LET'S MAKE BRITAIN TOP OF THE CLASS IN MATHS.

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Under Labour we've fallen to 24th in the world at maths, behind countries including Canada and Korea.

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Summary

Standards are too low

- Between 1998 and 2008 3,474,095 pupils left school without at least a 'C' in maths GCSE.[1]

- Academics at Durham University have shown that pupils who would have received a U (fail) in maths A-level in 1988 received a B/C in 2006.[2]

- An independent study of engineering students has found that students 'with an A at A-level mathematics today will, on average, obtain a score…which would have placed them near the bottom of the cohort fifteen years ago'.[3]

- A lack of mathematical skills causes problems for science students. The Royal Society of Chemistry found that for GCSE 'only limited skills of applying mathematics to chemistry problems were evident [in 2008], with questions requiring even very simple manipulation of numbers posing difficulties for many [16 year olds]'.[4]

The Government admits to declining standards

- The Government's own watchdog, the Qualification and Curriculum Authority (QCA), has said that A-level maths have become easier. In a report the QCA said 'supplementary provision that takes the standard of achievement beyond A-level' had to be considered.[5]

- Sir Peter Williams, who chaired the Government's review into the teaching of primary mathematics, said: 'Over 20 or 30 years, I don't think there is any doubt whatsoever that absolute A-level standards have fallen. They have edged south, continuously over a long period of time. I think all university academics and a good proportion of sixth-form teachers would agree with my assertion'.[6]

Lack of specialist teachers

- There is not a single primary teacher training course with a specialism in Mathematics, while hundreds of primary teacher trainees go through specialist language courses.[7]

- Less than half of secondary school maths teachers have a degree in maths.[8]

- A fifth of secondary maths teachers in state schools have left the sector within three years.[9]

- Only two per cent of PGCE primary teachers have a first degree in a maths, science or technology subject.[10]

Why does maths matter?

'Mathematics is the language in which God has written the universe' (Galileo)

Maths is the foundation of science and engineering, and therefore the foundation of technological innovation - and with it economic progress.

Without the proper training in mathematics, at all levels, we cannot hope to recover from difficult economic times. We also cannot answer the most fundamental questions about where and who we are.

As information technology, computer science and mathematical modelling become integral to an ever-increasing group of industries, maths is becoming more fundamental, not less.

And mathematics is of enormous *personal* value – without the right skills, people's earnings and opportunities are curtailed:

- Mathematical understanding has a measurable effect on the labour market. Those with A-level mathematics earn 7-10 per cent more than similarly educated workers, even after controlling for the initial ability of the individuals (Dolton, PJ & Vignoles, A, 2002; Wolf, A, 2002). No other A-level has that effect.

- The Department for Education and Skills analysed the cumulative earning effects of increased numeracy. While the highest effects are for above level 2 (above GCSE) skills, GCSE level mathematics is a prerequisite for studying Mathematics at a more advanced level (DfES, *Literacy, Numeracy and the Labour Market; Further analysis of the Skills for Life survey,* 2005).

- Evidence from the USA has also shown that the traditional core parts of the school curriculum are increasingly the most important focus. 'Moreover, it again seems to be mathematics skills which matter most [in relation to the future earning power of the country]' (Wolf A, 2002).

- In 2002 the Institute of Education conducted an in-depth study into mathematical skills in the workplace for the Science, Technology and Mathematics Council. They found:
  - o Mathematics GCSE at a minimum of grade C was a common requirement for *non-professional* companies.
  - o There is an increasing number of people involved 'in mathematics-related work, and with work involving increasingly sophisticated mathematical activities. In agreement with other recent studies, we conclude that the country needs to rethink and look to upgrade mathematics provision for young people and to ensure that people have access to additional provision over their lifetimes' (Hoyles, Wolf, Molyneuex-Hodgson, Kent, 2002).

- Business has repeatedly warned of problems with basic standards in maths and science. For example, John Cridland, Deputy Director of the CBI, said: 'We are beginning to see UK companies saying it makes economic sense to source science graduates internationally, particularly from China and India' (*The Guardian*, 15 March 2006). The CBI has also warned that China is producing 300,000 STEM graduates per year and India 450,000 (ibid.).

Declining Standards in maths

Between 15 and 20 per cent of UK adults 'do not have basic functional numeracy skills'[11]. Hundreds of thousands are being added to their number every year. Even according to the Department's official statistics, an unacceptable number of students are not achieving the basics.

- **Almost half of pupils do not get a good GCSE in maths.** Last year, 7 per cent of pupils were not even entered for maths GCSE and 45 per cent did not get a good GCSE in maths (a C or above) (*DCSF: GCSE attempts and achievements in selected subjects of pupils at the end of Key Stage 4 2007/8).*

- **Millions of children without a good GCSE in mathematics under Labour.**
  - o Between 1998 and 2008, 3,474,095 pupils left school without at least a 'C' in maths GCSE (*Hansard,* 21 July 2008, col. 933W; House of Commons Library).
  - o Between 1998 and 2007, 604,478 pupils did not get any GCSE (grade G or above) in maths (ibid.).
  - o Between 1998 and 2007, 403,133 did not even enter for maths GCSE (ibid.).

- **Children falling back under Labour.** Over 75 per cent of pupils do not fulfil their potential in maths between the ages of 14 and 16. The percentage of pupils making twO-level of progress in maths between Key Stage 3 and Key Stage 4 (GCSE) – the Government's new measure of achievement – is just 23.3 per cent. Pupils' progress is falling further behind: this year's figure is 4 per cent lower than in 2007 and the lowest figure recorded since records began in 2005 (DCSF, *GCSE and Equivalent Results in England 2007/8*).

But official statistics do not tell the full story. There is an increasing body of evidence showing that our exams have been devalued.

Before GCSE

- **Academics find that intellectual ability of the country's brightest teenagers has declined.** A report by Professor Michael Shayer of King's College London found that the 'high level thinking' skills of 14 year olds are now on a par with 12 year olds in 1976. The study tested 800 13 and 14 year olds on their understanding of abstract concepts such as volume, density, quantity and weight and compared it to a similar exercise in 1976. 'Michael Shayer…believes that [the mismatch between the report and official statistics] is the result of exam standards 'edging down'…he believes most of the downturn has occurred over the last ten to fifteen years' (M Shayer, *Thirty years on – a large anti-Flynn effect? (II): 13 &14 year olds. Piagetian tests of formal operations norms 1976-2006/7).*

GCSE

- **Academics find pupils of the same ability getting higher grades under Labour.** Professor Tymms and Robert Coe of Durham University have shown that in 2006 students received a grade higher in maths GCSE than students of the same ability in 1996 (CEM Centre Durham University, *Change in GCSE and A-Level: Evidence from ALIS and YELLIS,* April 2007*).*

- **Decline in the difficulty of mathematics papers.** A team of mathematicians led by Professor John Marks has studied GCSE and O-level maths papers over time – from 1951, 1960, 1970, 1980, 1990, 2000 and 2006 (Reform, *The Value of Mathematics,* June 2008). They found that:
  - o Maths exams began to get easier from 1980 and then got much easier after the introduction of GCSEs in 1987.
  - o The GCSE curriculum is broader but shallower than the O-level. O-level had three basic papers – arithmetic, algebra, and geometry - with extra papers that combined the topics. GCSE had extra subjects added, such as statistics, but required less knowledge.
  - o GCSE has 'far fewer long, unstructured questions'; instead pupils are guided through each stage. 'It would clearly be possible to have achieved a grade C pass without doing any significant amount of either algebra or classical Euclidean geometry or its equivalent.'

- o 'The concept of proof was virtually absent in the GCSE papers, unlike O-level papers in which it was a central feature.'
- o Calculators are allowed in more situations and formulae sheets are provided where in O-level pupils had to know formulae. Coursework was introduced in GCSEs, counting for about 20 percent in maths (the QCA admitted in 2006 that it had been a mistake and it was dropped in 2007).
- o 'It is now possible to achieve a grade C in GCSE mathematics having almost no conceptual knowledge of mathematics. This is due in part to the simplicity of the questions and the decline of algebra, geometry and proof within the papers.'
- o 'It has become substantially easier to achieve a grade C since the inception of GCSEs in 1987... In 1990 the percentage mark on the Higher Tier for a grade C was just over 50 per cent. However, in 2000 and 2006 the required percentage mark for a grade C had fallen to about 20 per cent; this mark could be attained by answering correctly the first four questions on Paper 5 and Paper 6... In 1990 the percentage mark on the Intermediate Tier for a grade C was 70 percent. However, in 2000 and 2006 the required percentage mark for a grade C had fallen to just over 40 percent.'

- **Lack of mathematics leading to crisis in science.** The Royal Society of Chemistry (RSC) found that 'only limited skills of applying mathematics to chemistry problems were evident [in 2008], with questions requiring even very simple manipulation of numbers posing difficulties for many [16 year olds]'. The Chief Executive of the RSC said 'the brightest pupils are not being stretched, or trained in mathematical techniques, because they can get a grade A* without doing a single calculation' (RSC, *The Five Decade Challenge,* November 2008; *Telegraph,* 26 November 2008).

A-level

The lack of challenge in GCSEs, and the lack of preparation for A-level, have had an inevitable effect.

- **Pupils turning away from maths and physics.** The number of students taking mathematics A-level has decreased from 87,682 in 1985 (*Hansard,* 4 July 2005, col. 165W) to 57,618 in 2008 (*DCSF: A-level examinations 2007/8).* And the number doing Physics A-level has decreased from 38,950 in 1985 (*Hansard,* 10 June 1991 col. 431) to 24,703 in 2008 (*DCSF: A-level examinations 2007/8).*

Meanwhile those pupils who are still doing maths A-level are not being challenged to the same extent as their predecessors.

- **Pupils achieving three grades higher than 18 years earlier.** Professor Tymms and Robert Coe of Durham University showed that pupils who would have received a U (a fail) in maths A-level in 1988 would receive a B/C in 2006 (CEM Centre Durham University, *Change in GCSE and A-Level: Evidence from ALIS and YELLIS,* April 2007*).*

- **Academic finds a decline in the ability of A grade Mathematics Students.** Ken Todd at the University of York studied the performance of first year students in an engineering department and found that 'a student with an A at A-level mathematics today will, on average, obtain a score…which would have placed them near the bottom of the cohort fifteen years ago...' (Todd, K. L., *An Historical Study of the Correlation between G.C.E. Advanced Level Grades and the Subsequent Academic Performance of Well Qualified Students in a University Engineering Department*, *Mathematics* 2001).

- **Old CSE topics in A-level.** Dr Jonathan Ramsay and John Corner analysed maths papers between the 1960s and 2004. They found:
  - o 'The mathematical skills and topics, which previously formed part of the syllabus for children aged 14 to 16 years, and were examined at C.S.E. and 'O' level, are now set as questions in the early 'A' level units. In particular, finding areas and volumes using calculus, which used to be examined

at 'O' level, are now examined in 'A' level pure mathematics units one (P1) and two (P2) respectively, but it is the 'O' level questions which are harder.

- o 'On comparing the current 'A' level mathematics with the earlier, pre-modular examination, one observes several other worrying trends in the new examination. Its modular nature severely limits the variety and difficulty of questions, which are shorter and more predictable [and] less algebraically demanding' (Campaign for Real Education, 2004).

- **Study finds further decline in mathematics A-level.** Dr Ramsay did a further analysis of changes to Mathematics A-level between 2000 and 2005. The paper found:
  - o There was less core material per module.
  - o It had become easier to avoid difficult modules.
  - o A student could obtain a grade A in mathematics 'knowing less core material than for Specification 2000 and with only a rudimentary understanding of applied topics.'
  - o 'Finally, the requirement that candidates may resit any individual unit once only has been scrapped, i.e. there is now no restriction on the number of times a unit may be attempted, and the best result will count towards the final award. Employers and university admissions tutors will therefore be unable to distinguish between the weak student, who obtained grades A in the easy C1 and C2 units after four attempts, and the very bright student who achieved them on his first attempt' (Campaign for Real Education, 2006).

- **Students with an 'N' in 1991 score better than those with a 'B' in 2001.** Duncan Lawson, at the University of Coventry, tested students' mathematical competence. He found that 'students entering in 2001 with A-level mathematics grade B exhibit slightly lower levels of competency in these basic skills than those entering 10 years earlier with grade N' (Lawson D, *Changes in student entry competencies, 1991-2001,* 2003).

- **Government's official 'watchdog' says A-level maths reforms have made the subject easier and should be reviewed.** Reviews by the QCA (Qualifications and Curriculum Authority) found:
  - o Between 1995 and 1998 the performance in algebraic manipulation had declined. In the same period the level of structuring (leading students through the question) had increased.
  - o Between 1998 and 2004:
    - – There was a decrease in the content in some topics.
    - – Certain subjects, like mechanics, could now be omitted completely
    - – 'Increased modularity [meant] the only manipulative mathematics techniques required in the AS applications units were those developed for the early pure units. This made the techniques involved less complex than used to be the case'.
    - – There is greater predictability in the structure and content of question papers (QCA, *Review of standards in mathematics: GCSE 1999-2004 and A-level 1998-2004,* March 2006),
  - o Post-2004 A-level:
    - – The QCA admitted that 'supplementary provision that takes the standard of achievement beyond A-level' had to be considered (QCA, *Evaluation of participation in GCE mathematics,* November 2007).
    - – 'Mathematics has amongst the highest level of resitting on at least one occasion across the most units…Furthermore, it also shows the most persistent resitting, with the highest proportion of candidates repeatedly resitting units. It also shows some of the highest 'returns' to resitting with candidates gaining considerable grade improvement'.
    - – In a survey conducted by the QCA 'It was felt by the majority of respondents to our survey (61 per cent) that the two optional units do not provide sufficient 'stretch' for most able students. However, some 66 per cent of centres reported offering other strategies to provide additional stretch, including further mathematics, advanced

extension awards (AEA) and the sixth-term examination paper (STEP)'.
  - The perception that the new specifications were easier [was one of the two] most significant differences cited for the AS and overall specifications.

- **Government mathematics adviser says A-level is getting easier.** Sir Peter Williams, who conducted the Government review into primary mathematics, said 'Over 20 or 30 years, I don't think there is any doubt whatsoever that absolute A-level standards have fallen. They have edged south, continuously over a long period of time. I think all university academics and a good proportion of sixth-form teachers would agree with my assertion'. 'Sir Peter, who chairs the Advisory Committee on Mathematics Education, said comparisons of past A-levels with current papers showed that students today face equations requiring less knowledge and understanding. This had forced universities to adapt their degree courses' (*Daily Mail,* 16 July 2007).

Effect on universities

The decline in standards at A-level, in turn, causes problems for universities.

- **Remedial Numeracy classes now the norm.** A survey of vice-chancellors in 2004 showed that nearly half put on remedial classes in English and maths for undergraduates. Two thirds said that extra numeracy classes were now 'the norm' – 'poor mathematical skills were the biggest problem now facing the universities' (*Guardian,* 17 July 2004).

- **'Desperate need' to increase mathematical literacy of science undergraduates.**
  - Richard Pike, Chief Executive of the Royal Society of Chemistry 'claim[ed] that teachers increasingly want 16-year-olds to drop maths and take easier A-levels purely to boost their school's place in league tables. 'The consequence of this is that most universities run remedial mathematics courses for new chemistry students, as many have not opened a text book on the subject for over two years'.
  - Marcus du Sautoy, Professor of Maths at the University of Oxford, agreed that there was a 'desperate need' to increase the mathematical literacy of science undergraduates in Britain. 'The economic future of the country depends on having a mathematically literate population. China recognises this,' he said (*The Times,* 25 April 2007).

- **Students dropping out because of low maths skills.** A report by the National Audit Office found that science students were most likely to drop out of university, mainly because of poor mathematics. One of the authors of the report, Angela Hands said 'It could become a barrier to more scientists but it's not a council (sic) of despair because a lot of universities are trying to overcome this by putting on extra maths courses'. 'Asked whether the quality of maths teaching in schools had deteriorated, she said: 'In previous studies we have picked up evidence that maths teaching is not as good as it was' (*Times,* 26 July 2007).

- **Engineering council finds undergraduate knowledge equivalent to a 14 year old a decade earlier.** A report by the Engineering Council in 2000 found that maths and engineering students were being ordered to take remedial maths lessons 'because they do not have a basic grasp of algebra, geometry or even arithmetic when they enter university... The dramatic decline in standards means that at least 60 university science departments will order this autumn's first-year undergraduates to take extra maths classes to bring them up to scratch... One of the report's authors told the *Independent on Sunday* that many first-year undergraduates' maths knowledge is equivalent to that of a 14-year-old a decade ago' (*Independent on Sunday,* 6 August 2000).

- **Universities forced to increase length of degree because of poor skills.**
  - Imperial College changed its engineering degree from a three to a four year course because, according to the director of admissions David Robb

'half the first year is taken up with remedial teaching... Absolute standards are dropping, there is no doubt about that' (*Times Higher Education Supplement,* 10 January 2008).

- Cambridge University's director of admissions, Dr Geoff Parks, said (2009) of the current generation of science and engineering undergraduates, "They're just too slow. That's why we have to spend a lot of time priming up their maths in the first and second years. That's why most science courses are now four years instead of three" (*Times,* 11 January 2009).
- Roberto Cipolla, Professor of Information Engineering at Cambridge, said 'Five out of six applicants I interviewed recently for Cambridge entrance for engineering couldn't do a simple maths calculation: two to the power of 10. That's why students doing university science and engineering spend their first and even second years catching up on the maths my generation did at school... Based on the national curriculum pupils work in modules – discrete learning segments which give a smattering of popular knowledge across a wide area. This is where the problems begin. It's significantly weak in fundamentals' (ibid.).

International comparisons

While the Government claims 'record' results, other countries are moving further ahead in mathematics

- **PISA.** The Programme for International Student Assessment (PISA) is run by the OECD – it had three assessment cycles in 2000, 2003 and 2006. Between 2000 and 2006 the UK fell from 8th to 24th in Mathematics and 4th to 14th in Science.

- **The World Economic Forum.** The World Economic Forum Global Competitiveness Report 'examin[es] the many factors enabling national economies to achieve sustained economic growth and long-term prosperity. In 2008/9 the report ranked the UK as 28th in the quality of primary education, 28th in the quality of the educational system and 47th in the quality of math and science education.

Inequality in mathematics

The divide

Schools, and pupils, do not suffer equally from the decline in standards in maths. While independent schools continue to do rigorous qualifications, state schools are left behind.

- **Mathematics taken predominantly in independent and grammar schools.** The think tank Policy Exchange has found 'Independent and Grammar school students are far more likely to take traditional subjects such as Mathematics and science. For example, more than 22% of Physics, Chemistry and Mathematics A-level entries are in independent schools. This figure is even higher (35%) for Further Mathematics...[this puts] students at a potential advantage at universities that favour traditional science subjects, such as Imperial, UCL and Oxford.' (Policy Exchange, *The hard truth about soft subjects,* December 2008).

Independent schools are abandoning GCSEs

Independent schools are increasingly taking the IGCSE in Mathematics. The QCA refuses to acknowledge the exam, so the best schools in the country appear at the bottom of the GCSE league tables.

- **Independent schools at bottom of the league tables.**175 independent schools were recorded with 0 per cent of pupils getting five good GCSEs including English and maths because they had opted for the IGCE (*DCSF Performance Tables 2008).*

- **Increasing numbers are taking the IGCSE.** More than 250 schools in the UK take the IGCSEs through Cambridge Assessment. Worldwide entries for the June 2008 exams were 13 per cent above the previous year – over 4,000 schools in more than 100 countries take the IGCSE (Cambridge Assessment).

- **Why the IGCSE is preferred.** In November 2006 the QCA published a comparison of the IGCSE and the GCSE (QCA, GCSEs and IGCSEs compared, November 2006). They found:
  - o Both the Edexcel and the CIE IGCSE place a greater weight on number and algebra and on shape, space and measures. They offered much less than the GCSE on 'using and applying mathematics' which is predominantly defined as maths coursework. CIE offers optional coursework, and Edexcel has no coursework. Most centres choose not to take coursework options.
  - o IGCSE allows calculators for both papers. The QCA reviewers said 'it is by no means obvious that [having calculators] makes a paper easier'.
  - o The QCA reviewers concluded 'when considering depth of coverage through the questions asked in the terminal papers, there is a suggestion that CIE is slightly more demanding than both GCSE qualifications, especially for Extended papers'.
  - o The CIE exam was considered more demanding partly because:
    - There is very limited provision of formulae
    - The CIE extended paper is 'significantly more demanding' than the others
    - There are 'extensive structured questions [which] require organisation and a systematic approach
    - there are questions which require the candidates to choose their own strategies
    - there are fewer 'simple 1-mark questions'

- **Comments from Headteachers.**
  - o **David Levin Head of City of London Boys' School** explained why he is planning to extend the number of IGCSEs from six to nine, covering all the main subjects, from next year. 'For clever boys, coursework is just like jumping through hoops, it's not very interesting and reduces their contact time with teachers'. He also expressed concerns that if private schools opt out of the GCSE, it could create further divisions between state and independent schools. 'The worst case would be that we end up like South Africa, where the independent schools have formed their own exam board, so separation

between the two sectors is complete' (*The Times*, 16 December 2008).

- **Graham Able, Master, Dulwich College** said 'We have already reached a situation where the content of science GCSEs has been reduced to an extent where it is difficult to sustain the interest of intelligent, inquisitive students. Such students will only be encouraged to study science A-level if they are stimulated by appropriate challenges in their GCSE courses. We in the independent sector can switch to IGCSE -as we have done at Dulwich in Mathematics and English -but this luxury is sadly denied to our colleagues in the maintained sector through the diktat of the Qualifications and Curriculum Authority' (*The Times*, 31 August 2007).

Teaching of mathematics

We cannot hope to improve standards in mathematics without well qualified, enthusiastic teachers. But under Labour, under half of secondary teachers do not have a degree in mathematics, while over a fifth flee the profession within three years.

- **Department doesn't keep proper statistics.** The Royal Society has warned 'No accurate estimate of the population of science and mathematics teachers in the UK exists, nor can this be obtained from the available data…The government's (sic) own workforce modelling is simply not fit for purpose…It is time that people woke up to the true scale of the problem and did something about it.' (The Royal Society, *The UK's Science and Mathematics Teaching Workforce*, 2007).
  - o The report also found 'Counts of published advertisements and additional considerations show that schools face a much tougher challenge in recruiting appropriate science and mathematics teachers than is reflected in the official counts of vacancies' (ibid.).

- **More than half of secondary maths teachers do not have a degree in mathematics.** The best data show there are 30,800 secondary maths teachers, 25 per cent of whom do not have a post-A-level qualification in the subject, and more than half of which do not have a degree in maths (DCSF, *Secondary School Curriculum and Staffing Survey 2007*, table 5.1.1).
  - o Of those completing the PGCE in 2006/7 only 48 per cent of maths teachers had a degree in maths (FOI request to the TDA, 2008).

- **One in five of those who begin teaching maths in a secondary have left within 3 years** (*Hansard,* 7 January 2008, col. 230 W).

- **There is not a single primary teacher training course with a specialism in Mathematics.** In contrast there were 720 trainees taking a specialism in primary foreign languages last year (*Hansard,* 26 January 2009).

- **Government review finds primary teachers inadequately trained in maths.** Sir Peter Wiliams published his review into the teaching of primary school mathematics for the Government in 2008. He found:
  - o Of postgraduate primary trainees in 2006, only about 2 percent had a first degree in a STEM subject
  - o 'Most [teacher training] does not in itself constitute a sound basis for deep subject and pedagogical knowledge in mathematics'

Numeracy tests for teachers

The mathematical training of all teacher trainees is not at a high enough standard.

- **Teacher trainees failing numeracy test.** To become a qualified teacher, teacher trainees must pass a numeracy test:
  - o In 2006/7 23 per cent of teacher trainees failed the numeracy skills test at least once – almost twice the number as in 2000 (*Hansard,* 27 October 2008, col. 714W).
  - o 4,600 teacher trainees had to take the test three or more times – 13 per cent of teacher trainees and more than 2 and a half times the figure in 2000.
  - o A further 3,520 had to take the test twice – 10 per cent of teacher trainees and 1,000 more than in 2000/1.
  - o The QCA claims these tests are pitched at A-level between GCSE and AS Level. A sample question from the test is: '*In a test a pupil scored 18 marks out of 25. What was the pupil's score as a percentage?*'.

- **Government review admits the numeracy test is inadequate.** The Williams Review into primary mathematics (2008) admitted that the standard numeracy test for new teachers is inadequate: "The TDA numeracy skills test, which all student teachers must pass to gain QTS, is not designed to test knowledge of the primary mathematics curriculum, and can be retaken as often as necessary for the student to pass."

Inequality - mathematics teachers

Staff in the independent sector are more likely to exacerbate inequality.

- **Disparity in teacher quality.** Research by the Sutton Trust illustrates the disparity in quality between the staff in the independent and state sectors. Using its list of the 13 leading universities they found that while nearly 30 per cent of independent school teachers were graduates from these institutions, the corresponding figure for state schools was just 10.5 per cent. Independent schools had *seven times* as many staff educated at Oxbridge. Moreover, independent school teachers were also more likely to have performed well in their degree, with 60 per cent having achieved a 2:1 or higher, compared to only 45 per cent of their state school counterparts (*Sutton Trust,* January 2003).

1 House of Commons library

2 Professor Tymms. CEM Centre Durham University, *Change in GCSE and A-Level: Evidence from ALIS and YELLIS*, April 2007

3 Todd, K. L. 'An Historical Study of the Correlation between G.C.E. Advanced Level Grades and the Subsequent Academic Performance of Well Qualified Students in a University Engineering Department', *Mathematics* 2001

4 RSC, *The Five Decade Challenge,* November 2008;

5 QCA, *Evaluation of Participation in GCE Mathematics*, November 2007

6 *Daily Mail,* 16 July 2007

7 *Hansard,* 26 January 2009, col. 176W

8 DCSF, Secondary School Curriculum and Staffing Survey 2007, table 5.1.1

9 *Hansard,* 7 January 2008 col. 230W

10 DCSF *Independant Review of Mathematics Teaching in Early Year Settings and Primary Schools*, June 2008

11 Ibid.

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