



CaSE Briefing

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Briefing for Queens Speech Debate on Education, Wednesday June 2nd 2010

Two education bills were presented in the Queens speech to deliver greater freedoms to schools. They may also affect the way in which science and mathematics are taught. Giving schools more freedom over the curriculum must not lead to some ceasing to offer students three separate biology, physics and chemistry GCSEs (triple science). Accountability changes also provide an opportunity for improvement.

The **Education and Children's Bill** will introduce a slimmer curriculum giving more space for teachers to decide how to teach as well ensuring that head teachers are held properly accountable for the core educational goals of attainment and closing the gap between rich and poor.

The **Academies Bill** will enable more schools to become Academies giving them freedoms to deliver an excellent education in the way they see fit, within a broad framework where they are clearly accountable for the outcomes they deliver.

Encouraging more students to study science and mathematics is important because:

- The Government's science and mathematics recruitment targets have been missed every year since 2001¹.
- Leaders from high-tech industries consistently say that the most important factor in deciding whether to invest in the UK is the presence of a highly-skilled workforce².
- Two thirds of all employers report difficulty recruiting enough workers with science, technology, engineering and mathematical skills³.
- The availability of researchers in the workforce is falling in the UK, but rising in comparable countries with whom we compete⁴.

Improving Triple Science Provision

The number of students taking A levels in science has recently started to increase; this may partly be because of recent improvements in the provision of triple science. In 2006, about a quarter of state-maintained schools entered students into triple science, compared with half in 2009. Other evidence showing the importance of increasing provision of triple science includes:

- Ofsted found that students who study triple science were more likely to continue studying science at A level and beyond⁵.
- More specific analysis found that the odds of getting an A or B grade at chemistry A-level were increased by 76% for pupils who took triple science rather than two combined sciences⁶.
- Studying A level physics correlates with having taken physics GCSE⁷.

Only one in ten students study triple science, partly because many maintained schools do not offer it. This denies educational and career opportunities to bright students who would have excelled in studying science.

The previous Labour government had a target for 90% of schools to offer triple science and 17% of students to take it. Prior to the election, the Liberal Democrats said that they wanted to ensure that every single student could study triple science while the Conservatives said that they wanted triple science to be a basic curriculum entitlement, CaSE was disappointed not to see it in the Programme for Government.

Action: The core curriculum should continue to include studying science at Key Stage 4. CaSE believes that all schools should offer triple science, within a reasonable timeframe. The new accountability framework should audit whether schools offer triple science GCSEs, as well as what proportion of their students take them.

Improving Teaching

Ofsted and others have shown that the quality of science teaching relates to teachers' qualifications, with better teaching improving standards and achievement of students^{8, 9}. Unfortunately:

- A quarter of state-maintained 11-16 schools lack a physics specialist¹⁰.
- Specialist teachers are less likely to work in lower attaining schools or in socially deprived areas.
- In 2007, 75% of grammar school maths lessons were taught by teachers with a mathematics degree, compared with 47% of maths lessons in comprehensive schools to age 16, and 58% of comprehensives to age 18¹¹.

Headteachers who lack specialist teachers should be more encouraged to recruit them, and those who do have them should be encouraged to use resources at their disposal to retain them.

Action: The new accountability framework should include auditing schools on whether they have specialist mathematics, biology, physics and chemistry teachers.

Improving provision of specialist teachers and opportunity to study triple science should also help achieve the stated goal of closing the gap between rich and poor.

More details: CaSE can supply our full *Working Brief on Education & Skills* on request.

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¹ *The Scientific Century*, The Royal Society. March 2010

² Towards a Global Labour Market? Globalisation and the Knowledge Economy, The Work Foundation, June 2008

³ *Emerging stronger: the value of education and skills in turbulent times*. CBI/Nord Anglia, 2009.

⁴ *Performance of the UK Research Base*, EvidenceLtd for BIS, 2009

⁵ *Success in science*, Ofsted, June 2008.

⁶ *Science and Innovation Investment Framework 2004-2014: Next Steps – 2006 budget*.

⁷ *Specialist Science Schools*, Smithers & Robinson, Centre for Education and Employment Research, January 2009.

⁸ *Success in science*, Ofsted, June 2008.

⁹ *Physics in Schools and Colleges: teacher deployment and student outcomes*. Smithers & Robinson, The Centre for Education and Employment Research, University of Buckingham, 2005.

¹⁰ *Mathematics and Science in Secondary Schools. The Deployment of Teachers and Support Staff to Deliver the Curriculum*. National Foundation for Educational Research & DfES, 2006.

¹¹ *Secondary School Curriculum and Staffing Survey 2007*, June 2008.