

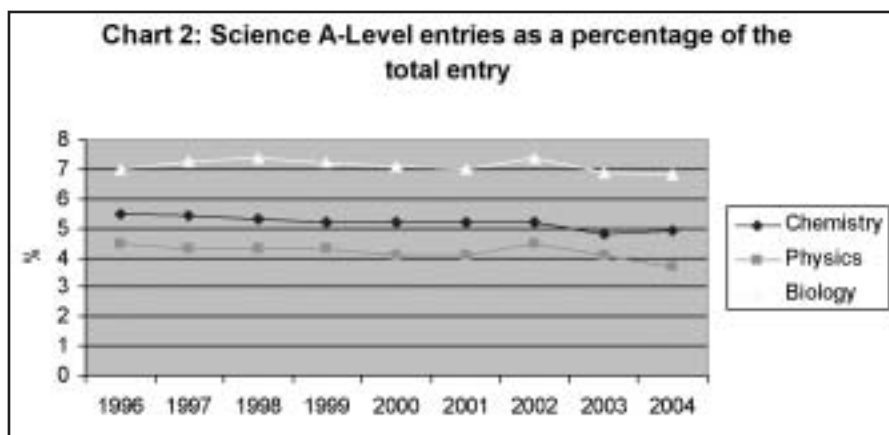
Science Education and the Science Learning Centres

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Good science education is essential to the economic and social wellbeing of the UK. Ian Gibson, Chair of the Commons Science and Technology committee, said: "Graduates in science, engineering and technology are at the heart of our political and economic agenda. We need them to drive innovative R&D, support financial services, underpin policy-making and we need teachers to inspire future generations of scientists."¹ But it is not only for the future scientific elite that good science education is needed. As Lord May, President of the Royal Society, has said: "Today, as the frontiers of scientific understanding continue to expand, reaching down into the molecular machinery by which living things assemble themselves, it is ever more important to have a scientifically informed citizenry."²

Thus science teachers have what Lord Jenkin of Roding has called a "dual mandate" to inspire and prepare both a new generation of scientists and a new generation of citizens for life in a world dominated by the effects of science and technology.



The state of science education

Nationally available data tells a contrasting story about pupils' achievements in science. Attainment in science in primary and secondary schools has risen steadily over the past 9 years (chart 1). Yet over the same period, participation in science past the age of 16 has fallen (chart 2).

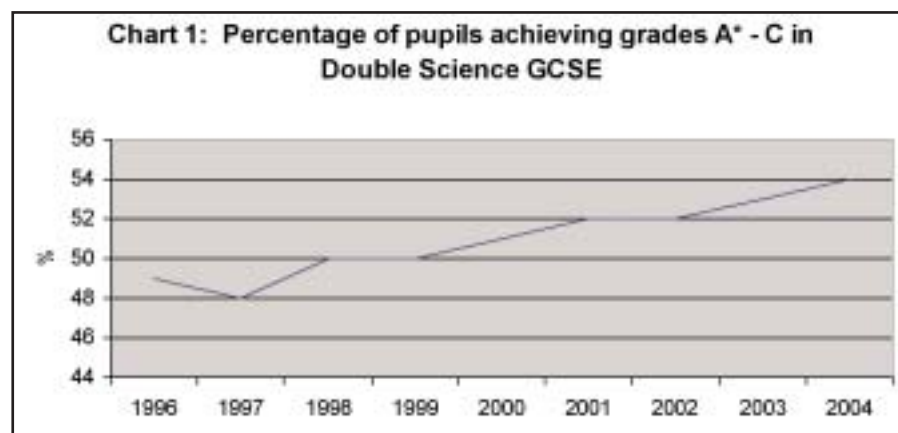
Paradoxically, while pupils are achieving better and better results in science, when given a chance to choose whether to continue their study of science, less of them are doing so.

What do students think?

An international comparative study based at the University of Oslo asked English school students about their views on science education. Some results are highlighted in the table.

On the whole, students believe science is important in their lives and for their future careers, and that everyone should study it. They do not find science excessively difficult, and many find it interesting, but students do not see themselves becoming scientists – and they do not enjoy science as much as other subjects.

This international study draws on results from 22 countries. Amongst these, despite their widely varying curricula, the developed countries share the English experience that science is less popular than other subjects. In developing countries, however, students' attitudes to science are much more positive: this suggests that there are strong social and economic factors at work, and that only part of the solution is to be found through actions in schools. Nevertheless, the low enjoyment rating of science lessons pinpoints a problem in schools.



Students' responses to statements about science in school (1277 students, most aged 14–15)³

Statement offered to student	Disagree %	Low disagree %	Low agree %	Agree %
School science is a difficult subject	25	34	28	14
School science is interesting	16	23	38	23
I like school science better than most other subjects	43	25	20	11
I think everybody should learn science at school	17	15	28	40
The things that I learn in science at school will be helpful in my everyday life	16	24	36	25
I think that the science I learn at school will help my career chances	14	19	34	33
I would like to become a scientist	58	21	13	8

The Science Learning Centres

Addressing the declining interest in science was the prime motivation behind the Science Learning Centres initiative, which was foreshadowed in the Labour Party manifesto in 2001 and taken forward in Sir Gareth Roberts' report *Set for Success*. This £51 million joint Wellcome Trust/DfES initiative has established a network of Science Learning Centres to provide high quality professional development for science teachers and technicians.

The central assertion behind the initiative is that inspired teachers are needed to inspire students. Scientific knowledge grows ever faster and the subject knowledge of a science teacher who graduated even five years ago can be seriously out of date. Furthermore, teaching methods advance in response to new technology and the changing curriculum, and teachers need to keep in touch with new techniques. This is particularly true if science teachers are to deal with the controversial issues surrounding science – issues relating to stem cell research or climate change, for example.

The nine Regional Science Learning Centres for England, funded by the DfES, are now open and offering a rich range of courses and professional development opportunities in areas ranging from contemporary science to new teaching techniques. The National Science Learning Centre opens in November in an £11 million purpose-built centre on the campus of the University of York, funded by the Wellcome Trust. Wellcome are

investing a total of £25 million in the building and operation of the National Science Learning Centre, the largest single investment they have ever made in public engagement. This residential centre will have outstanding facilities dedicated to science teachers and is unique in the world. The teachers who attend the National Science Learning Centre will be able not only to update their subject knowledge and teaching skills but also to have a uniquely high quality professional experience in the company of fellow professionals with whom they have time to reflect and share good practice. We aim to build a cadre of teachers who have attended courses at the National Science Learning Centre and who can become the present and future leaders in their subject.

Complementing other initiatives

The Science Learning Centres stand alongside other government initiatives to improve education, in particular the National Secondary Strategy, with its remit for core subjects including Science. While the National Secondary Strategy focuses strongly on the standards-raising agenda, measured in terms of attainment in external tests, the Science Learning Centres focus on making science teaching more engaging and enjoyable by improving teachers' skills and their ability to inspire. Indeed, it has been argued that relentless pressure to raise standards contributes to the decline in participation post-16: there is evidence that the pressure to get students through the curriculum and to successful examination outcomes contributes to their declining interest in

science⁴. The mission of the Science Learning Centres is to help teachers to inspire more young people towards science while at the same time maintaining increased achievement.

Measuring success

The Science Learning Centres initiative will be the subject of rigorous external evaluation by DfES and the Wellcome Trust. The evaluation study will ask many questions, including:

- How many teachers visit the Centres for professional development?
- How many report positive experiences?
- What lasting changes take place in the classrooms of those who come to the Centres?

In the end, what matters is the effect on pupils, and in particular:

- Does pupils' interest and engagement in science increase?
- Does the proportion of pupils choosing to study science post-16 increase?

Realistically, it will take time before the effects of high-quality professional development for teachers work their way through the system so they can be detected in the behaviour of students. This bold initiative is a testament to the government and the Wellcome Trust's commitment to science, and one with which they will need to keep faith.

¹Quoted in *Education in Chemistry*, May 2005

²Times Higher Educational Supplement, August 6 2004

³Jenkins, E., & Nelson, N. W. (2005). Important but not for me: students' attitudes toward secondary school science in England. *Research in Science & Technological Education*, 23(1), 41-57.

⁴Osborne, J. and Collins, S. (2000) *Pupils' and parents' views of the school science curriculum*. London: School of Education, King's College London.