

Boolean Maths Hub Conference

Collaboration Counts

Perspectives from Ofsted

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Aims

To:

- explore some current challenges in mathematics and spot opportunities for collaboration
- reflect on transition in mathematics
- bust some myths about inspection

Think for a moment ...

... what challenges do you face in your school in mathematics?

... what opportunities do you have to tackle them?

Discuss!



Challenges



- Teachers' subject expertise:
 - 'new' mathematics content in NC/GCSE/post-16
 - the NC aims: how to teach reasoning, problem solving for all/the 'rapid graspers'; the meaning of fluency
- Expectations and progression:
 - gaps between pupils' prior learning and the GCSE spec or programme of study they are learning
 - higher demand, especially for lower attainers and SEN
 - differentiation; challenge for the 'rapid graspers'
- Teachers' worries about demonstrating pupils' progress:
 - in lessons
 - for performance management/inspection

More challenges

- Assessment without NC levels, and the quality of national assessments
- Transition between: schools, key stages, one year to the next, one lesson to the next, one mathematical idea to the next, ...
- Capacity:
 - recruitment and retention of suitably qualified staff and subject leaders
 - availability of local/in-school expert help ... the role of the Maths Hubs.

Opportunities



The national curriculum (including the new GCSE):

- captures, in its aims, the best mathematical education for all pupils
- represents greater ambition for all pupils, especially the lower attainers (and pupils in receipt of Pupil Premium)
- emphasises depth over acceleration
- lets us think afresh about progression, the wider aims and conceptual links. The programmes of study, accompanying primary guidance and secondary 'working mathematically' offer much more, potentially, than lists of content
- provides a context for teachers and schools to learn from each other and together (including through Maths Hubs).

Inspection findings – CPD



- Wide variability in the CPD provided for primary staff. The best reflects a grasp of the challenges, including:
 - development of the NC aims, emphasising reasoning and problem-solving across the mathematics curriculum
 - ensuring pupils understand calculation strategies and make links between different methods and operations
 - how to challenge and deepen the more able, a.k.a. the 'rapid graspers'
 - strengthening teachers' subject knowledge.
- Not enough CPD on the NC provided for secondary staff. More have had training on the new GCSE.

Inspection areas for improvement



Priorities common to the primary and secondary phases:

- a better awareness of the NC aims and expectations
- the development of mathematical reasoning across the mathematics curriculum
- deepening learning of pupils who grasp ideas quickly.

Some examples of very strong teaching but teaching overall remains variable within and between schools:

- The best builds concepts from first principles, develops reasoning (through discussion, questioning, careful choice of tasks/exercises/problems), and provides challenge.
- The weaker continues to teach methods like recipes with lack of attention to reasoning and problem solving.

Reasoning

Reasoning is integral to the development of conceptual understanding and problem-solving skills.

Inspection findings:

- Of the three NC aims, it is the least well developed.
- Not all classrooms have a positive ethos that encourages learning from mistakes.
- Teachers do not exploit opportunities to model thinking.
- Tasks are not used well enough to develop reasoning.
- Talk often focuses on the 'how' rather than the 'why', 'why not', and 'what if' in:
 - teachers' explanations and questions
 - pupils' responses.

Problems and puzzles



- Problems do not have to be set in real-life contexts. Beware pseudo contexts.
- Providing a range of puzzles and other problems helps pupils to reason strategically to:
 - find possible ways into solving a problem
 - sequence an unfolding solution to a problem
 - use recording to help their thinking about the next step.
- It is particularly important that teachers and teaching assistants stress such reasoning, rather than just checking whether the final answer is correct.
- All pupils need to learn how to solve problems – not just the high attainers or fastest workers.

Teaching problem solving ... do:



- set problems as part of learning in all topics for all pupils
- vary the ways in which you pose problems
- try to resist prompting pupils too soon and focusing on getting 'the answer' – pupils need to build their confidence, skills and resilience in solving problems, so that they can apply them naturally in other situations
- make sure you discuss with pupils alternative approaches to help develop their reasoning. If relevant, consider why one approach/solution might be more elegant than another
- ensure that problems for high attainers/'rapid graspers' involve more demanding reasoning and problem-solving skills and not just harder numbers.

Pause for thought ...

... what do you think inspectors expect to see in relation to mathematics teaching?

Discuss!



Ofsted expects ...



... teachers to use their subject and pedagogical expertise to provide high quality teaching and curricular experiences in order to secure the best possible learning and outcomes for their pupils.

Look at the extract on inspecting the impact of the teaching of mathematics, taken from the School Inspection Handbook, paragraph 163.

<https://www.gov.uk/government/publications/school-inspection-handbook-from-september-2015>

Myth-busting



- Ofsted does not have a preference for particular teaching styles, assessment systems (including marking and feedback), or ways of planning the curriculum.
- Guidance can be found at:
<https://www.gov.uk/government/publications/school-inspection-handbook-from-september-2015/ofsted-inspections-mythbusting>
- It includes information on lesson planning, self-evaluation, grading of lessons, lesson observations, and pupils' work.

Ofsted's guidance on pupils' work



Ofsted does not expect to see a particular frequency or quantity of work in pupils' books or folders. Ofsted recognises that the amount of work in books and folders will depend on the subject being studied and the age and ability of the pupils.

Ofsted recognises that marking and feedback to pupils, both written and oral, are important aspects of assessment. However, Ofsted does not expect to see any specific frequency, type or volume of marking and feedback; these are for the school to decide through its assessment policy. Marking and feedback should be consistent with that policy, which may cater for different subjects and different age groups of pupils in different ways, in order to be effective and efficient in promoting learning.

While inspectors will consider how written and oral feedback is used to promote learning, Ofsted does not expect to see any written record of oral feedback provided to pupils by teachers.

NCETM's guidance on teachers' marking

- The most important activity for teachers is the teaching itself, supported by the design and preparation of lessons.
- Marking and evidence-recording strategies should be efficient, so that they do not steal time that would be better spent on lesson design and preparation.

<https://www.ncetm.org.uk/files/33333022/NCETM+Primary+Marking+Guidance+April+2016.pdf>

[https://www.ncetm.org.uk/public/files/40764571/Secondary+Marking+Guidance+\(October+2016\).pdf](https://www.ncetm.org.uk/public/files/40764571/Secondary+Marking+Guidance+(October+2016).pdf)

- No aspect of these guidelines is in conflict with the contents of Ofsted's School Inspection Handbook and 'myth-busting' information.

Transition: a national priority



- Ofsted's report, *Key Stage 3: the wasted years?* identifies the particular concern of secondary pupils repeating primary mathematics work. Of Year 7 pupils surveyed, 39% said that in mathematics they were doing the same work as in primary school most or all of the time.
- Readiness for the next stage is important at all transition points within a school as well as between schools.

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.

Primary questions focused on:

- strengths and weaknesses in current Y6 cohort's fluency, mathematical reasoning and problem solving
- any differences in the attainment of different groups in Y6
- reflection on aspects of school's own transition work:
 - sharing information about Y6 pupils' strengths and weaknesses in mathematics and their curricular experiences, including increased challenge of Y6 tests
 - work to enable the secondary school to understand any gaps in attainment of different groups
 - monitoring, review and evaluation of own transition arrangements in mathematics.

Secondary questions focused on:

- information received about primary pupils' knowledge, skills and understanding in mathematics, including any particular strengths and weaknesses?
- any assessment of pupils' mathematical knowledge, skills and understanding early in Y7 (whole cohort). If yes:
 - chosen assessments and how results used
 - correlation between assessments and information from primaries, including national test results and TA
 - any groups where match is not close?
- knowledge/use of QLA (available for current Y7 pupils)
- rate aspects of own transition work

Pause for thought ...

... information sharing at transition

- Consider, for mathematics, the curricular information and pupils' data that you provide for, or receive from, your transition partner schools.
- Does it include anything explicitly on
 - pupils' curricular experiences
 - strong and weak topics for individual pupils, groups or the whole cohort
 - pupils' achievement in reasoning and problem solving?
- What use is made of the information/data?



Knowledge of the next/previous PoS



- Over time, teachers become familiar with the mathematics for the year group or key stages that they teach.
- Teachers are often less familiar with the preceding or succeeding programmes of study or exam specifications.
- Understanding how a topic:
 - builds on earlier learning
 - develops beyond the current year/key stagehelps to inform teaching approaches that equip pupils best, including for future learning.
- This is all about progression and connection-making:
 - from one unit of work/topic/lesson to the next
 - within lessons.

The ribbon problem

Silver glitter ribbon costs £1.25 per metre.
Mrs Price buys a piece of ribbon 1.2 metres long.
How much does it cost?



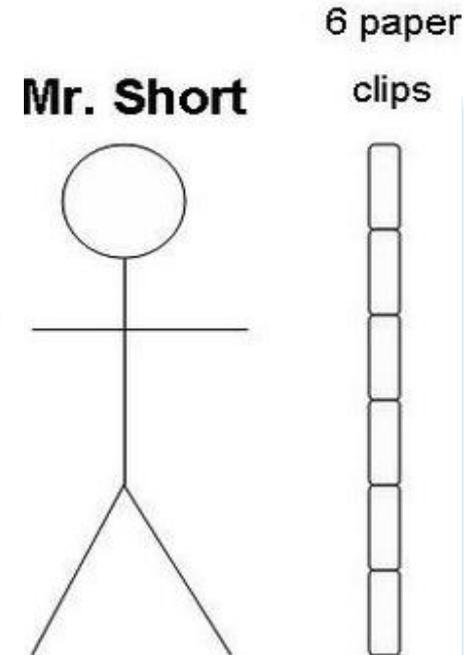
- How would you respond to this answer?
 $£1.25 + £0.25 = £1.50$

Teaching for progression

When measured with paperclips, Mr Short is 6 paperclips tall. Mr Short has a friend, Mr Tall.

When you measure their heights with matchsticks, Mr Short's height is 4 matchsticks and Mr Tall's height is 6 matchsticks.

What would be Mr Tall's height if you measured it in paperclips?



- How would you respond to a pupil's answer of 8 paperclips?
- What is the underlying difficulty?

Pause for thought ...

... how next-stage ready are your pupils?

... do all the teachers in your school understand, and teach for, progression?

Discuss!



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