Department for Education

Consultation Response Form

Consultation closing date: 19 September 2014
Your comments must reach us by that date

Reformed GCSE and A level subject content

If you would prefer to respond online to this consultation please use the following link: https://www.education.gov.uk/consultations

The government is reforming GCSEs and A levels to ensure that they prepare students better for further and higher education, and employment. GCSEs are being reformed so that they set expectations which match those of the highest performing countries, with rigorous assessment that provides a reliable measure of students' achievement. The new A levels will be linear qualifications that make sure that students develop the skills and knowledge needed for progression to undergraduate study.

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information regimes, primarily the Freedom of Information Act 2000 and the Data Protection Act 1998.

If you want all, or any part, of your response to be treated as confidential, please explain why you consider it to be confidential.

If a request for disclosure of the information you have provided is received, your explanation about why you consider it to be confidential will be taken into account, but no assurance can be given that confidentiality can be maintained. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

The Department will process your personal data (name and address and any other identifying material) in accordance with the Data Protection Act 1998, and in the majority of circumstances, this will mean that your personal data will not be disclosed to third parties.

Please tick if you want us to keep your response confidential.	
Reason for confidentiality:	

Name: Professor Alice Rogers	
Please tick if you are responding on behalf of your organisation.	✓
Name of Organisation (if applicable): London Mathematical Society	
Address: 57-58 Russell Square London WC1B 4HS	

If your enquiry is related to the DfE e-consultation website or the consultation process in general, you can contact the Ministerial and Public Communications Division by e-mail: consultation.unit@education.gsi.gov.uk or by telephone: 0370 000 2288 or via the GOV.UK 'Contact Us' page.

What best describes you as a respondent?

☐ Academies	☐ Awarding organisations	☐ Colleges
☐ Employers/business sector	☐ Further education	☐ Headteachers
☐ Higher education	☐ Local authorities	☐ Organisations representing school teachers and lecturers
☐ Parents	☐ Schools	☐ Subject associations
☐ Teachers	☐ Young people	☑ Other

Please Specify:
Learned Society.

This response is from the London Mathematical Society, and relates to Mathematics and Further Mathematics.

The London Mathematical Society (LMS), founded in 1865, is the UK's learned society for mathematics. The Society's main activities include publishing journals and books, providing grants to support mathematics and organising scientific meetings and lectures. The Society is also involved in policy and strategic work to support mathematics and the mathematics research community. This work includes engaging with government and policymakers on mathematics education and research, participating in international mathematical initiatives and promoting the discipline.

Before addressing the specific questions asked there are some general points we would like to make.

We have some concerns about the review procedure itself. The English system, with three awarding bodies, puts heavy requirements on regulation and demands a particularly coherent structure, currently lacking, for the development and periodic review of the Mathematics curriculum and its associated assessment. We would welcome indications that steps will be taken, with cross-party support, to set up an effective structure for this.

Our concerns about the current review include its pace, lack of provision for piloting, and lack of synchronisation with other reforms.

In more detail, we are concerned at the rapid move to a fully linearised model before the effect of removing the January module sittings is analysed. We believe that some of the aims of linearisation could be achieved by other means, such as combining modules so that fewer, longer, more synoptic examinations are taken. We are also surprised that the revised A-level will begin to be taught a year before students emerge from the most recent revision of GCSE.

While A-level entry numbers appear robust and on a pleasing upward trend, experience following the introduction of ‘Curriculum 2000’ shows that numbers can be fragile, and that change is best introduced cautiously and incrementally. A particular concern is the proposed dissociation of AS from A-level, since there are many students for whom AS level provides a mechanism for putting a toe in the water, students who may not take the plunge into the full A-level; this risk is thought to be higher for girls. It is also particularly difficult for schools with small cohorts or limited experience.

There are of course concerns about the current Mathematics A-level, and we recognise that any qualification should be subject to periodic review, however the concerns mostly relate to the way the content is assessed rather than the content itself. There is particular concern that assessment should encourage good teaching which develops mathematical thinking and not just the ability to carry out procedures. It is also important that the assessment is able to judge over the full range of grades, so that the

A-level is not more difficult than those in other facilitating subjects but that achievement of A and A* grades should require some demonstration of understanding and the ability to tackle unfamiliar problems rather than merely very accurate solution of somewhat routine questions.

It is also highly desirable that the assessment should encourage good teaching, and should not require a teacher to train students to carry out predictable routines rather than try to impart real understanding and appreciation of mathematical ideas.

Many of the points we are making have been made by other mathematics bodies, including in the report of the ALCAB panel on Mathematics and Further Mathematics made in June 2014.

4 Is the revised A level content in each of these subjects appropriate in view of the issues raised in ALCAB's reports? Please consider:

- whether the content reflects what students need to know in order to progress to undergraduate study

  Please provide evidence to support your response.

4 c) Mathematics

☐ Yes	☐ No	☑ Not Sure

Comments: We are broadly happy with the proposed content, apart from some concern that the balance between statistics and mechanics is too much in favour of statistics.

As remarked above, our major concern is that the timetable of reform be slowed so that assessment can be developed which actually reflects the Overarching Themes as well as the more specific detailed content, changes can be introduced gradually and a pilot stage included.

We would like there to be an explicit requirement that 'except where stated to the contrary, the derivation of all results used should be known and understood'

A few points of detail:

In OT1.3 the symbols { and } should also be included. In A-level, the specification of sets by condition, eg {x:x<3} should be included.

The Overarching Themes and Use of data in statistics should stress more the importance of working with good data and potential for bias. The understanding of concepts should be stressed rather than the use of statistical packages.

A7 should explicitly require use of the symbol $\propto$ Also the type of equation implied by 'simple' could be more tightly specified.

B2 should list the circle theorems required

F7 should include at the end 'and inverse functions'. (This would cover the relationship between dy/dx and dx/dy.)

I2 should also include resolving vectors

I5 the nature of the problems in pure mathematics to be solved by vector methods could be more clearly indicated

K3 specify the measures of spread to be covered

4 d) Further mathematics

☐ Yes	☐ No	☑ Not Sure

Comments:

Comments: We are broadly happy with the proposed content. As remarked above, our major concern is that the timetable be slowed so that assessment can be developed which actually reflects the Overarching Themes as well as the more specific detailed content, changes can be introduced gradually and a pilot stage included.

We would like there to be an explicit requirement that ‘except where stated to the contrary, the derivation of all results used should be known and understood’

5 Is the revised AS qualification content in each of these subjects appropriate?

Please provide evidence to support your response.

5 c) Mathematics

☐ Yes	☐ No	☑ Not Sure

Comments:

Please see comments on A-level and in preamble

5 d) Further mathematics

☐ Yes	☐ No	☑ Not Sure

Comments:

Please see comments on A-level and in preamble

Thank you for taking the time to let us have your views. We do not intend to acknowledge individual responses unless you place an 'X' in the box below.

Please acknowledge this reply.	✓
Email address for acknowledgement: education@lms.ac.uk	

Here at DfE we carry out our research on many different topics and consultations. As your views are valuable to us, please confirm below if you would be willing to be contacted again from time to time either for research or to send through consultation documents?

✓	Yes		No

All DfE public consultations are required to meet the Cabinet Office Principles on Consultation

The key consultation principles are:

- departments will follow a range of timescales rather than defaulting to a 12-week period, particularly where extensive engagement has occurred before
- departments will need to give more thought to how they engage with and use real discussion with affected parties and experts as well as the expertise of civil service learning to make well informed decisions
- departments should explain what responses they have received and how these have been used in formulating policy
- consultation should be 'digital by default', but other forms should be used where these are needed to reach the groups affected by a policy
- the principles of the Compact between government and the voluntary and community sector will continue to be respected

Completed responses should be sent to the address shown below by 19 September 2014

Send by email to: Gcseandalevel.consultation@education.gsi.gov.uk

Send by post to: Alex Smith, Floor 2, Sanctuary Buildings, Great Smith Street, Westminster, London SW1P 3BT, UK

If you have any comments on how DfE consultations are conducted, please contact Aileen Shaw, DfE Consultation Co-ordinator, tel: 0370 000 2288 / email: aileen.shaw@education.gsi.gov.uk

Thank you for taking time to respond to this consultation.