

**MEI draft response, 27 March 2013**



**Department  
for Education**

**Consultation Response Form**

**Consultation closing date: 16 April 2013  
Your comments must reach us by that date.**

**Reform of the National Curriculum in  
England:**

**Consultation Response Form**

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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.

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**Please tick if you want us to keep your response confidential.**

Reason for confidentiality:

Name Charlie Stripp  
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If your enquiry is related to the DfE e-consultation website or the consultation process in general, you can contact the Public Communications Unit 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 Department's ['Contact Us'](#) page.

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Please tick one category that best describes you as a respondent

<input type="checkbox"/> Primary School	<input type="checkbox"/> Secondary School	<input type="checkbox"/> Special School
<input type="checkbox"/> Organisation representing school teachers	<input type="checkbox"/> Subject Association	<input type="checkbox"/> Parent
<input type="checkbox"/> Young Person	<input type="checkbox"/> Higher Education	<input type="checkbox"/> Further Education
<input type="checkbox"/> Academy	<input type="checkbox"/> Employer/Business Sector	<input type="checkbox"/> Local Authority
<input type="checkbox"/> Teacher	<input checked="" type="checkbox"/> Other	

Please Specify:  
Curriculum development organisation for mathematics.

Are you answering this consultation in response to particular subjects? Please tick all those that apply.

<input type="checkbox"/> English	<input checked="" type="checkbox"/> mathematics	<input type="checkbox"/> science
<input type="checkbox"/> art & design	<input type="checkbox"/> citizenship	<input type="checkbox"/> computing
<input type="checkbox"/> design & technology	<input type="checkbox"/> geography	<input type="checkbox"/> history
<input type="checkbox"/> languages	<input type="checkbox"/> music	<input type="checkbox"/> physical education
<input type="checkbox"/> Not applicable		

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### 1 Do you have any comments on the proposed aims for the National Curriculum as a whole as set out in the framework document?

Comments:

In addition to knowledge, the first aim should also emphasise skills and understanding, providing a foundation to prepare **all** students to make a meaningful contribution to society

The second aim should not be interpreted as meaning that it is the content outside the National Curriculum which will be exciting. Nor should the programme of study for mathematics be seen as maximal for teaching mathematics.

The National Curriculum should apply to **all** state-funded schools (including academies and free schools).

### 2 Do you agree that instead of detailed subject-level aims we should free teachers to shape their own curriculum aims based on the content in the programmes of study?

Agree

X Disagree

Not sure

Comments:

It is desirable that teachers should be able to choose to use different resources, examples and pedagogy to teach the content of the curriculum, but teachers should not determine the aims of the curriculum.

Form should follow function in education; the content and emphasis of the curriculum in mathematics should be shaped by its aims. The stated aims for mathematics have the potential to help all teachers of mathematics, including non-specialists, understand what the intentions of the curriculum are.

Fluency is sometimes understood as the ability to do familiar types of questions quickly and efficiently and is, as such, quite a low level skill. However, we consider that a better understanding of mathematical fluency is by analogy with fluency in a language. It includes the ability to adapt to unfamiliar contexts and incorporates understanding mathematics in a wide range of situations. A rewording of the first bullet point in the aims, as follows, would make this clearer.

- *become fluent in the fundamentals of mathematics, proficient in the use of mathematical techniques and able to select appropriate techniques in a variety of contexts, so that they are able to apply their knowledge and understanding rapidly and accurately to problems*

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The aims for mathematics, as written in the draft, express the purposes of the curriculum in broad terms; there is no need for further detail but they should not be removed for teachers to construct their own.

In the final sentence of the purpose of study for Mathematics, it would be clearer if “the ability to reason mathematically” was replaced by “the ability to reason analytically and logically”.

The statement about the use of ICT in Mathematics is contradictory at present; it says that calculators should not be used until the end of KS2 but also leaves the decision about use of ICT with teachers. We agree that calculators should not be used to *avoid* mental and written calculation, but digital technologies offer students a wealth of opportunities to enhance teaching and learning in mathematics and are widely used for mathematics outside of education. Students should experience using digital technologies in mathematics to reason mathematically and solve problems in mathematics. They should be able to use digital technologies to produce and test results when exploring relationships and they should be able to identify whether a solution to a problem obtained using technology is realistic.

The importance of technology was eloquently expressed by Michael Gove in his speech at the Royal Society in June 2011:

*“In addition to the debate over what is taught, and the issue of who does the teaching, we also need to think about how the teaching takes place. So as well as reviewing our curriculum and strengthening our workforce, we need to look at the way the very technological innovations we are racing to keep up with can help us along the way. We need to change curricula, tests and teaching to keep up with technology, and technology itself is changing curricula, tests, and teaching.”*

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### 3 Do you have any comments on the content set out in the draft programmes of study?

Comments:

#### KS2

Although the preamble to the content of the curriculum allows for flexibility of teaching within a key stage, there is a danger that separating KS2 into lower and upper will be interpreted as meaning that content from lower KS2 is inappropriate for upper KS2. Furthermore, the separation of the programme of study into yearly programmes is likely to result in almost all students being taught the programme for the year group. This runs contrary to the importance placed by Ofsted on differentiation.

The emphasis in the primary curriculum on formal written multiplication should not be interpreted as a ban on the grid method of multiplication. When this is taught in a way which enables students to link it to area, it allows links to be made within mathematics as well as providing a model for conceptual understanding of the multiplication of fractions, decimals and algebraic expressions.

In a similar way, the emphasis on long division is overstated as this technique is not as helpful as other methods of division for supporting progression to future understanding of factorising algebraic expressions in KS3 and KS4.

We welcome the inclusion of understanding of the equals sign in year 5; lack of understanding of the equals sign is a barrier to progression in algebra.

There are some statements in the primary curriculum for mathematics which will not be easily understood by non-specialist teachers of mathematics. Indeed, as specialists, we are uncertain what is meant by them. For example:

- *“harder multiplication problems such as which  $n$  objects are connected to  $m$  objects”* (year 4 multiplication and division).
- *“interpret and present discrete data using bar charts and continuous data using line graphs”* (year 4 data). Both vertical line graphs and bar charts are appropriate for representing discrete data. We do not understand what is meant by representing “continuous data using line graphs”.
- *“solve comparison, sum and difference problems using information presented in line graphs”* (year 5 data)

A glossary of terms would assist teachers in understanding what is intended by curriculum statements. We note that a glossary has been provided for English and recommend that one be provided for mathematics also.

The following statement for year 5 fractions seems overambitious, especially since the use of common denominators and conversion to decimals does not appear until year 6.

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*“compare and order fractions whose denominators are all multiples of the same number”*. How is it envisaged that year 5 students will compare fractions such as  $5/14$  and  $7/18$  (for example)?

There may be some value in students working with Roman numerals, but we question whether study of them should be part of the statutory curriculum

There are enormous implications for CPD to ensure that teachers are able to interpret and teach the new National Curriculum successfully. Very few primary school teachers are mathematics specialists and they often lack confidence in mathematics, as highlighted by the *William’s Review of Primary Mathematics (2008)*. Without appropriate CPD there is a serious danger that non-specialist and inexperienced teachers will emphasise rote learning of methods of calculation, at the expense of conceptual understanding and problem solving, so limiting students’ ability to progress into KS3 and 4.

### KS3

The algebra in KS3 is based mainly on equations; functions should also have greater prominence.

There are some examples of statements in the draft KS3 curriculum where the meaning is not clear. There are many non-specialist teachers of mathematics at this level so it is especially important to ensure that they understand what they are required to teach.

- *“simple error intervals, using standard interval and inequality notation”* What is meant here by *“standard interval notation”*?
- *“identify properties, e.g. equal lengths, circles, triangles, quadrilaterals and other plane figures, using appropriate language”* Is the word *“in”* missing after *“lengths”*?
- *“identify face, edge and vertex properties of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres”* It is not clear how this goes beyond what is expected in year 2.

Again, a glossary of terms and some exemplification of what is intended would be useful to enable teachers to interpret the National Curriculum.

Building from the KS2 curriculum, the development of students’ skills when using proportion and their understanding of fractions (and decimals) is crucial to the improvement of students’ learning at KS3. Evidence from TIMMS and the King’s College ICCAMS project shows that English students do not perform well in these areas. Focused CPD is needed to enable KS3 mathematics teachers (many of whom are non-specialists) to build on the foundations laid at KS2 to provide effective teaching of these concepts, which are vital for success at KS4 and beyond.

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### KS4

The draft KS4 curriculum requires considerable work before it is ready for final publication.

The KS4 draft content follows on from that of KS3; however, it is unclear what the relationship between this and the content of new GCSEs will be. The current draft does not include important number work, such as percentages; it is vital that such content is assessed at the end of KS4 because of its importance for life, employment and further study. The current draft KS4 content does not constitute an appropriate mathematical diet for any student, unless it also includes the use and consolidation of content which is currently in KS3. It may be that this was intention of the draft but, if so, it needs to be made explicit. In particular, the current KS4 draft, as written and without the incorporation of KS3 content, could alienate and be largely inappropriate for students who are not interested in mathematics for its own sake.

There are some statements in the KS4 programme of study which are not clear to us. For example:

- “*express composition of two familiar functions using function notation and know which are distributive over addition*”. An investigation of when it is true that  $f(g(x) + h(x)) = fg(x) + fh(x)$  offers a high level of challenge for the most able students at KS4 but we find it hard to believe that this is intended for all students.
- We do not understand when it would be appropriate to use dimensional analysis to derive formulae for calculating area of parallelograms and trapezia. The former is included in year 6 and the latter is quite easy to derive from the area of a parallelogram.

We welcome the emphasis on problem solving, reasoning and the broad understanding of fluency.

We also welcome the inclusion of applications of mathematics, with reference to finance, and to velocity and acceleration. However, it is not appropriate to include momentum and collisions in the mathematics curriculum at this level. Momentum and collisions could be introduced in physics, but we note that they are not included in the physics curriculum at KS4.

There should be a greater emphasis on statistics as a key application of mathematics.

The KS4 curriculum should place far more emphasis on mathematical modelling, including the financial and statistical modelling cycles.

There is scope to make links with the computing scheme of work at all levels.

Again, extensive CPD will be required to ensure the new curriculum can be implemented successfully.

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**4 Does the content set out in the draft programmes of study represent a sufficiently ambitious level of challenge for students at each key stage?**

Sufficiently ambitious

Not sufficiently ambitious

x Not sure

Comments:

It is sufficiently ambitious for some students but over-ambitious for others. It is better for students to understand and be able to use some mathematics than for them to fail to understand or be able to use a great deal of mathematics.

At present there is a wide range of mathematical attainment – seeking to narrow the gap by improving the performance of the “tail” is an excellent aim but there is a fine line between an appropriate level of challenge and something that is just too difficult for students to cope with and so results in a reduction in engagement and achievement.

**5 Do you have any comments on the proposed wording of the attainment targets?**

Comments:

Our principal concern with the wording is that it fails to acknowledge the significance of the shift away from Attainment Targets being defined by levels. This is a radical shift. It would suggest the new curriculum is intended to be a “mastery for all” curriculum as, unlike the previous National Curriculum, there are no graduated statements of attainment.

If the intention is to have a “mastery for all” curriculum, then this should be made explicit in the wording and also in the introductory statements in the curriculum.

If this is not the intention and there will be some form of graduated statements of attainment, particularly at the end of KS1 and KS2, then the approach to this graduated attainment and any associated assessment regime needs to be clarified and communicated alongside the curriculum.

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**6 Do you agree that the draft programmes of study provide for effective progression between the key stages?**

Agree

Disagree

Not sure

Comments:

Effective progression depends on teachers building on what students already know (rather than what the programme of study for the previous key stage says they should know).

**7 Do you agree that we should change the subject information and communication technology to computing, to reflect the content of the new programmes of study?**

Agree

Disagree

Not sure

Comments:

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**8 Does the new National Curriculum embody an expectation of higher standards for all children?**

Yes

No

X Not sure

Comments:

An expectation of higher standards is not sufficient to raise standards. Teachers need to develop suitable strategies to enable students to meet the higher demands. This requires appropriate support and resources. Moreover, “more content” does not mean the same thing as “higher standards” in mathematics. The true level of standards lies in the level of understanding students develop, which is crucial for their progression and their ability to use mathematics effectively in the future.

**9 What impact - either positive or negative - will our proposals have on the 'protected characteristic' groups?**

Comments:

Research such as the QCA's *Evaluation of Participation in A level Mathematics* shows that girls are more risk-averse than boys when deciding whether to pursue further study of mathematics. For example, the interim report found that “*Girls still find the usefulness of mathematics important, but they also appear to be more concerned with being comfortable about their ability to cope.*” At present, 40% of A level Mathematicians and 30% of A level Further Mathematicians are girls; it would be highly regrettable if these percentages reduced as a result of the new curriculum damaging girls' confidence in mathematics before the age of 16.

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**10 To what extent will the new National Curriculum make clear to parents what their children should be learning at each stage of their education?**

Comments:

We consider that schools are best placed to provide this information to parents but the National Curriculum can provide an assurance that individual school curricula are of an appropriate standard. However, parents would find it easier to understand the National Curriculum if it included more exemplification and explanation of terminology.

**11 What key factors will affect schools' ability to implement the new National Curriculum successfully from September 2014?**

Comments:

- Final version of the new NC available in schools no later than 1 September 2013.
- Teacher awareness and ability to adapt to new ways of working.
- Teacher subject knowledge needs to be secure. This will be a particular concern in primary schools and also in secondary schools where non-specialist teachers are necessary in Key Stage 3 to meet the shortfall in specialist teachers.
- The availability of suitable high-quality resources – it is not clear to us that these can be produced and made available to schools all within one academic year.
- Properly funded, high-quality professional development opportunities – the NCETM will have a key role to play in helping to ensure teachers can access the mathematics CPD they will need to implement the new curriculum effectively.
- Funding to support implementation – the cost will be significant at a time when school budgets as a whole are flat, set against significant inflation in non-pay costs and pay rises of 1% per year. It is essential that dedicated and additional funding of an adequate level is provided and that schools know how much as soon as possible.
- Coherent structures for assessment of progression, set alongside the curriculum content, produced in time for publication by 1 September 2013.
- Note Oates (2010): *A system is regarded as 'coherent' when the national curriculum content, textbooks, teaching content, pedagogy assessment and drivers are all aligned and reinforce one another.*"

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### 12 Who is best placed to support schools and/or develop resources that schools will need to teach the new National Curriculum?

Comments:

For mathematics, there are a number of groups that could provide support to teachers: subject associations and curriculum development groups such as MEI have considerable expertise in resources development and in providing CPD. Teaching Schools, Academy Chains and commercial CPD providers can also play an important role in supporting schools.

The NCETM can play a key coordinating role, providing expert advice and support to schools and CPD providers, regulating the quality of CPD provision, highlighting high-quality resources and promoting a coherent provision of professional development.

A serious concern is that developing and providing high-quality resources and professional development requires significant time and money, both of which are in very short supply.

### 13 Do you agree that we should amend the legislation to disapply the National Curriculum programmes of study, attainment targets and statutory assessment arrangements, as set out in section 12 of the consultation document?

Agree

Disagree

Not sure

Comments:

This may give more time for schools to adapt to the new curriculum. As well as time, teachers will also require access to high-quality CPD and resources if the implementation of the curriculum is to be effective.

It is vital to ensure coherence and progression within the curriculum at all Key Stages. The current Programmes of Study in Years 3 to 5 do not adequately prepare pupils for the subsequent years in the proposed curriculum. Work should build upon previous experiences. Although disapplying the curriculum for Years 3 and 4 in September 2013 would allow teachers the potential to prepare pupils for subsequent Years 4 and 5, these, largely non-specialist, teachers will need considerable support with this process as the demands of the new curriculum are much higher.

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**14 Do you have any other comments you would like to make about the proposals in this consultation?**

Comments:

**15 Please let us have your views on responding to this consultation (e.g. the number and type of questions, whether it was easy to find, understand, complete etc.)**

Comments:

It was helpful to be able to comment freely and to have the response document in Word to facilitate discussion.

Some of the boxes in the consultation accept text (like this one) but others seem just to be rectangles which get in the way of typing.

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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

E-mail address for acknowledgement: charlie.stripp@mei.org.uk

Here at the Department for Education we carry out our research on many different topics and consultations. As your views are valuable to us, would it be alright if we were to contact you again from time to time either for research or to send through consultation documents?

Yes	<input checked="" type="checkbox"/>	<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 consult with those who are affected
- consultation should be 'digital by default', but other forms should be used where these are needed to reach the groups affected by a policy; and
- the principles of the Compact between government and the voluntary and community sector will continue to be respected.

Responses should be completed on-line or emailed to the relevant consultation email box. However, if you have any comments on how DfE consultations are conducted, please contact Carole Edge, DfE Consultation Coordinator, tel: 0370 000 2288 / email: [carole.edge@education.gsi.gov.uk](mailto:carole.edge@education.gsi.gov.uk)

## **MEI draft response, 27 March 2013**

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

Completed questionnaires and other responses should be sent to the address shown below by 16 April 2013

Send by post to:

Consultation Unit,  
Area 1c,  
Castle View House,  
East Lane,  
Runcorn,  
Cheshire,  
WA7 2GJ.

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