

Mathematics in primary and secondary education – session with Jane Jones HMI, National Lead for Mathematics at OFSTED

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Committee Room 17, House of Commons

Curricular context in England, improvement and challenges.

- The aims of the National Curriculum, currently implemented in Years 1 – 10, are fluency, problem solving and mathematical reasoning. Mathematics is a 'mastery' subject – currently the only subject in the National Curriculum that is. This means having high expectations that all children can succeed, generally teaching the whole class together and encouraging depth of understanding. Some primary schools are beginning to do this – the challenge is to get all schools to understand it.
- The National Strategies had a very positive impact on primary school mathematics, especially in the early days
- Ofsted has found that the quality of teaching is still too variable – some excellent practice but some weak. Teachers need the most support with teaching mathematical reasoning.
- Subject knowledge is a challenge across all key stages; even at secondary, 25% of those teaching mathematics are non-specialists, accounting for 20% of lessons.
- The ambition of new GCSEs has resulted in many secondary schools increasing the amount of mathematics teaching time. This is also the case for Further Education, where fewer than 20% of those who didn't get Cs in English and mathematics GCSE go on to succeed post-16.
- Mathematics A-Level has surged in popularity over the last decade; over 82,000 people took it last year, making it the most popular subject.

Variation: regional, gender and disadvantaged pupils

- Her Majesty's Chief Inspector's annual report highlights a divide between the south/east and north/midlands.
- Attainment in London is the strongest (though it fell in 2015 by 0.7%). The North East is weakest, especially at secondary.
- Quality of teaching and expertise of staff is likely to be the biggest influence on variability, including in-school variability.
- Students who start below the expected level at age 11 make the least progress through secondary.
- In the early years, boys (disadvantaged boys in particular) perform less well than girls
- Beyond this, there is no significant gender gap at the expected standard for each key stage, or at GCSE grades C, though many more boys than girls go on to study A-level mathematics and further mathematics.

Transition

- A recent review by Ofsted investigated whether Key Stage 3 is providing enough breadth and challenge. The survey found 39% of Year 7s said the mathematics they were doing was the same work as in primary school most or all of the time. The biggest drop-off in attainment is in Year 8.
- Time can be wasted on needless re-testing where secondary schools are sceptical of Key Stage 2 results. More important that schools focus on hitting the ground running.
- Readiness for the next stage is important at all transition points *within* a school, as well as between schools.
- For post-16 transition, some good provision has focussed on a small number of topics in detail. Teacher shortage presents challenges in spreading consistency and ensuring quality.
- Two factors that influence the effectiveness of transition are:
 - The pupil's mathematical readiness for the next (key) stage
 - The teacher knowing and building on the pupil's prior learning in mathematics

Staffing: mathematics teachers and middle leaders, workload and Initial Teacher Education (ITE)

- Schools choice to increase teaching time for the more demanding GCSE (and the requirement for GCSE re-sit post-16), coupled with teachers leaving the profession, mean that there is a real shortage of mathematics teachers.
- Ofsted's survey found that 6 out of 10 schools struggle to recruit mathematics teachers and are relying on a temporary supply, rising to 9 out of 10 in deprived areas.
- There is an urgent need to improve retention. Approaches should be sought to achieve this. Too many teachers leave within the first 5 years. Recently more Teach First graduates have left than joined the profession.
- Half of initial teaching training is now school-based. The best trainees are often snapped up by leading schools. Disadvantaged areas with lower results have great difficulty attracting good teachers.
- Within schools, high sets were twice as likely to receive good teaching than low sets (Ofsted's report, *Mathematics: made to measure*).
- Workload is a challenge for many schools. Sometimes this is self-inflicted by school policy e.g. complicated or time-consuming marking. Teachers should spend less time marking and more time thinking about teaching. Ofsted 'myth busting' document aims to help address this.
- Figures on the teacher shortage may be worse than they seem because many posts are filled by non-specialists; 20% of mathematics lessons in years 7-13 are given by teachers who do not have a relevant qualification post A-level. This is of some concern.



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Relevant resources

Ofsted myth busting document: <https://educationinspection.blog.gov.uk/2015/06/10/ofsted-mythbusting-dispelling-the-rumours-around-inspection/> (for teachers)

NCETM subject knowledge audit tools:
https://www.ncetm.org.uk/cpd/mathematics_subject_knowledge_audits (for teachers)

ACME 'mathematical needs' report: <http://www.acme-uk.org/news/news-items-repository/2011/6/launch-of-the-acme-mathematical-needs-project>

'Key stage 3: The wasted years?' report : <https://www.gov.uk/government/publications/key-stage-3-the-wasted-years>

'Mathematics: made to measure' report <https://www.gov.uk/government/publications/mathematics-made-to-measure>

The Annual Report of Her Majesty's Chief Inspector of Education, Children's Services and Skills
<https://www.gov.uk/government/publications/ofsted-annual-report-201415-education-and-skills>