

## Appendix 2

### Case study schools, including school statistics and pathways to progression

	School A	School B	School C	School D	School E	School F	School G	School H	School I	School J
<b>Background information</b>										
Number of pupils on roll (all ages)	727	855	1447	1381	917	862	1258	1385	1224	1356
Percentage of pupils on roll with SEN*, with statements or supported at School Action Plus	10.2%	0.8	2.1%	3.8%	3.2%	1.4%	3.2%	4.4%	4.1%	6.8%
Percentage of pupils on roll with SEN, supported at School Action	7.0%	1.5	3.5%	5.7%	5.8%	3.5%	21.0%	8.5%	10.2%	10.0%
<b>KS3 value added (VA)</b>										
Coverage indicator – percentage of eligible pupils included in KS2–KS3 VA	96%	89%	97%	98%	96%	98%	95%	96%	97%	96%
KS2–KS3 VA measure	100.2	103.0	100.4	100.8	100.7	101.4	99.4	101.9	99.6	101.6
<b>Science</b>										
Percentage of pupils achieving level 6 or above in science test	31%	98%	54%	45%	8%	91%	47%	75%	52%	51%
Percentage of pupils achieving level 5 or above in science test	68%	100%	84%	84%	44%	100%	75%	94%	84%	86%
Average KS3 point score per eligible pupil	34.0	44.8	37.7	36.6	31.1	42.5	35.1	39	37.3	37.7
<b>GCSE and equivalent achievements of pupils at the end of KS4</b>										
Percentage achieving level 2 (5+ A*–C) including English and mathematics GCSEs	42%	98%	66%	54%	54%	98%	43%	68%	48%	69%
Average total point score per pupil (uncapped)	375.9	549.1	404.9	341.0	407.4	489.7	338.1	419.4	339.6	407.5

\*special educational needs

	School A	School B	School C	School D	School E	School F	School G	School H	School I	School J
<b>KS2 to KS4 contextual value added (CVA) measure</b>										
KS2–KS4 CVA measure	1011.1	1001.2	999.5	997.2	1016.7	1000.7	1009.8	1016.3	979.5	1007.0
KS2–KS4 CVA upper confidence interval	1021.6	1012.9	106.4	1005.4	1025.4	1012.3	1018.5	1024.7	988.2	1015.7
KS2–KS4 CVA lower confidence interval	1000.5	989.6	992.5	989.0	1007.9	989.0	1001.1	1007.8	970.7	998.3
Coverage indicator – percentage of pupils included in KS2–KS4 CVA	99%	92%	97%	96%	98%	92%	98%	96%	97%	95%
Average number of qualifications (equivalent to GCSE) taken by pupils included in KS2–KS4 CVA	10.3	11.1	9.8	8.5	10.2	10.1	9.3	9.9	8.9	9.9
<b>GCE/CE and equivalent results</b>										
Number of students aged 16–18	0	259	429	217	296	251	153	274	180	253
<b>General and vocational A/AS or equivalent achievement</b>										
Number at end of A/AS or equivalent study		122	186	76	108	121	46	128	68	112
Average point score per student		870.6	777.6	832.1	801.3	708.2	651.5	762.8	648.3	770.9
Average point score per examination entry		222.2	207.1	200.8	215.0	219.2	174.8	196.8	187.6	226.0

## Case study schools: Pathways in science progression

### School A

#### Year 11 in 2005–6

	GCSE science experience							Other (please specify)	
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry		Physics
GCSE courses offered to this cohort (please tick)	yes		yes			yes	yes	yes	
Number of students who studied these courses	13		99			23	23	23	
Number of students examined in these courses (if different)									
Number of students gaining A*–C at GCSE in these courses	1		36			22	21	23	
Teaching time as a proportion of the school week (Y10/Y11/school week)	16.6%		16.6%			6.6%	6.6%	6.6%	
Number of teachers per class per year	1		1			1	1	1	

#### Year 12 in 2005–6 (Year 11 in 2004–5)

	GCSE science experience							Other (please specify)	
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry		Physics
GCSE courses offered to this cohort (please tick)			yes			yes	yes	yes	
Number of students who studied these courses			114			26	26	26	
Number of students examined in these courses (if different)									
Number of students gaining A*–C at GCSE in these courses			51			26	26	23	
Teaching time as a proportion of the school week (Y10/Y11/school week)			16%			6.6%	6.6%	6.6%	
Number of teachers per class per year			1			1	1	1	

#### Year 13 in 2005–6 (Year 11 in 2003–4)

	GCSE science experience							Other (please specify)	
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry		Physics
GCSE courses offered to this cohort (please tick)	yes		yes			yes	yes	yes	
Number of students who studied these courses	16		116			7	7	7	
Number of students examined in these courses (if different)									
Number of students gaining A*–C at GCSE in these courses	0		59			7	7	7	
Teaching time as a proportion of the school week (Y10/Y11/school week)	20%		20%			6.6%	6.6%	6.6%	

School C

**Year 11 in 2005-6**

	GCSE science experience							Other (please specify)	
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry		Physics
GCSE courses offered to this cohort (please tick)	yes		yes	yes	yes				
Number of students who studied these courses	10		272	4	45				
Number of students examined in these courses (if different)									
Number of students gaining A*-C at GCSE in these courses	0		210	0	22				
Teaching time as a proportion of the school week (Y10/Y11/school week)	18%		18%	18%	18%				
Number of teachers per class per year	3		3		3				

**Year 12 in 2005-6  
(Year 11 in 2004-5)**

	GCSE science experience							Other (please specify)	
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry		Physics
GCSE courses offered to this cohort (please tick)	yes		yes						
Number of students who studied these courses	10		320						
Number of students examined in these courses (if different)									
Number of students gaining A*-C at GCSE in these courses	0		211						
Teaching time as a proportion of the school week (Y10/Y11/school week)	18%		18%						
Number of teachers per class per year	3		3						

**Year 13 in 2005-6  
(Year 11 in 2003-4)**

	GCSE science experience							Other (please specify)	
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry		Physics
GCSE courses offered to this cohort (please tick)	yes		yes						
Number of students who studied these courses	10		328						
Number of students examined in these courses (if different)									
Number of students gaining A*-C at GCSE in these courses	0		210						
Teaching time as a proportion of the school week (Y10/Y11/school week)	18%		18%						
Number of teachers per class per year	3		3						



School D

Year 12 in 2005-6  
(Year 11 in 2004-5)

	GCSE science experience							Other (please specify)	
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry		Physics
GCSE courses offered to this cohort (please tick)	yes		yes			yes	yes	yes	
Number of students who studied these courses	124					12	12	12	
Number of students examined in these courses (if different)									
Number of students gaining A*-C at GCSE in these courses	57.3%		85%			100%	100%	100%	
Teaching time as a proportion of the school week (Y10/Y11/school week)	3/25		6/25			2/25	2/25	2/25	
Number of teachers per class per year	3		3			1	1	1	
Of the students considered above, how many started these courses? (if known)	AS biology	1	21			6			
	AS chemistry	1	15				4		
	AS physics	1	17					5	
	Other science qualification (please specify)	n/a	n/a			n/a	n/a	n/a	
Of the students joining from other schools, how many had each GCSE experience? (if known)	AS biology								
	AS chemistry								
	AS physics								
Other science qualification (please specify)									

School D

Year 13 in 2005-6  
(Year 11 in 2003-4)

	GCSE science experience								
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)
GCSE courses offered to this cohort (please tick)				yes					
Number of students who studied these courses				209					
Number of students examined in these courses (if different)				207					
Number of students gaining A*-C at GCSE in these courses									
Teaching time as a proportion of the school week (Y10/Y11/school week)				9/50 2 week tt					
Number of teachers per class per year									
Of the students considered above, how many started these courses? (if known)	AS biology			12					
	AS chemistry			8					
	AS physics			10					
	Other science qualification (please specify)			n/a					
Of the students joining from other schools, how many had each GCSE experience? (if known)	AS biology			No data					
	AS chemistry			No data					
	AS physics			No data					
	Other science qualification (please specify)								

School E

Year 11 in 2005-6

		GCSE science experience								
		Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)
GCSE courses offered to this cohort (please tick)		yes			yes					
Number of students who studied these courses		34			167					
Number of students examined in these courses (if different)		34			167					
Number of students gaining A*-C at GCSE in these courses		5.9%			59.9%					
Teaching time as a proportion of the school week (Y10/Y11/school week)		4/25			4/25					
Number of teachers per class per year		2 in Y10, 3 in Y11			2 in Y10, 3 in Y11					
Of the students considered above, how many started these courses? (if known)		AS biology			26					
		AS chemistry			22					
		AS physics			14					
		Other science qualification (please specify)								
Of the students joining from other schools, how many had each GCSE experience? (if known)		AS biology			17					
		AS chemistry			6					
		AS physics			6					
		Other science qualification (please specify)								



School E

Year 12 in 2005-6  
(Year 11 in 2004-5)

	GCSE science experience								
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)
GCSE courses offered to this cohort (please tick)	yes			yes					
Number of students who studied these courses	45			163					
Number of students examined in these courses (if different)									
Number of students gaining A*-C at GCSE in these courses	4.4%			59.1%					
Teaching time as a proportion of the school week (Y10/Y11/school week)	As before			As before					
Number of teachers per class per year	As before			As before					
Of the students considered above, how many started these courses? (if known)	AS biology			35					
	AS chemistry			24					
	AS physics			22					
	Other science qualification (please specify)								
Of the students joining from other schools, how many had each GCSE experience? (if known)	AS biology			12					
	AS chemistry			7					
	AS physics			8					
Other science qualification (please specify)									

## School E

### Year 13 in 2005–6 (Year 11 in 2003–4)

	GCSE science experience								
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)
GCSE courses offered to this cohort (please tick)	yes			yes					
Number of students who studied these courses	52			141					
Number of students examined in these courses (if different)									
Number of students gaining A*–C at GCSE in these courses	13.7%			64.8%					
Teaching time as a proportion of the school week (Y10/Y11/school week)	As before			As before					
Number of teachers per class per year	As before			As before					
Of the students considered above, how many started these courses? (if known)	AS biology			23					
	AS chemistry			6					
	AS physics			8					
	Other science qualification (please specify)								
Of the students joining from other schools, how many had each GCSE experience? (if known)	AS biology			4					
	AS chemistry			2					
	AS physics			1					
	Other science qualification (please specify)								

Year 11 in 2005-6

		GCSE science experience								
		Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)
GCSE courses offered to this cohort (please tick)				yes			yes	yes	yes	
Number of students who studied these courses				60			58	58	58	
Number of students examined in these courses (if different)										
Number of students gaining A*-C at GCSE in these courses				57			58	58	58	
Teaching time as a proportion of the school week (Y10/Y11/school week)				20%			8%	8%	8%	
Number of teachers per class per year				3			1	1	1	
Of the students considered above, how many started these courses? (if known)		AS biology		13			32	32	32	
		AS chemistry		13			31	31	31	
		AS physics		2			22	22	22	
		Other science qualification (please specify)								
Of the students joining from other schools, how many had each GCSE experience? (if known)		AS biology		8						
		AS chemistry		6						
		AS physics		3						
		Other science qualification (please specify)								

## School F

### Year 12 in 2005-6 (Year 11 in 2004-5)

	GCSE science experience									
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)	
GCSE courses offered to this cohort (please tick)				yes		yes	yes	yes		
Number of students who studied these courses				75		37	37	37		
Number of students examined in these courses (if different)										
Number of students gaining A*-C at GCSE in these courses				67		37	36	37		
Teaching time as a proportion of the school week (Y10/Y11/school week)				20%		8%	8%	8%		
Number of teachers per class per year				3		1	1	1		
Of the students considered above, how many started these courses? (if known)	AS biology			8		22	22	22		
	AS chemistry			3		10	10	10		
	AS physics			3		9	9	9		
	Other science qualification (please specify)									
Of the students joining from other schools, how many had each GCSE experience? (if known)	AS biology			6						
	AS chemistry			9						
	AS physics			none						
	Other science qualification (please specify)									

School F

Year 13 in 2005-6  
(Year 11 in 2003-4)

	GCSE science experience								
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)
GCSE courses offered to this cohort (please tick)				yes		yes	yes	yes	
Number of students who studied these courses				69		43	43	43	
Number of students examined in these courses (if different)									
Number of students gaining A*-C at GCSE in these courses				63		43	43	43	
Teaching time as a proportion of the school week (Y10/Y11/school week)				20%					
Number of teachers per class per year				3		1	1	1	
Of the students considered above, how many started these courses? (if known)	AS biology			13		23	23	23	
	AS chemistry			4		27	27	27	
	AS physics			1		17	17	17	
	Other science qualification (please specify)								
Of the students joining from other schools, how many had each GCSE experience? (if known)	AS biology			6					
	AS chemistry			5					
	AS physics			none					
Other science qualification (please specify)									

School I

Year 11 in 2005-6

		GCSE science experience									
		Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)	
GCSE courses offered to this cohort (please tick)		yes		yes		yes	yes	yes	yes		
Number of students who studied these courses		17		103		58	33	33	33		
Number of students examined in these courses (if different)		10		103		57	33	33	33		
Number of students gaining A*-C at GCSE in these courses		0		50		26	33	33	33		
Teaching time as a proportion of the school week (Y10/Y11/school week)		20%		20%		20%	6.7%	6.7%	6.7%		
Number of teachers per class per year		2		3		2	1	1	1		
Of the students considered above, how many started these courses? (if known)		AS biology		9			13				
		AS chemistry		5				17			
		AS physics		6						13	
		Other science qualification (please specify)									
Of the students joining from other schools, how many had each GCSE experience? (if known)		AS biology			4						
		AS chemistry			3						
		AS physics			5						
Other science qualification (please specify)											

School I

Year 12 in 2005–6  
(Year 11 in 2004–5)

	GCSE science experience								
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)
GCSE courses offered to this cohort (please tick)	yes		yes		yes	yes	yes	yes	
Number of students who studied these courses	20		92		43	60	60	60	
Number of students examined in these courses (if different)	16		92		43	60	60	60	
Number of students gaining A*-C at GCSE in these courses	0		48		25	56	59	60	
Teaching time as a proportion of the school week (Y10/Y11/school week)	20%		20%		20%	6.7%	6.7%	6.7%	
Number of teachers per class per year	2		3		2	1	1	1	
Of the students considered above, how many started these courses? (if known)	AS biology		3			20			
	AS chemistry		2				30		
	AS physics		4					20	
	Other science qualification (please specify)								
Of the students joining from other schools, how many had each GCSE experience? (if known)	AS biology		2						
	AS chemistry		2						
	AS physics		5					1	
	Other science qualification (please specify)								

## School I

### Year 13 in 2005–6 (Year 11 in 2003–4)

	GCSE science experience									
	Single Award	Single Award applied	Double Award (modular)	Double Award (coordinated)	Double Award applied	Biology	Chemistry	Physics	Other (please specify)	
GCSE courses offered to this cohort (please tick)	yes		yes			yes	yes	yes		
Number of students who studied these courses	19		154			31	31	31		
Number of students examined in these courses (if different)	16		154			31	31	31		
Number of students gaining A*–C at GCSE in these courses	0		68			31	31	31		
Teaching time as a proportion of the school week (Y10/Y11/school week)	20%		20%			6.7%	6.7%	6.7%		
Number of teachers per class per year	2		2			1	1	1		
Of the students considered above, how many started these courses? (if known)	AS biology		3			20				
	AS chemistry		3				18			
	AS physics		4					15		
	Other science qualification (please specify)									
Of the students joining from other schools, how many had each GCSE experience? (if known)	AS biology		2							
	AS chemistry		3							
	AS physics		3							
	Other science qualification (please specify)									



## Case study schools

### School A

*Ofsted report 2004*

School A is an inner-city boys' comprehensive school which educates 720 pupils. It is a voluntary-aided school with a Roman Catholic foundation. Boys come from a wide area across south London to attend the college and it is oversubscribed. The population of the college includes a very high proportion (85%) of pupils from minority heritages, with African and Caribbean groups predominating. The proportion of pupils eligible for free school meals is above average. The proportion of pupils with a mother tongue that is not English is very high (32%), although the number at an early stage of learning English is small. Pupils' standards when they enter the school in Year 7 are below the national average.

The proportion of pupils who have special educational needs is average. The percentage of pupils with statements of special educational needs is above the national average. However, the pupil population represents the full range of abilities, including gifted and talented boys. Standards have risen in science and the weaknesses in accommodation for science have been removed with the completion of the new science block.

There is some very good teaching in Years 10 and 11, especially in geography, mathematics and science. Standards at GCSE are in line with the national average and well above those in similar schools. Good standards are achieved in English, mathematics, science and history. Achievement is good in all year groups. This is mainly due to the very positive attitudes of the pupils and the good teaching they receive, especially in geography, mathematics and science.

#### ***Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school***

The head of science reported in a questionnaire that she kept pupils informed about the sort of work carried out at A level and gave careers advice (especially about medical careers).

### School B

*Ofsted report 2003*

School B is an average-sized selective grammar school for boys. There are 837 on roll, including 240 in the sixth form. The school has a very diverse and changing population from a range of ethnic heritages. The percentage of pupils whose mother tongue is not, or believed not to be, English is high. No pupils are at an early stage of learning English.

It is a very effective school. It is very successful in ensuring that boys achieve well and attain high (and often very high) standards academically, and fosters good personal attitudes and values in pupils for learning and for one another.

Sixth form provision is very good overall. The sixth form caters very well for its current students through a very good range of academic courses, and provides a very positive environment for their personal development. The quality of teaching is very good; students make good progress in relation to their qualifications on entry and learn well.

Biology: very good; standards are high and students make good progress throughout the modular course. Good teaching and very good management of the subject support excellent learning. Chemistry: good; students achieve well in relation to their prior attainment because of the good teaching they receive and their

excellent attitudes to learning. Physics (this subject was sampled rather than fully inspected): results in 2003 were significantly higher than national averages. In 2002 two-thirds of students taking the examination gained an A or B grade.

Main strengths are:

- teachers' knowledge and understanding of their subject;
- the high expectations of student achievement;
- the meticulous attention to examination requirements.

Teachers apply their subject knowledge effectively and set clear objectives for their students. In lessons challenging tasks involve students in a demanding range of activities. Students value the opportunities provided to sharpen their analytical skills and to think critically.

There are very good classroom relationships with groups of students that underpin the very good teaching seen in the sixth form. Students make good gains in knowledge and understanding because of their high levels of motivation and their positive responses to the teachers' high aspirations. The attention paid to the welfare of pupils is comprehensive and thorough. Pupils are provided with very good guidance and support for their academic and personal development from their induction to the school to the discussion and advice that prepares them for life after school. Systems for ensuring their health and safety are good. Pupils see the value and esteem attached to the achievements of their elders and are soon ready to emulate such successes.

### ***Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school***

The head of science reported the following factors in an interview.

- Specialist teaching. Teachers only teach to their own discipline and enable pupils to gain a greater awareness of real life applications of the subject.
- Detailed knowledge of the subject increases confidence in delivery. Pupils pick up on the teacher's expert knowledge and feel confident in the teacher's ability to support them and ensure good outcomes.
- An emphasis on practical approaches to teaching. Pupils enjoy doing practical work, they remember more about what they have done and it plays to the strength of the staff who are good at organising practical activities.
- Career aspirations – there is partly a cultural element to this. Pupils and parents focus on progression routes to perceived high-status careers like medicine and dentistry. High aspirations are generally encouraged by the school.
- Success leads to success. Pupils' and parents' awareness of success at GCSE as well as in post-16 courses encourages succeeding cohorts to take science subjects.
- Pathways into higher education. Relatively few pupils choose to do pure sciences at degree level and very few go on to engineering. The majority opt for medicine, dentistry, veterinary medicine and related subjects.

## School C

### *Ofsted report 2006*

The school is larger than average. Pupils come from the local town and from neighbouring rural and urban areas. In 2006, over 50 learners joined the sixth form from other local schools. Pupils enter the school with above-average standards; the proportion of pupils who have learning difficulties and/or disabilities is well below average. There are small numbers of pupils from minority ethnic groups and a few who have English as an additional language. The proportion of pupils eligible for free school meals is below average. The school has held specialist status in science and humanities since September 2006 and it also has Leading Edge status and Investors in People and Healthy Schools awards. It shares its own good practice widely – for example, a large group of middle-school pupils were enjoying being taught by a teacher in a wizard's costume whilst investigating 'the magic of science' in an after-school lesson.

In the sixth form and both Key Stages 3 and 4, the school is outstanding in working in partnership with others to promote learners' well-being. Similarly the overall personal development and well-being of the learners is outstanding, and the curriculum and other activities are outstanding in meeting the range of needs and interests of learners. The care, guidance and support received by pupils is also judged by Ofsted to be outstanding.

Pupils reached standards which were above average in mathematics and science.

### ***Pupil voice***

Pupils chose science because 'they liked it', 'wanted to pursue it further' and they recognised the use of science in job opportunities. They found science challenging, really interesting, topical and 'something many do not do'.

Science is seen as important by pupils, parents and school staff. If you are doing well in A level science you are judged to be impressive.

### ***Teacher voice***

Asked 'To what do you attribute your good uptake of post-16 science?' teachers responded as follows.

- A clear focus on pupil learning.
- There is a supportive staff and good teaching.
- The school offers detailed analysis of pupil progress followed by appropriate action, and assessment for learning.
- There is focused marking.
- eLearning revision resources purchased from SAM learning have helped.
- Peer assessment is going well.
- The school is good at pushing pupils to their limits.
- The school has a very good headteacher and head of sixth form.
- Focus is also on social aspects – five (male) of twenty science staff took part in a dancing competition.

- Science is seen as interesting, worthwhile and the department as successful.
- Good science qualifications provide improved employment opportunities.

### ***Strategies influential in promoting post-16 science by enhancing transition arrangements***

In the questionnaire the head of science reported that 60 GCSE pupils participate in a series of 6 A\* sessions, which are based on the big ideas in science and how they impact on our lives and ideas – this is voluntary and has run for the last two years; most pupils went on to take A level science(s).

### ***Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school***

In reporting back to the headteacher the consultant made the following key points.

- The science department comes across as enthusiastic and committed with good teacher/teacher and teacher/student relationships.
- There is an atmosphere of a commitment to learning (e.g. the provision of new courses such as ‘Twenty-first century science’, Triple Award science and A level applied science), of sharing ideas and experiences, and of appropriate risk taking.
- The refurbished laboratories provide a positive learning environment, reflect student views of what laboratories should be like and have some engaging student displays. The provision of the observation classroom and ICT suite provide further enhancement.
- On a wider level, participation in the dancing competition where staff are in the position of learners in front of students helps build student/teacher relationships of trust and support.

The likely reasons for success are a mix of contributory factors – good teaching, committed staff, some good resources, students who are appropriately pushed to succeed, good staff/student relationships, a sense of the interesting or enjoyable aspects and the importance of science, and good tracking and analysis of pupil performance allied to appropriate action and support. The introduction of applied science at A level has been positively received by Year 12 students following the course. Year 13 students saw science as worthwhile, an appropriate challenge and a good route to enhanced career opportunities.

## **School D**

### *Ofsted report 2006*

This larger-than-average secondary school serves a small market town and a wide rural area. It became a specialist arts college in September 2004. The proportion of pupils known to be eligible for free school meals is one quarter of the national average. Nearly all pupils are of white British ethnicity and have English as their first language. The percentage of pupils with learning difficulties and/or disabilities is broadly in line with the national average, although the percentage with statements of special educational needs is half that found nationally.

The school works well in partnership with others to promote learners’ well-being and pupils throughout the school receive outstanding care, guidance and support which in the sixth form is good. The curriculum and other activities provide well for the range of needs and interests of learners.

During their first three years at the college, pupils make good progress so that results for Year 9 pupils in the core subjects of English, mathematics and science have been consistently above average.

### ***Pupil voice***

Pupils chose science because they 'liked it'. They wanted to pursue it further and 'enjoyed the challenge'. Good GCSE results were motivating and pupils recognised use of science in job opportunities. They felt that science was highly regarded generally. They found it 'interesting' and were mindful that many degrees require one A level in a science subject.

### ***Teacher voice***

Asked 'To what do you attribute your good uptake of post-16 science?' teachers responded as follows.

- There are good GCSE results, good staff, and good teamwork.
- There is a culture of achievement – success is valued, science is good to take at A level.
- Staying on is generally due to rural isolation – the distance to nearby towns.
- Pupils like the school, and if there was not a sixth form many would not participate in post-16 education.
- Pupils are encouraged to stay on into sixth form.

### ***Strategies influential in promoting post-16 science***

As reported in the questionnaire by the head of science:

- moving to grade BB for acceptance onto post-16 science courses (CC would be accepted 'on probation').

### ***Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school***

As reported in the questionnaire by the head of science:

- stable staffing;
- good GCSE results;
- more students staying on in school overall.

The science department comes across as a committed and largely cohesive team with good teacher/teacher and teacher/student relationships. There were no negative comments from students about science staff. The edge of the school location for the science department results in staff breaks largely being taken together where teaching and learning issues are discussed regularly. The three laboratories that have been refurbished provide a positive learning environment. A chemistry masterclass with a colleague at another school received very positive comments.

The likely reasons for success are a mix of contributory factors:

- good teaching and committed staff;
- a school climate where success is valued;
- students who are appropriately pushed to succeed;
- good staff/student relationships;
- a sense of the interesting or enjoyable aspects and importance of science;
- Year 12 and Year 13 students seeing science as worthwhile, well-regarded or respected, an appropriate challenge and a good route to enhanced career opportunities.

## School E

*Ofsted report 2006*

School E has a low number of pupils who are eligible for free school meals. Almost all the pupils are of white British ethnicity. The proportion of pupils with a statement of special educational needs is in line with the national average, although the number of pupils with learning difficulties is below average. The college has a stable population; almost all pupils who join the college in Year 9 complete their compulsory education there. The college, along with some of the middle schools in the local area, is part of the national pilot for a shortened Key Stage 3: about two-thirds of the pupils take their national Key Stage 3 tests at the end of Year 8 before they join the college. 25% of the sixth form join the college at the start of Year 12, having attended other local secondary schools. The school gained specialist status in the visual arts in September 2004.

The college is outstandingly effective at all key stages and in the sixth form. The work the school does in partnership with others to promote learners' well-being and their overall personal development is outstanding throughout the school, as is the curriculum and other activities in meeting the range of needs and interests of pupils. The care, guidance and support given to learners are also outstanding.

Pupils' attainment on entry to the college is average. Good – sometimes outstanding – teaching, an excellent curriculum carefully tailored to meet the range of pupils' needs, and superb care and support enable pupils to make good, and sometimes outstanding, progress.

Since 2004, pupils have made less progress in English than in science and mathematics during Year 9; while standards in mathematics and in science have been above the national average, standards in English have remained in-line.

### ***Pupil voice***

Pupils were influenced by teachers with 'infectious enthusiasm for their subject'. They had found the subject interesting pre-16 and appreciated the 'relevance of the subject to the world we live in'. They enjoyed the 'practical aspect of courses'.

Extracurricular experiences at Key Stages 3 and 4 influenced their enjoyment and interest.

## **Teacher voice**

When asked 'To what do you attribute your good uptake of post-16 science?' teachers replied:

- good specialist quality teaching at both pre- and post-16;
- a history of good results;
- staff support;
- pupil monitoring as a high priority both in the department and in the school – staff are not prepared to allow pupils to underachieve if it is at all possible to do so;
- experienced staff who are approachable and available.

## **Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school**

As reported in the questionnaire by the head of science:

- a very strong record of results;
- excellent quality teaching;
- the reputation of the department is excellent and so the students from other local schools, whom we take a large number of sixth formers, are keen to attend;
- in the local area, the school has the best reputation for A level sciences.

## **School F**

*Ofsted report 2004*

School F is an 11–18 mixed selective grammar school of below average size. The number on roll is about 850 pupils, of which 250 are in the sixth form. It has recently formed a sixth form consortium with two other schools. Very few pupils leave or join the school at other than the usual time. Approximately 35% of pupils are of white British heritage, 56% are of Asian heritage, and the remainder have a range of different backgrounds.

The number of pupils who speak English as an additional language is high. The percentage of pupils identified as having special educational needs is well below the national average. About half of the pupils come from local secondary schools into the sixth form. The school is a specialist technology college, a Leading Edge school, has two awards for achievement, has Investors in People status, has an Artsmark Award, a Sportsmark Award and is involved in many local and national initiatives.

The overall effectiveness of the sixth form and the school is good, as are enrichment of the curriculum and out of school activities. The school provides good support, advice and guidance for pupils and has effective links with the community.

Standards in Year 9 are above average in science and most other subjects. Standards in physics are above average and improving, reflecting very good achievement and the teaching is very good. Standards in chemistry are above average and very good teaching and learning here helps pupils to achieve well.

Subject provision, particularly in science, design and technology, history, English, art and modern languages, is enhanced through after-school clubs, masterclasses, revision sessions and outside visits. The school also supports primary schools by providing mathematics masterclasses, helping with science and providing technical support. Good extracurricular opportunities exist, including a science club.

### ***Strategies influential in promoting post-16 science specifically by helping transition***

The head of science reported the following in a questionnaire.

- Physics and chemistry after-school workshops are offered from the start of the AS course to help weaker students come up to the same level as the more able Triple Award students.
- In chemistry this support is taken up by students who come to the sixth form from local secondary schools and weaker Double Award students.
- In the early part of Year 12 the students' work is monitored by staff to ensure that the correct sets of notes are being kept.

### ***Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school***

The head of science reported the following in a questionnaire.

- Stable, experienced staff provide specialist teaching from Year 9 onwards.
- The head of physics is a good female role model who takes great pains to make physics accessible and practical for girls.
- Staff regularly discuss a range of careers open to students with science qualifications.
- AQA modular examinations at Key Stage 4 over the past two years have increased our percentage of A/A\* grades and this has led to a higher uptake at A level.
- Staff are willing to give extra support to students having difficulties.

## **School G**

### *Ofsted report 2006*

School G is a larger-than-average mixed comprehensive school, with around 1260 pupils, including 159 sixth formers. It has community status and has been a specialist in the performing arts since September 2003. The large majority of pupils are of white British heritage. Others mainly have Asian or Caribbean backgrounds. Most pupils are from typically average socio-economic backgrounds. The proportion eligible for free school meals is average. The percentage identified with special educational needs is average, but very few have statements of special educational needs. There is less mobility than in most schools. The school gives learners at all key stages and the sixth form a good education.

Pupils' starting points in Year 7 are below the national average, and their literacy skills are well below average. They make good progress, especially in English and science, and reach above-average standards overall in the Year 9 National Curriculum tests.



### **Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school**

The head of department reported that the good uptake of post-16 science courses was due to:

- a department composed of well-qualified staff who teach in their specialist subject areas;
- staff who are good teachers and who want the best for their pupils;
- a critical mass of students who achieve success in the subject, encouraging others to follow them;
- students who have confidence in their teachers, because of the enthusiasm their teachers demonstrate for their subjects;
- a widely-held understanding that achievement in science courses provides a wide range of career opportunities;
- the school management team being supportive of the science department – one member of the department has responsibility for raising the profile of science-based careers;
- extracurricular visits to universities.

Students commented that:

- they took courses ‘that would be useful and because of subject enjoyment’;
- they thought that other students ‘who didn’t take science were influenced by the perception that science is hard at post-16’;
- this year, the Year 11 students were able to shadow sixth formers for a day and all felt that this was a positive feature that helped with both subject choices and whether to stay at school or go to college;
- although the work was harder post-16, this was coupled with a greater sense of achievement and they would make the same choices again;
- science is seen as one of the highest profile subjects in the school. The fact that all students now take Double Award (historically many only took Single Award GCSE) is seen as increasing the profile of the subject further;
- parents see the science department as being professional and of high profile in the school.

### **School H**

*Ofsted report 2006*

School H is of above average size for an 11–18 school. It is situated in a rural area and has been oversubscribed for the past 15 years. The percentages of pupils eligible for free school meals, with English as an additional language, from areas of social and economic deprivation and from minority ethnic backgrounds are well below the national averages. The proportion of pupils with learning difficulties is below average, but the percentage of pupils with a statement of special educational needs is above average. The school houses an Autistic Strategic Facility and became a specialist mathematics and computing school in 2003. Pupils’ attainment when they start at the school is above the national average.

In Year 9, pupils gain well above average higher grades in mathematics and science. The school does outstanding work in partnership with others to promote learners' well-being throughout the school. The care, guidance and support given to learners in Key Stage 3, Key Stage 4 and the sixth form are good and the personal development and well-being of learners of all ages are outstanding. The enjoyment learners gain from their education is exceptional.

***Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school***

In an interview the head of science reported:

- a strong focus on making science interesting, exciting and enjoyable throughout the school;
- an emphasis on learning and discussing rather than note copying;
- the effective use of support books which allows pupils to be engaged by the science content;
- a balanced view of the curriculum, so sciences are not studied separately at GCSE as this would mean both cramming and skewing the timetable;
- that students are confident and well-prepared by the end of GCSE so they have a good start for A level (separate science would imply an elite group – all doing Double Award ensures that they are all at the same starting point);
- the focus of the school on 'Every Child Matters'. This does not require them to 'chase league tables';
- honest and careful course guidance provided by teachers taking account of the students' skills and their chances of success;
- strong parental support, placing value on science A level (and throughout the school). Many parents are working in science-related industries or medical fields, or are teachers;
- a high staying-on rate, where many pupils have tailored their GCSE choices with A level routes and university courses in mind;
- success breeding success; good results from Key Stage 2 onwards mean the pupils feel confident about doing science and are willing to keep working at it;
- that the students themselves are excellent role models for the younger pupils;
- that the students have confidence in their teachers; the teachers who would teach the new applied science course were carefully chosen to demonstrate to pupils that this was a valuable course which would be well-managed;
- high career and academic aspirations by all in the school community. Of the Oxbridge entries this year, five of six offers are to study science or science-related courses;
- the excellence of teachers and technicians.

## School I

### *Ofsted report 2006*

School I is larger-than-average with 1239 pupils on roll, including 186 students in the sixth form. It was awarded science college status in September 2004. The school is part of a 14–19 consortium consisting of three secondary schools. Pupils' attainment on entry to the school is average. The proportion of pupils with learning difficulties and disabilities is lower than the national average. Almost 90% of pupils are from white British backgrounds; the proportion of pupils from minority ethnic groups and those with English as an additional language is well below that in most schools. The school serves an area with low deprivation and high stability. The proportion of pupils claiming free school meals is low but rising. Attendance is average.

The school is described by Ofsted as 'satisfactory' overall and it works well in partnership with others to promote learners' well-being both pre- and post-16. Standards on entry to the sixth form are described as below average and the retention rate is good.

Inspectors also comment that science college status has started to accelerate developments in teaching and learning across the school, and the school's designation as a specialist science college has already achieved some impact in promoting creative teaching and investigative learning.

### ***Pupil voice***

When asked 'What influenced your choice of subjects?' students replied that they were 'good at science', 'enjoyed it', '[I was] interested' and that 'science is easy'. They also expressed a pragmatic view concerning the market value of science subjects: 'A level subjects are good to study'. They cited 'a good GCSE experience', 'teachers who know you' and 'teachers who take GCSE single always go on to post-16' as influences, indicating that clear pathways and confidence in provision are important to them, reinforced by the observation that the department 'has a good record of results'. They liked the nature of science: 'there is always an answer, not like history and English where it is only about opinions'. Perhaps unsurprisingly they like 'lots of practical' work. Others commented: science teachers 'gave more support than other subject teachers'; 'we had breakfast clubs before the GCSE exams that gave us moral support'.

The majority of the students had come through the Triple Award science route and acknowledged that they felt special 'in a way' because they knew that what they were doing was hard (they study all three sciences in double GCSE allocation of time). They felt that science had credibility and 'commanded respect' because it was difficult, and that it gave them confidence knowing that they could 'handle difficult things'.

Asked more generally why they think that science is popular post-16, one student's immediate observation that 'science is well-run, organised, and teaching is good' provoked laughter in the other students – not because they disagreed, but because he had been atypically intense in his response. They all cited 'Unsafe chemistry', a presentation by the head of science when they were in Year 7, given as an award for a particularly good piece of work, as 'inspiring'. They could still describe the actual experiments.

Their experience at Key Stage 3 and Key Stage 4 had been seminal in recruiting them to science at a later stage. It was 'good' and 'enjoyable' with 'good teaching, engaging, [they] helped you to understand'. They described it as 'interactive and challenging'.

## **Teacher voice**

In discussion, when asked, 'To what do you attribute your good uptake of post-16 science?' teachers replied as follows.

- Students **know** they will be well taught. It's too important for their courses to take risks.
- Feedback from students to each other is good, the sixth form is sociable and word gets round.
- Information from brothers and sisters.
- Good teacher/student relationships – the effect filters down to younger students.
- Students get good feedback, they know what their strengths are.
- A level teaching is very professional.
- The head of faculty meets parents' and pupils' aspirations. They feel safe.
- Results are improving.

## **Strategies influential in promoting post-16 science**

The head of science described the following strategies.

- Well-resourced, high priority Triple Award science courses have been developed.
- AS/A2 teachers are used as lead teachers on Triple Award courses so that the teaching develops links between GCSE and AS showing, for example, how certain topics are developed post-16.
- They try to make all Triple Award topics as relevant as possible.
- There are high academic expectations of all Triple Award groups.
- The use of extracurricular trips, visits and talks are used to enthuse the students and to raise the profile of all three sciences – for example in this year, trips to the *Physics at Work* Exhibition in Cambridge and the National Space Centre in Leicester, science week activities (talks by Imperial College post-doctoral researchers on nanotechnology and challenging physics, and the Institute of Physics' Annual Schools lecture (*The Science of Colour*)).
- Deliberate strategies to recruit and retain students into the sixth form are monitored by senior staff.
- There is investment in basic equipment so that all students can get 'hands-on' experience.
- A bridging course finished in GCSE and continued at A level.
- Extensive science enrichment – there are activities throughout Key Stage 3, Key Stage 4 and Key Stage 5. Each year group experiences one external and one internal enrichment event per year, and there is science-based work experience.
- Sixth form science is given equal priority with other key stages.
- Teachers promote A level work throughout Key Stage 3 and Key Stage 4 to establish expectations and

knowledge.

### **Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school**

In feeding back to the line manager the external consultant made the following points:

- science specialism
  - a sense of identity in learning science
  - a strong enrichment programme in science
- strong subject teaching
  - good subject knowledge, questioning, the challenge appeals to higher-attaining students
  - good preparation – teachers know what they have to do and what has to be done
  - well equipped – lots of hands-on, individual experiments
  - good internal science CPD – driven by expertise in the department not by external courses
  - passion for and belief in what the department is seeking to achieve
- student confidence in teachers and departments
  - they know the pathways and the teachers
  - a strong student grapevine gets the message across
  - a professional outlook by the department, a sense of being 'client-centred'
- students are 'known' academically and personally by the teachers.

## **School J**

### *Ofsted report 2005*

School J is a larger-than-average 11–18 comprehensive school. The present school roll is 1360, with a large and growing sixth form. Pupils come from ethnically diverse backgrounds. Increasingly over the last few years there have been more boys than girls. About two-thirds of this school's pupils come from Asian backgrounds and a fifth from black Caribbean and African backgrounds. A high percentage of pupils do not have English as a first language, but few are at an early stage of learning English. The number of pupils with learning difficulties and disabilities is broadly in line with the national picture, but above the national average number of pupils have a statement of special educational needs. A small percentage of pupils come from refugee backgrounds and a number of pupils are in the care of the LA. Just over a fifth of pupils are entitled to free school meals; this is above the national average. Mobility in and out of the school is generally low. The school acquired specialist status in science and mathematics in 2002 and Leading Edge status in 2003. A city learning centre is attached to the school.

School J is an outstanding school, which enables its pupils to learn well. Pupils enter the school with average

attainment but by the time they leave in the sixth form they achieve standards that are well above the national average. The staff are very committed to their pupils and the level of care, and the support shown to them is outstanding. Pupils with learning difficulties and disabilities are well supported.

Over the past five years the school has invested considerable time in developing a range of initiatives aimed at improving the teaching and learning. These include the acquisition of specialist science status, the provision of an effective literacy programme and a strong focus on the achievement of black African Caribbean boys. The school has also contributed well to the wider educational development of neighbouring schools with its outreach work. The school ensures a safe environment in which to work, and the professional development of staff is given a very high priority.

The sixth form is both effective and efficient. Students achieve very well because of the high quality education they receive. Advice, guidance and support are excellent. Students are individually tutored about what to study and firmly mentored if efforts waver. In turn, in their role as peer mentors, they help others settle into sixth form life, making the transition from Year 11 a smooth one.

In 2005 the highest A level results were in mathematics, physics, chemistry, media and history. Students learn together well, collaborating on problem-solving activities, for example in science and mathematics. Teachers often use skilful questioning techniques, where students are encouraged to make extended contributions to classroom discussion.

### ***Key factors that are influential in achieving high levels of take-up of science subjects post-16 in this school***

The head of science reported the following in an interview.

- Aspirations and expectations are high – ethnic groups, pupils and parents have high expectations and are focused on progression routes, particularly to perceived high status careers like medicine and dentistry.
- The pre-16 experience – the school makes every effort to ensure that the experience of science between the ages of 11 and 16 is very rewarding for pupils so that they are keen to choose science.
- The school offers lots of positive curriculum enrichment activities which pupils and parents value, e.g. international experience.
- The school's science college status helped to create a good environment and status due to refurbished laboratories and ICT resources.
- Success leading to success; pupils' and parents' awareness of success at GCSE as well as post-16 encourages successive cohorts to take science subjects.
- The analysis of data – the department uses data very effectively to target pupils and ensure that pupils meet their potential and are encouraged to take science post-16.

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