Curriculum reform and mathematics

Nicola Edwards
National Curriculum Review Division
Department for Education
Aims of presentation

Tell you about:

- why are we reviewing the National Curriculum
- main changes to the mathematics curriculum
- GCSE & accountability announcements
- what this all means for schools
- wider implementation
- timetable and next steps
- A level reform
The Importance of Teaching White Paper

- benchmarking **expectations** for our children against the expectations of the most successful nations
- ensure that our **qualifications** match the best in the world, providing a good basis for further study and employment
- stronger **leadership**, more intelligent **accountability** and, above all, improvements in **teaching quality** are essential
- extending **school freedoms**, reforming **performance tables** and reforming **inspection**
- attracting even more **outstanding people** into an already great profession....

... and help raise **attainment for all children** and support **poorest children most** of all
<table>
<thead>
<tr>
<th>Age 10 – Year 5</th>
<th>Age 14 – Year 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>542 (9th of 50)</td>
<td>507 (10th of 42)</td>
</tr>
<tr>
<td>541 (7th of 36) – 2007</td>
<td>513 (7th of 45) - 2007</td>
</tr>
<tr>
<td></td>
<td>20/38 – 1999</td>
</tr>
</tbody>
</table>

**England**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>484</td>
<td></td>
<td>531</td>
<td>541</td>
<td>542</td>
</tr>
</tbody>
</table>

Significant increases to 2007

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>498</td>
<td>496</td>
<td>498</td>
<td>513</td>
<td>507</td>
</tr>
</tbody>
</table>

Significant difference in 2003-07
What was announced on 7 February 2013

National Curriculum consultation
- Defining the school curriculum
- All subjects retained at all 4 key stages
- Foreign languages at Key Stage 2
- Removal of Attainment target levels and descriptors
- Consultation ends Tuesday 16 April 2013.

Reform of GCSEs
- Decisions regarding Key Stage 4 qualification consultation

Secondary accountability consultation
- Additional accountability measures for secondary schools
- Consultation ends Wednesday 1 May 2013
Aims of mathematics curriculum

- “become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.”
Links across the curriculum

- Coherence with content in other subjects
  - links across to science, computing and geography
  - Financial literacy in citizenship

- Numeracy and mathematics statement
  - developing mathematics in all subjects so pupils understand and appreciate the importance of mathematics.
  - not only about number - applying geometric, algebraic and probabilistic understanding across curriculum subjects
  - scientific method - understanding cyclical process of collecting, presenting and analysing data.
  - using mathematics to solve both routine and non-routine problems across all subjects
Primary mathematics – what has changed?

• **higher expectation** overall - benchmarked against age-related expectations in other nations

• progression shown **year-by-year** – but for teachers to set out their year-by-year approach in their school curriculum

• **conceptual development of number addressed in detail**, especially in relation to arithmetic and proportionality

• **fewer things in more depth** in primary so data has less prominent and probability not introduced till Key Stage 3

• all pupils expected to **build firm foundations** and not be accelerated to content expected in secondary school
Primary mathematics – what has changed?

In detail (1):

- Earlier and more challenging requirement for multiplication tables
- Clear expectations around written methods in addition to mental methods
- Earlier and more challenging requirement for fractions and decimals
- Increased requirement for pupils to use formulae for volume and to calculate the area of shapes other than squares and rectangles
Primary mathematics – what has changed?

In detail (2):

- Probability has been removed
- Increased requirement for understanding of proportional reasoning – for example through volume and calculations with fractions
- Financial education has been reinforced with a renewed emphasis on essential numeracy skills, using money and working with percentages
- A strong steer that the use of calculators should be restricted until the later years of primary.
Secondary mathematics – what has changed?

- **higher expectation** overall - benchmarked against age-related expectations in other nations
- **less detailed than primary and set out by key stage** – secondary school teachers will need to set out the detail in their school curriculum by year.
- **consolidating understanding** - Key Stage 3 builds on Key Stage 2
- Probability and statistics treated separately
- **mathematics set out in more detail** than current National Curriculum – with less specification of generic skills
- **preparing young people for further study** post-16 as well as for work and personal life
Secondary mathematics – what has changed?

In detail:

• Increased level of challenge around the theory of number by introducing prime numbers and surds in KS3

• Increased requirements for algebra, geometry and measures and ratios, proportion and rates of change – the three pillars for calculus at post 16

• Raised expectations in probability

• Financial education has been reinforced with a focus on solving problems involving percentage increases and decreases, simple interest and repeated growth.
National Curriculum consultation

Includes questions on:

- proposed **aims** for the new National Curriculum
- changes to the **Programmes of Study** for all subjects and key stages (except English, mathematics and science at Key Stage 4)
- a proposal to replace the **ICT programme of study** with a **new computing programme of study**
- the **implementation** of the new National Curriculum
- the **disapplication** of aspects of the current National Curriculum for a limited period from September 2013
- the likely **equalities implications** of our reforms
GCSE reforms

- Main substantive change is that we are **not implementing market reforms**
- The **GCSE title maintained**
- **New GCSEs remain accessible** to the same proportion of pupils.
- **Pass level** to reflect that of high-performing jurisdictions
- **Linear, no tiers**, minimal **controlled assessment**, minimal **exam aids** and a new **grading scale**
- **New GCSEs** in English literature and language, mathematics, sciences, geography and history for first teaching from 2015.
Secondary accountability reforms

- publish extensive data on secondary schools and introduce sample testing at Key Stage 4

- remove existing 5 A*-C measure and replace with:
  - new a threshold attainment measure in English and mathematics; and
  - new average point score measure across of 8 qualifications including mathematics and Ebacc subjects
  - new progress measure based on value-added measure for Key Stage 2 tests to APS in 8 qualifications
CPD & the NCETM

- the National Centre for Excellence in the Teaching of Mathematics (NCETM) - https://www.ncetm.org.uk/

- supports providers of mathematics CPD to meet quality standards, and signposts high quality CPD resources to teachers

“Host Schools” project with a number of schools that have excellent and proven record in the teaching of calculation to offer opportunities to other primary schools

- “Professional Development Lead Support Programme” designed to improve the practice of CPD providers; e.g. on algebraic proficiency of students through effective teaching and the use of multiple representations.

- working with the National College to support Mathematics Specialist Leaders in Education (SLEs) and teaching schools
Wider implementation

- **Initial teacher training:** We are working with the Teaching Agency to align training from September 2013 with curriculum changes and to explore provision of subject specialists;

- **Subject associations and learned societies:** Actively encouraging the subject associations and others to develop further guidance and plans to support schools to develop their school curriculum

- **Inspection:** Reforms will have implications for Ofsted in their inspection of schools’ “broad and balanced curriculum” and we will continue to work with them

- **Curriculum resources:** We are working with the Educational Publishers Council (EPC) and British Educational Suppliers Association (BESA) to enable the publication and resources market to respond to schools’ needs.
Who are DfE talking to

Alongside ACME and NCETM, discussions with:

- Teaching associations – ATM/MA primary group; separate MA and ATM secondary groups; NAMA
- Learned societies – LMS, IMA and RSS
- Unions – inc. NAHT, ASCL and ATL
- Publishers – British Educational Suppliers Association (BESA) and Publishers Association (PA)

Meetings/presentations include:

- JMC (26 February)
- MA and ATM conferences (April)
We want to hear from you….

- What are you likely to prioritise in your school or schools?
- To what extent will you be able to develop your own school curriculum?
- What will be the most significant challenges to overcome?

- If you are planning early, let us know at: NationalCurriculumReview.FEEDBACK@education.gsi.gov.uk
A level reform

- Context for reform: evidence from Ofqual research and consultation
- November 2012: Ofqual announce interim changes to A levels by removing January exams, to take effect from September 2013
- SoS letters to Ofqual in January and March 2013
- A levels to become two year, linear qualifications with assessment at the end of the course
- AS to be preserved to allow breadth of study; and decoupled from the A level to become a standalone qualification
A level reform

- Universities to have greater input into content of A levels, including through Russell Group advisory body
- Most of facilitating subjects (i.e. mathematics, English, physics, biology, chemistry, geography, history) plus some other popular subjects to be reformed for first teaching from September 2015, with first exams in 2017
- Other subjects, including languages, to follow as soon as possible after that
- Russell Group to play key role in annual post-exam review process
Next steps

- Ofqual to finalise design conditions for new A levels

- Awarding organisations working with the Russell Group and Ofqual to finalise details of the process for university engagement
Looking ahead

- Primary assessment and accountability proposals
- **September 2013** – Final National Curriculum published
- **September 2014** – First teaching of National Curriculum
- **September 2015** – First teaching of new English, mathematics, sciences GCSEs
- **May 2016** – First Key Stage 1 and 2 assessment
- **September 2016** – First teaching of other new GCSEs
Links

Consultations:
- [www.education.gov.uk/aboutdfe/departmentalinformation/consultations](http://www.education.gov.uk/aboutdfe/departmentalinformation/consultations)

2014 National Curriculum:
- [www.education.gov.uk/nationalcurriculum](http://www.education.gov.uk/nationalcurriculum)

National Curriculum review:
- [www.education.gov.uk/nationalcurriculumreview](http://www.education.gov.uk/nationalcurriculumreview)

Ofqual publishes A level reform correspondence