



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.

<b>Please tick if you want us to keep your response confidential.</b>	<input type="checkbox"/>
Reason for confidentiality:	

Name: <b>Adam McBride,</b> <b>Chair of Council of The Mathematical Association</b>	
Please tick if you are responding on behalf of your organisation.	✓
Name of Organisation (if applicable): <b>The Mathematical Association</b>	
Address: <b>The Mathematical Association,</b> <b>259 London Road,</b> <b>Leicester,</b> <b>LE2 3BE</b>	

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](mailto: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?

<input type="checkbox"/> Academies	<input type="checkbox"/> Awarding organisations	<input type="checkbox"/> Colleges
<input type="checkbox"/> Employers/business sector	<input type="checkbox"/> Further education	<input type="checkbox"/> Headteachers
<input type="checkbox"/> Higher education	<input type="checkbox"/> Local authorities	<input type="checkbox"/> Organisations representing school teachers and lecturers
<input type="checkbox"/> Parents	<input type="checkbox"/> Schools	<input checked="" type="checkbox"/> Subject associations
<input type="checkbox"/> Teachers	<input type="checkbox"/> Young people	<input type="checkbox"/> Other

Please Specify:
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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

<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	Not Sure
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*Comments:*

In general we feel that the content would provide a sound base for progression to undergraduate study in subjects which make significant mathematical demands of students.

We appreciate that including both statistics and mechanics in the course will add clarity to the understanding of what Mathematics A level actually entails, both for employers and admissions tutors.

We hope that awarding bodies will be able to include some of the more rigorous and challenging elements of Decision Mathematics within the Further Maths content.

We do have some concerns about the extent of the changes, as the combined applied content appears both wider and deeper than the current specifications. This, combined with the increased emphasis on challenging problem solving and mathematical argument in assessment, makes the new subject content seem very full indeed.

We would like to make the following specific points about content:

- Use of technology: this welcome and timely embracing of appropriate technology has both cost and professional development implications which need to be addressed. Undoubtedly students need to know how to use statistical packages effectively, but CPD for teachers is needed in order to ensure all students are exposed to good practice in using packages and interpreting output. The cost implications of purchasing graphical calculators are not insignificant for students and/or centres.
- We also feel that CPD will be needed to enable smaller mathematics departments to cover the breadth of the revised content, with its inclusion both of mechanics and statistics. Moreover the significantly increased demands of the statistics strand in particular will also create the need for CPD. Whilst we approve the purpose of the overarching themes, we feel that, here too, a

significant proportion of teachers will need support in developing their teaching of problem solving.

- To fulfil requirements of accurate notation, we would like content statements to specify the variable with respect to which differentiation and integration are being performed.
- A9 – the restriction on the parameters of the normal distribution seems unnecessary, given that students are to study combinations of transformations
- D4 – the use of the terms arcsin, arccos etc rather than  $\sin^{-1}$  etc seems archaic. To avoid ambiguity, 'appropriate domain and range' would be preferable wording.
- Whilst appreciating that Coulomb undoubtedly modelled friction, current parlance does not usually acknowledge his input by such attribution of the rules.

4 d) Further mathematics

<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not Sure
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*Comments:*

We feel that the content for Further Mathematics will provide a sound basis for further study, though we are concerned where content is described only in terms of manipulation techniques rather than in the context of application and would like suggested (if not prescriptive) contexts to be noted.

As stated above, we hope that awarding bodies will be able to include some of the more rigorous and challenging elements of Decision Mathematics within the Further Maths content as they are of use in both further study and employment.

In order to deepen students' knowledge of statistics and mechanics, we feel that they should be required to study further content in both, whilst recognising that some specialisation should be possible.

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

Please provide evidence to support your response.

5 c) Mathematics

<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Not Sure
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*Comments:*

We have grave concerns about what we feel is excessive content in the AS qualification, particularly in the short term (for the cohort progressing from the current GCSE), but even in the longer term.

The nature of the subject means that at present, comparable demand to one year of A level is reached with less than half of the content.

The inclusion of both mechanics and statistics in the prescribed content (which we approve) adds a significant demand.

The depth of conceptual understanding in statistics is more demanding than at present.

It is vitally important that we avoid a repeat of Curriculum 2000, and we feel that the proposed content of the AS, particularly if it effectively has to be taught in 2 terms, is too great. We do suggest that some improvement could be made by ensuring that examinations did not take place so early, allowing further time for both teaching and revision, but our concerns about an overburdened AS content would remain. Some movement of topics into the A level course is needed.

In addition to this major concern, we would like to make the following specific points about content:

- OT 1.4: the omission of proof by contradiction from the AS content seems arbitrary, and the examples given are part of our mathematical culture and accessible at this stage.
- To fulfil requirements of accurate notation, we would like content statements to specify the variable with respect to which differentiation and integration are being performed.
- E1 – to introduce  $e$  in such a limited manner seems counterproductive. It would be better to leave it until A2 to give a comprehensive treatment.

- F1 – are students to differentiate any power of  $x$  from first principles or only for a restricted domain of  $n$  (e.g. positive integers)?
- F2 – needs tighter description to ensure clarity for the domain of  $n$ .
- N2 – it is not usually possible to construct a critical region so exactly for a discrete distribution so we would like the wording here to be improved.

5 d) Further mathematics

<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Not Sure
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*Comments:*

Although the reduced percentage of prescribed content will allow awarding bodies some scope to allow for the parallel teaching of Maths and Further Maths, we are concerned that an AS Further Mathematics course could consist of only 30% Pure Mathematics, and yet there is much desirable pure content that should be included to support study (and employment) in many high maths-usage fields.

At present the AS Further Mathematics course provides a more comprehensive basis for studying mathematics (or engineering and physics), and we have some concerns that changes in the A/AS structure could lead to a fall-off in the numbers henceforth taking AS Further Maths. The lack of A\* grade in AS is to be regretted as an incentive for high-achieving students and we are concerned that the gains in numbers taking AS Further Maths may not continue.

7 Do you think that any of the proposals have the potential to have a disproportionate impact, positive or negative, on specific students, in particular those with 'relevant protected characteristics'? (The relevant protected characteristics are disability, gender reassignment, pregnancy and maternity, race, religion or belief, sex and sexual orientation.) Please provide evidence to support your response.

<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Not Sure
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8 How could any adverse impact be reduced and how could the subject content of GCSEs and/or A levels be altered to better advance equality of opportunity between persons who share a protected characteristic and those who do not share it? Please provide evidence to support your response.

<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Not Sure
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*Comments:*

N/A

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.

<b>Please acknowledge this reply.</b>	x
E-mail address for acknowledgement: <a href="mailto:a.c.mcbride@strath.ac.uk">a.c.mcbride@strath.ac.uk</a>	

Here at the Department for Education 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?

<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
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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.

If you have any comments on how DfE consultations are conducted, please contact Aileen Shaw, DfE Consultation Coordinator, tel: 0370 000 2288 / email: [aileen.shaw@education.gsi.gov.uk](mailto:aileen.shaw@education.gsi.gov.uk)

**Thank you for taking time to respond to this consultation.**

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

Send by e-mail to: [Gcseandalevel.consultation@education.gsi.gov.uk](mailto:Gcseandalevel.consultation@education.gsi.gov.uk)

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