



## Putting the Government's stated commitment to science into practice in the DfES

Evidence to the House of Commons Education & Skills Committee's annual review of public expenditure in the DfES.

1. The Campaign for Science & Engineering is pleased to submit this response following the committee's request for evidence in advance of its session with the Secretary of State for Education & Skills. CaSE is a voluntary organisation campaigning for the health of science and technology throughout UK society, and is supported by over 1,500 individual members, and over 70 institutional members, including universities, learned societies, venture capitalists, financiers, industrial companies and publishers.

2. The Annual Report of the Department for Education & Skills contains much that is of great interest, both to the scientific community and to others with an interest in the Department's work. In pointing out what we consider to be deficiencies and shortcomings in the Department's work we do not mean to imply that we have failed to recognise those things that are being done for science and engineering (which are mentioned a total of 47 times in the report).

3. We base our comments on the supposition that the Department supports the often-stated view of the Prime Minister and the Chancellor of the Exchequer that they want Britain to be the best place in the world to do science<sup>1</sup>. Some of the ways in which the educational system will contribute to this aim are set out in the *Science & Innovation Investment Framework*, to which the DfES' Annual Report refers on several occasions.

### Primary Schools

4. The chapter of the Annual Report on primary schools has separate sections on music and languages, but mentions science just once in passing. This does not adequately reflect the importance of science. Most primary school teachers are not trained scientists (for example, 47% have no physics qualification of any kind). Partly as a consequence, they lack confidence in their own ability to engage children with scientific topics. Only about half of primary school teachers say they have 'a lot of confidence' in teaching science, appreciably lower than the two thirds who are self-assured in teaching English<sup>2</sup>.

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5. A recent survey shows that only 50% of primary school teachers in England believe they have 'good resources' for science and one third of them lack the confidence to relate scientific material to everyday life<sup>3</sup>. It is plain that more needs to be done to support science at primary school level if young people are to be given the best start in contributing to the Government's agenda for science.

### **Secondary school teachers**

6. The sections of the annual report that deal with secondary education do not appear to touch on the single most crucial issue for science and mathematics – the shortage of trained specialist teachers. In mathematics alone, the country is short of about 3,400 teachers, which means that even if 40% of all British mathematics graduates were to become teachers for each of the next few years, there would still be barely enough to provide a good mathematical education for all pupils<sup>4</sup>.

7. Two-thirds of those who teach physics to 15- and 16- year olds do not have a degree in physics, and one third do not even have the equivalent on an A-level<sup>5</sup>. One in ten of the people who teach chemistry to students between the ages of 11 and 18 do not have any qualification in chemistry. Nine per cent of biology teachers have no biology qualification<sup>6</sup>. Only 64% of secondary school lessons in general or combined science are taught by people who claim to have a degree in the subject. 74% of biology lessons, 78% of chemistry lessons and 72% of physics lessons are taught by people with a relevant degree, but these figures include teachers with general science degrees<sup>7</sup>.

8. These figures are so inadequate that it is astonishing that the DfES's Annual Report does not have a detailed section on what it is doing or proposing to do to recruit more science and mathematics teachers (and indeed those in other shortage areas such as languages).

### **Further Education**

9. In ensuring that science and engineering are adequately taught at further education level, one issue of public expenditure is key. At present, colleges obtain a standard unit of resource for each student of humanities, languages and similar subjects. For students in the arts, they receive about 12% more, but this in no way meets the extra costs of teaching science or engineering, which include the need for laboratories and other practical equipment. The extra costs of music are met with a premium of 60%, and the modest premium afforded to science is dwarfed by the 72% for those studying floristry or country sports<sup>8</sup>.

10. It is difficult to justify these figures for the use of public money with the real needs of the country or with the Government's own stated wishes. The DfES should commit to a full review of these relative weightings for different subjects.

## Higher Education

11. The funding of science in higher education comes in two parts – teaching and research. The Government has spent a good deal of effort in changing the system for funding teaching in recent years, with the introduction of top-up fees. However, the playing field for public funding is not level across subjects. It is possible to sustain teaching in a university department in arts or humanities using only the money available from public sources and fees. It is not possible to do the same in the sciences. That is one reason why, during the period covered by the DfES' Annual Report, there have been a number of high profile closures of important science departments.

12. This situation has recently been made worse. Until last year, universities received twice as much public money for every science or engineering student as they did for each student in the arts. This went some way to covering the additional costs of laboratories needed in the sciences. But last year, the formula was changed in an arbitrary manner, so that students in the sciences are now only funded at the rate of 1.7 times the level of arts students. This has without question accelerated the closure of science departments, at a time when the Government claims that it wants the UK to be the a world-leader in science.

13. It is astonishing that the DfES' Annual Report for the last year makes no mention of the furore over the axing of departments, which hit the newspaper headlines, prompted a Parliamentary inquiry by the Science and Technology Committee<sup>9</sup>, and stimulated a number of questions in the House of Commons.

14. In funding research, the Government as a whole has a good record, and this is reflected in the parts of the DfES' Annual Report that regurgitate headline figures from the Government's *Framework for Science and Innovation Investment*. However, most of the new money is coming through another Department (the Office of Science and Technology within the Department of Trade and Industry). In fact, the university community is very unhappy about that part of the research budget that is challenged through the DfES (via the Higher Education Funding Council), and its Research Assessment Exercise has been criticized by two Parliamentary Committees<sup>10</sup>. Again, it is odd that the DfES' Annual Report seems to ignore this.

## Overall conclusion

15. The DfES is quite entitled to congratulate itself on the good things it is doing, and to draw attention to the work it has in hand or is planning to do soon. However, its annual report does not properly reflect the state of problems of teaching and researching in the sciences and engineering in the UK, and shows no sign that these issues are really at the forefront of ministers' minds. That would be excusable if science were a backwater or an area that the Government as a whole had chosen, for whatever reason, to sideline, or if ministers in the DfES had explained why their approach should differ from that of the Chancellor of the Exchequer and the Prime Minister. But both have said that they want Britain to be 'the best place in the world for

science'. Their ambition will not be achievable unless the attitude of the DfES is more positive and engaged with science than the impression given by its Annual Report.

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- <sup>1</sup> *Science and Innovation Investment Framework 2004-2014*, HM Treasury, 2004.
- <sup>2</sup> *A study into the professional views and needs of science teachers in primary and secondary schools in England*, Council for Science & Technology, 2000
- <sup>3</sup> *Primary Horizons: Starting out in science*, The Wellcome Trust, 2005.
- <sup>4</sup> *Making mathematics count*, Stationery Office, 2004
- <sup>5</sup> *A study into the professional views and needs of science teachers in primary and secondary schools in England*, Council for Science & Technology, 2000
- <sup>6</sup> *Secondary schools curriculum and staffing survey*, DfES, 2003
- <sup>7</sup> DfES, Secondary Schools Curriculum and Staffing Survey [SFR 25/2003]
- <sup>8</sup> More details and further concerns from teachers and lecturers in the Further Education sector are in *Opinion Forum: Science and Engineering in Further Education*, CaSE, 2005.
- <sup>9</sup> *Strategic Science Provision in English Universities*, 8<sup>th</sup> Report of the House of Commons Science & Technology Committee, Session 2004-2005.
- <sup>10</sup> *Research Assessment Exercise: A reassessment*, 11<sup>th</sup> Report of the House of Commons Science & Technology Committee, Session 2003-2004; *The Future of Higher Education*, 5<sup>th</sup> Report of the House of Commons Education & Skills Committee, Session 2002-2003.