistics/data, a greater effort should be made to use real-world data and relevant examples – this could include cultural and societal data and examples that are of interest to students, for example on gender inequalities, migration, health and education trends, social media etc. The curriculum should be focused on solving problems using data rather than answering questions about data.

**24. To what extent does the current curriculum (including qualification content) support students to positively engage with, be knowledgeable about and respect others? Are there elements that could be improved?**

Including greater focus on real-world data and societal examples when teaching maths and statistics can teach students about others – for example exploring data on gender inequalities, socioeconomic trends etc.

**25. In which ways does the current *primary* curriculum support pupils to have the skills and knowledge they need for life and further study and what could we change to better support this?**

A stronger emphasis on the use on information communication technologies, such as visualisation software (eg iNZight: <https://lite.docker.stat.auckland.ac.nz/>) would be beneficial in primary school, along with increased use of real-world contexts and better connections between maths/statistics and other disciplines. The statistical investigative cycle (planning experiments, analysing data, drawing



conclusions etc) should be emphasised, as should the importance of statistical literacy to understanding the world around students.

**26. In which ways do the current *secondary* curriculum and qualification pathways support pupils to have the skills and knowledge they need for future study, life and work and what could we change to better support this?**

As we see it, this is the main area in need of improvement in relation to the education of maths, statistics and data. The current curriculum and qualification pathways do not equip students with the skills they need – especially for daily life and interpreting the world around them. The content of these subjects should be updated to include topics such as working with and interpreting real-world data, working with technology (as is done in the real world), statistical literacy and interpreting (data-based) claims in the media.

**27. In which ways do the current qualification pathways and content at 16-19 support pupils to have the skills and knowledge they need for future study, life and work and what could we change to better support this?**

We believe that the Statistics/data A-level should be refreshed – and composed of relevant and engaging examples – and available more widely for students to take. Few schools offer this option. Greater use should be made of statistical software to interrogate large data sets, to draw out the investigative and open-ended nature of problem-solving using data.

We also believe that Core Maths should be available more widely and take-up should be encouraged, as a route to support students to learn the quantitative skills they need to succeed in life and work. The acceptance of Core Maths by universities and employers would help encourage take-up.

**28. To what extent does the current *primary* curriculum support pupils to study a broad and balanced curriculum? Should anything change to better support this?**

**29. To what extent do the current *secondary* curriculum and qualifications pathways support pupils to study a broad and balanced curriculum? Should anything change to better support this?**

Considering breadth and balance within mathematical subjects (including statistics, data science, etc), we think that the balance of topics needs to change to include more statistics and data science – to meet the demands of our current data-led era. We would also like to see increased use of statistical software tools, to teach – and engage students with – these subjects. These views are echoed in a recent Royal Society report: <https://royalsociety.org/-/media/policy/projects/maths-futures/mathematical-and-data-education-policy-report.pdf>

**30. To what extent do the current qualifications pathways at 16-19 support learners to study a broad curriculum which gives them the right knowledge and skills to progress? Should anything change to better support this?**

We believe that students should study some aspects of maths, data science and statistics (especially parts relevant to daily life) until the end of schooling, within a framework where students can still study a range of other subjects of interest to them. This is necessary to equip students with the statistical and data skills necessary to navigate the real world.

**31. To what extent do the current curriculum (at primary *and* secondary) and qualifications pathways (at secondary *and* 16-19) ensure that pupils and learners are able to develop creative skills and have access to creative subjects?**



**32. Do you have any explanations for the trends outlined in the analysis and/or suggestions to address any that might be of concern?**

We note that there are relatively few GCSE Statistics entries, which have decreased over time – we are aware of limitations regarding the availability of this option, including schools opting not to offer this subject. This is likely to be linked to the current accountability and performance measures, meaning that schools focus on Maths due to its double weighting, and do not encourage pupils to take subjects outside of those that count towards performance measures. In addition, offering GCSE Statistics – which is likely taught by a subject-specialist teacher – likely means losing teacher availability for teaching GCSE Maths.

**33. To what extent and how do pupils benefit from being able to take vocational or applied qualifications in secondary schools alongside more academically focused GCSEs?**

**34. To what extent does the current pre-16 vocational offer equip pupils with the necessary knowledge and skills and prepare them for further study options, including 16-19 technical pathways and/or A levels? Could the pre-16 vocational offer be improved?**

**35. Is the volume of statutory assessment at key stages 1 and 2 right for the purposes set out above?**

**36. Are there any changes that could be made to improve efficacy without having a negative impact on pupils' learning or the wider education system?**

**37. Are there other changes to the statutory assessment system at key stages 1 and 2 that could be made to improve pupils' experience of assessment, without having a negative impact on either pupils' learning or the wider education system?**

**38. What can we do to ensure the assessment system at key stages 1 and 2 works well for all learners, including learners in need of additional support in their education (for example SEND, disadvantage, EAL)?**

**39. Is the volume of assessment required for GCSEs right for the purposes set out above? Are there any changes that could be made without having a negative impact on either pupils' learning or the wider education system?**

We believe that there is a high assessment burden at GCSE level. This could be reduced by the use of project- or coursework, which better reflects the practical nature of subjects including statistics.

**40. What more can we do to ensure that: a) the assessment requirements for GCSEs capture and support the development of knowledge and skills of every young person; and b) young people's wellbeing is effectively considered when assessments are developed, giving pupils the best chance to show what they can do to support their progression?**

For subjects with a practical nature, such as statistics and data skills, assessment via coursework or project-work can better reflect whether students have developed the relevant knowledge and skills.

Assessment using online tools can also allow for specific skills and knowledge to be tracked.



**41. Are there particular GCSE subjects where changes could be made to the qualification content and/or assessment that would be beneficial for pupils' learning?**

As outlined in our recommendations (<https://rss.org.uk/news-publication/news-publications/2024/general-news/rss-publish-key-recommendations-for-the-teaching-o/>), we believe that it would be beneficial to offer students the option to take either two GCSEs in Statistics/Data and Maths, or one dual Statistics-Maths GCSE composed of elements of both. These GCSEs would be refreshed and composed of relevant, engaging content, and the Statistics/Data aspect would include coursework assessment, as well as embedding statistical analysis software into assessment.

This would allow all students to develop the core data and mathematical skills they need for daily life, while also allowing students the option to explore these subjects in increased depth.

**42. Are there ways in which we could support improvement in pupil progress and outcomes at key stage 3?**

**43. Are there ways in which we could support pupils who do not meet the expected standard at key stage 2?**

**44. To what extent, and in what ways, does the accountability system influence curriculum and assessment decisions in schools and colleges?**

This system influences the subjects that schools focus their time on teaching and encouraging students to take – until the accountability system is altered, schools are unlikely to focus efforts on subjects like Statistics and data skills that are not included in this.

**45. How well does the current accountability system support and recognise progress for all pupils and learners? What works well and what could be improved?**

**46. Should there be any changes to the current accountability system in order to better support progress and incentivise inclusion for young people with SEND and/or from socioeconomically disadvantaged backgrounds? If so, what should those changes be?**

**47. To what extent does the range of programmes and qualifications on offer at each level meet the needs and aspirations of learners?**

- a. Level 3
- b. Level 2
- c. Level 1 and entry level

Across the board, there is the opportunity to increase the use of real-world, relevant, engaging examples and contexts in the education of maths, statistics and data. Increasing the focus on aspects that will equip students with the skills they need to navigate daily life and work in this data-driven era (eg statistical literacy, using and interpreting data) would be beneficial.

**48. Are there particular changes that could be made to the following programmes and qualifications and/or their assessment that would be beneficial to learners:**

- a. AS/A level qualifications
- b. T Level and T Level Foundation Year programmes



- c. **Other applied or vocational qualifications at level 3**
- d. **Other applied or vocational qualifications at level 2 and below**

There should be an option – that all students take – to study aspects of maths, statistics and data that are relevant to daily life and a broad range of work environments until age 18. This could be modelled on Core Maths.

**49. How can we improve learners’ understanding of how the different programmes and qualifications on offer will prepare them for university, employment (including apprenticeships) and/or further technical study?**

More awareness is needed on how subjects such as statistics can prepare students for the future. Students are often unaware of exactly what statistics and data science are when they come to them in later life – either as part of a university course or through work.

Statistics and data science are essential to many fields of study in which this may not immediately be apparent. We believe that it would be beneficial to increase awareness and recognition of what these subjects are, so that students can recognise what they are studying and how they are progressing their skills in these areas, and so that this information can inform their future choices.

Discussion of career options and further information on the composition of university degrees and job roles would be beneficial to allow students to make informed choices. Separating out statistics and data skills from mathematics, as a distinct option that students can take, would be beneficial in increasing the subject identity and bringing awareness to students on these subjects.

**50. To what extent is there enough scope and flexibility in the system to support learners who may need to change course?**

**51. Are there additional skills, subjects, or experiences that all learners should develop or study during 16-19 education, regardless of their chosen programmes and qualifications, to support them to be prepared for life and work?**

All students should study aspects of maths, statistics and data that are relevant to daily life and the world of work, as these skills are essential to succeed regardless of students’ future paths.

**52. How can the curriculum, assessment and wraparound support better enable transitions between key stages to ensure continuous learning and support attainment?**

We are aware that the transition between key stage 2 and 3 is often a point where attainment gaps in mathematics widen (<https://www.nottingham.ac.uk/research/groups/crme/documents/maths-pipeline-report.pdf>) and previously-high-attainers stop enjoying maths (<https://axiommaths.com/blog/why-year-7s-dont-like-maths/>) and that focus is needed at this stage. Increased teacher support and fun, engaging maths activities and clubs could be beneficial.

Difficulty maintaining subject specialist maths teachers means that many schools can only assign specialist/experienced teachers to KS4, which may also impact pupils below this stage.

**53. How could technology be used to improve how we deliver the curriculum, assessment and qualifications in England?**

In our daily lives and work, we interact with and use technology to help us with aspects of maths, statistics and data science. It follows that in school, in order to best prepare students for the real world, the focus should be on how to harness the power of technology to aid us, rather than on



calculations which would not be carried out in the real world. Technology should be incorporated into the maths, statistics and data curriculums. This will better equip students with relevant skills as well as engaging students. One key example of the use of technology is to allow students to explore real-world data sets.

Technology could also aid the assessment of aspects of maths, statistics and data (eg of multiple-choice questions, of computer skills, or via computer assessments) – increasing the efficiency of the process, reflecting real-world scenarios, and freeing up teacher time.

**54. Do you have any further views on anything else associated with the Curriculum and Assessment Review not covered in the questions throughout the call for evidence?**

