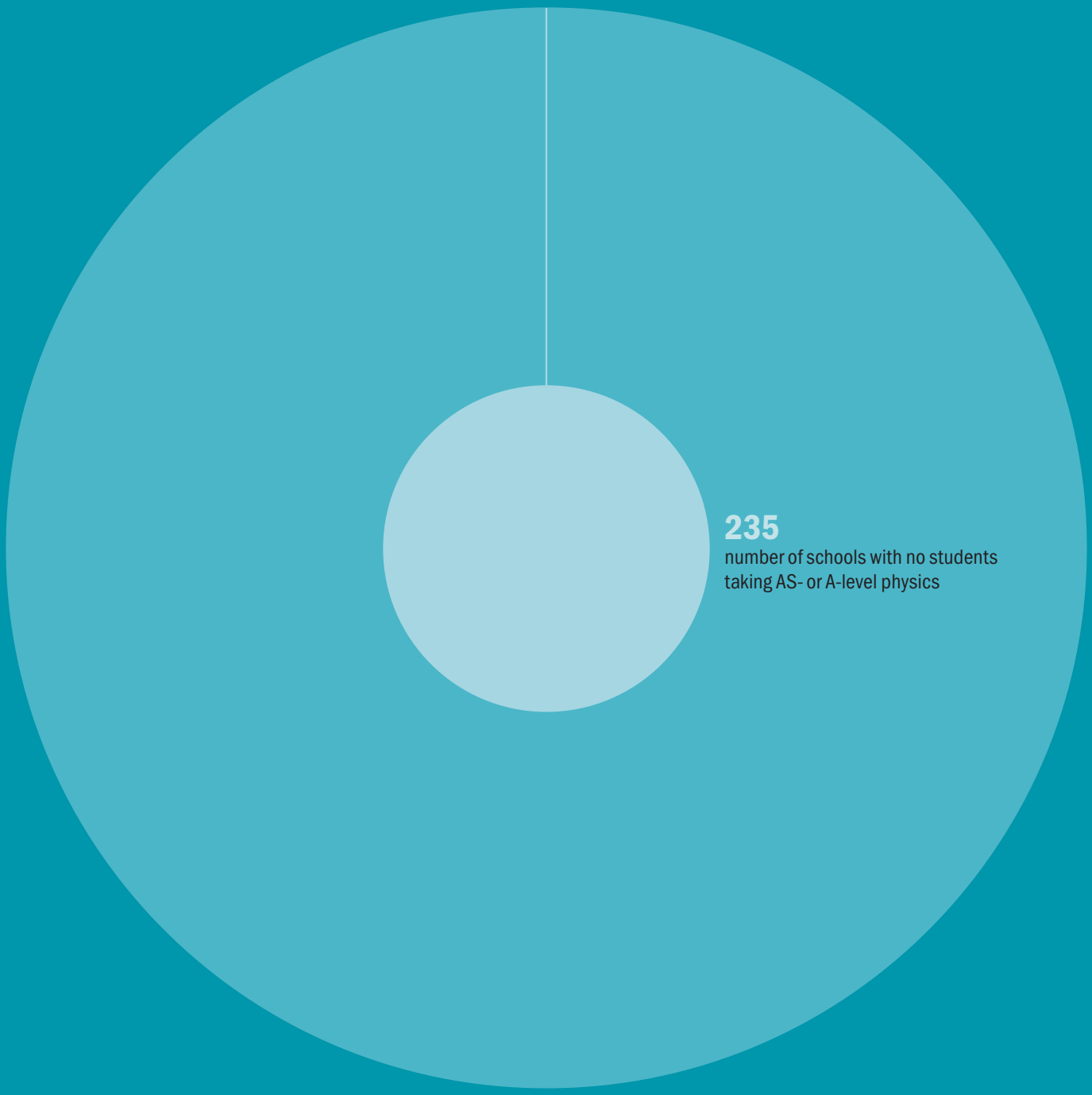
A Royal Academy of Engineering, Institute of Physics and Gatsby Foundation Report | **December 2015**

School sixth forms with no entries for A-level physics

A data report



ROYAL ACADEMY OF ENGINEERING
IOP Institute of Physics
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This data report is a product of a collaborative data project between the **Royal Academy of Engineering**, the **Institute of Physics** and **Gatsby Foundation**. The project uses government data sets to produce evidence-based research into a range of issues relating to STEM education.

These issues typically relate to the uptake of, attainment at, and progression to a range of STEM subjects and utilises data for learners at school, colleges and universities.

Acknowledgements
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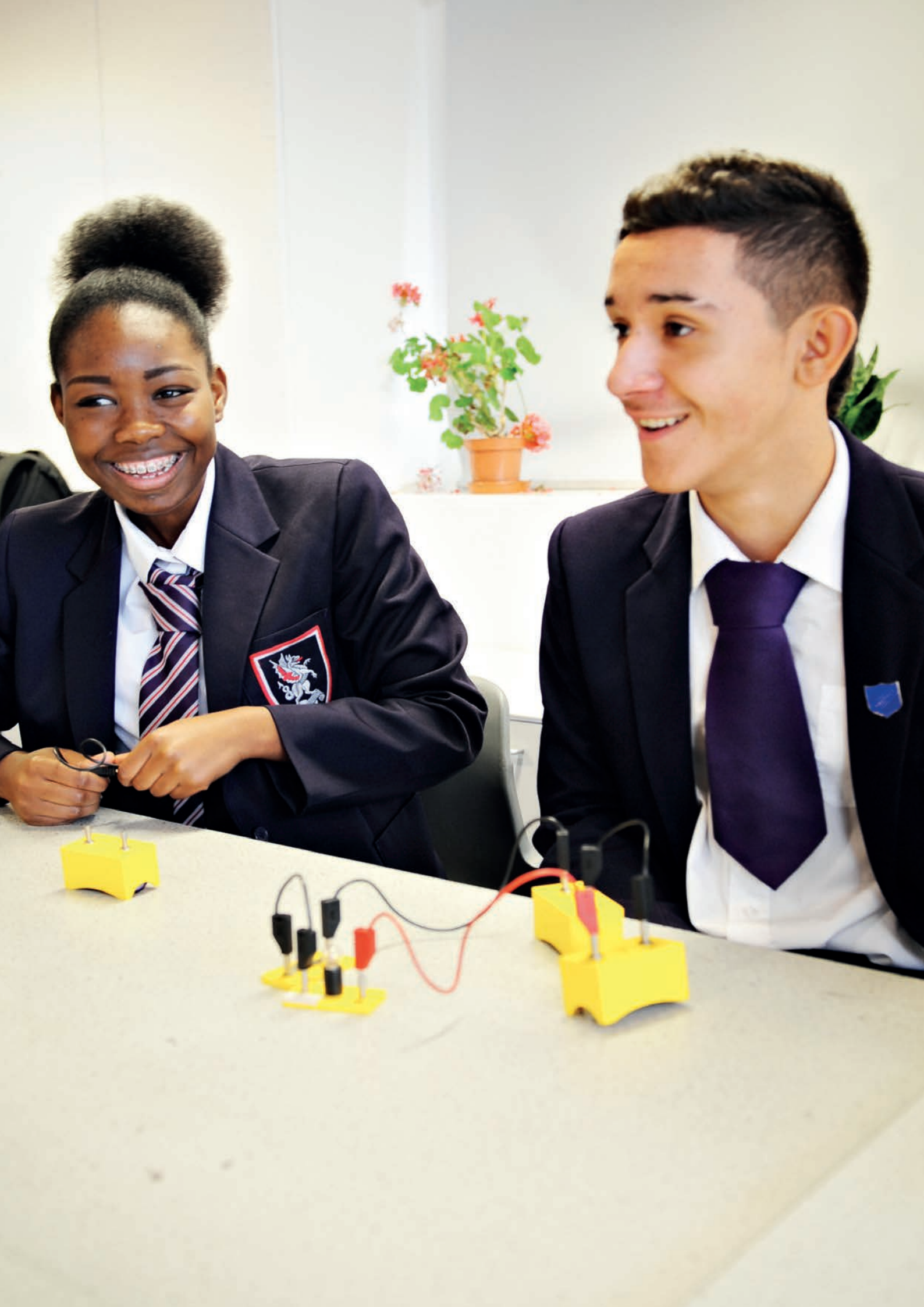


Introduction

This report is based on a statistical investigation of the physics uptake in schools that offer A-levels in their sixth forms. The uptake of A-level maths is also included in places to align this study with the Department for Education's research that was publicised in The Guardian[1] last year. This study aims to refresh that work by using up-to-date data, and to extend upon it by including school size, school type, and the gender of students at school sixth forms both with and without physics entries.

There are 2,591 school sixth forms in England and 235 of them have no students taking AS- or A-level physics. The purpose of the statistical investigation was to determine whether there were any patterns in the data and any underlying causes for the zero entries. The report also makes the important distinction between schools that do not *offer* physics A-level and those that *offer* it but have zero take-up.

If schools do not *offer* physics, then they present a subset of their students – those wanting to study physics and/or maths A-levels who want to stay at (or join) the school – with a dilemma: compromise their choice of subjects or go to another school.

If no one chooses to take physics in a school, then the problem is a different one. This separate issue may be more reflective of the experience that they had in the school they attended to the age of 16. This is more usefully examined by looking at schools that do not *send* students on to A-level physics rather than at schools that do not *enter* students at A-level. This analysis appears in part in the Institute of Physics publication It's Different for Girls: The influence of schools[2].

[1] www.theguardian.com/education/2014/jul/17/schools-fail-enter-pupils-science-maths-a-levels

[2] www.iop.org/education/teacher/support/girls_physics/file_58196.pdf

Summary of findings

The main findings of this study are described below and explored in greater detail in parts 1 and 2 of this report.

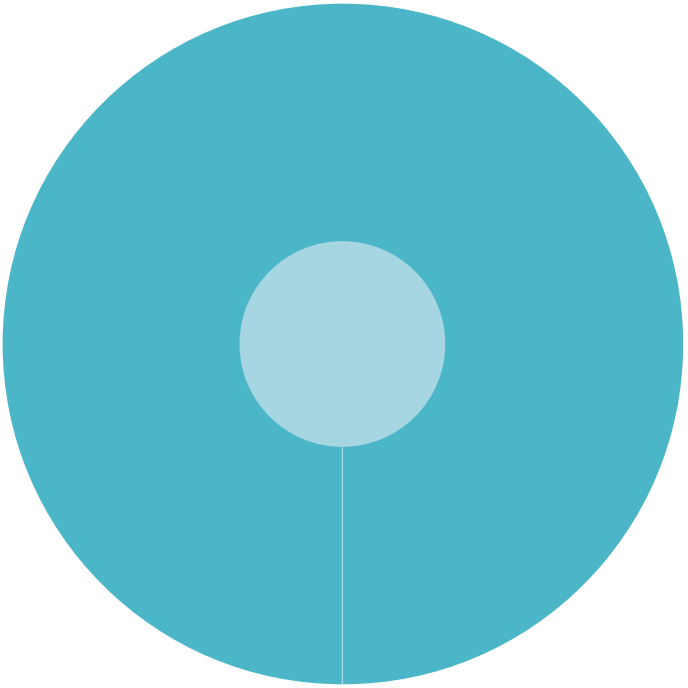
Part 1: Analysis of the data

A What are the global figures?

In 2013/14, 235 (9.1%) school sixth forms in England had no students entered for AS- or A-level physics; a subset of 79 of these 235 school sixth forms also had no maths entries. There were a further six schools that had entries for physics but not for maths.

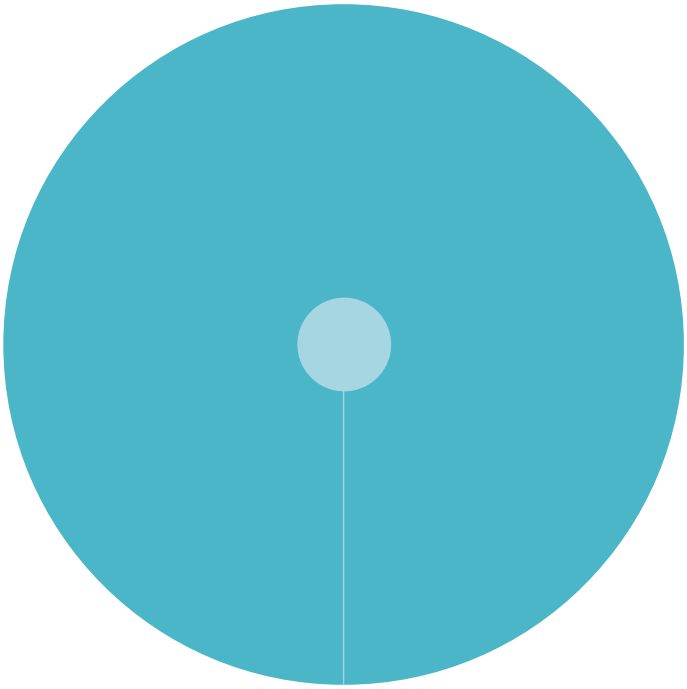
While it may seem somewhat concerning that 9.1% of school sixth forms have no entries for AS- or A-level physics, just 1.9% (7,767) of all AS- and A-level students study at such sixth forms.

School sixth forms



9.1% of school sixth forms have no entries to AS- or A-level physics

Students



Just 1.9% of students studied at school sixth forms with no entries to AS- or A-level physics

B How have the global figures developed over time?

Compared to 10 years ago, the proportion of school sixth forms that enter no students to physics is almost identical. However, during this time, the proportion of the overall AS- and A-level cohort that attends such school sixth forms has fallen by 25%.

C What is the effect of school size?

The majority (80%) of school sixth forms that did not enter students for AS- or A-level physics were schools in the smallest quintile of A-level cohort size.

D What is the effect of gender?

Of the larger sixth forms that did not offer A-level physics, seven of the top 10 schools were single-sex girls' schools

E Are there any differences between independent and state-maintained schools?

Whether or not school sixth forms have entries to AS- or A-level physics does not appear to be related to the type of school.

F Are there any regional variations?

There is some regional variation in the proportion of school sixth forms that do not have any entries to AS- or A-level physics, although this variation does appear to be at least partially an artefact of the number of small school sixth forms in the region. Regions also perform differently in terms of the average sizes of school sixth forms that have no entries to physics, which has considerable consequences in terms of the number of students who are affected by the issue.

G How do physics and maths compare with other subjects?

There were more school sixth forms that did not run A-level physics compared with A-level maths, biology, chemistry and history.

H How have the facilitating subjects fared over the past decade?

There has been significant variation in the number of school sixth forms that have no entries for each of the facilitating subjects, and the number of students studying at such sixth forms. Further maths and maths have performed particularly well, while geography, French and English literature have fared considerably less well.

I Students' movement between schools and associated likelihood of studying physics

Students who studied their GCSEs at one of the 235 schools whose sixth forms which had no entries at AS- or A-level for physics were much more likely to move school between their GCSE and sixth-form studies, than those who studied their GCSEs at a school which had physics entries in the sixth form (62.1% and 28.7% moved, respectively). The likelihood that students who moved school between their GCSE and sixth form studies would go on to study AS- or A-level physics did not appear to be significantly affected by whether the school they moved from had AS- or A-level physics entries.

J Small AS- and A-level physics classes

The risk of small AS- and A-level physics classes being deemed unviable due to their size could be a threat for many of the 453 school sixth forms with AS-level physics classes of between one and five students, as well as the 780 school sixth forms with A-level physics classes in the same size range.

Part 2: Survey of prospectuses and schools

K Are schools not *running* or not *offering* A-level physics

Of the 191 school sixth forms that had no entries for A-level physics, and which had four or more students entered for A-levels, 100 did not offer the subject at A-level, and 62 did. It was not possible to find out why the other 29 schools did not have anyone entered for physics.

L What reasons do schools give for not offering?

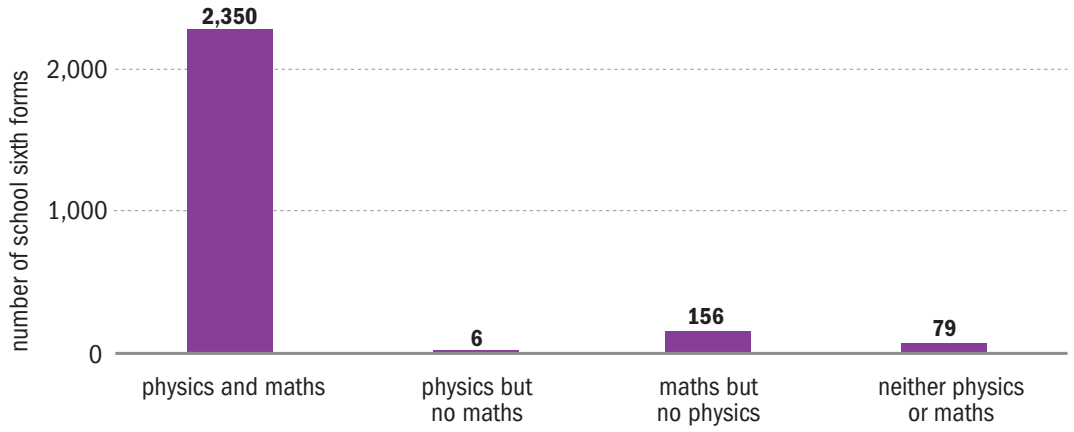
The most common reasons that schools provided during telephone interviews for not offering A-level physics were: lack of student demand, the school being too small to support the subject, a lack of physics specialists and there being other local providers that offered academic subjects.

Part 1: Analysis of the data

Data from the National Pupil Database for AS- and A-levels taken in 2014 was analysed to answer a series of questions about the overall numbers and how various features of the schools affected those numbers. In places, the figures for maths are included alongside those for physics. This is to build upon the maths element of the Department for Education research which prompted the creation of this report.

A What are the global figures?

Figure 1: Breakdown of the number of school sixth forms with or without entries for AS- or A-level physics and maths



- In 2014 there were 2,591 school sixth forms in England that entered at least one student for an AS- or A-level qualification. The total number of students studying AS- or A-levels at these schools was 416,491, with slightly more girls than boys.
- Of those 2,591 schools, 235 (9.1%) had no entries for physics AS- or A-level. There was a total of 7,767 students (4,954 girls and 2,813 boys) who were studying towards their A-levels in those schools, representing 1.9% of the total cohort.

Table 1: Students studying at school sixth forms

	Girls		Boys		Total number
	Number	%	Number	%	
Students taking AS- or A-levels in school sixth forms	220,977	53.1	195,514	46.9	**416,491**
Students taking AS-level physics in school sixth forms	9,697	24.5	29,880	75.5	**39,577**
Students taking A-level physics in school sixth forms	5,539	21.7	19,934	78.3	**25,473**
Students studying in school sixth forms without any entries for AS- or A-level physics	4,954	63.8	2,813	36.2	**7,767**

B How have the global figures developed over time?

The proportion of school sixth forms that had no entries to AS- or A-level physics and the proportion of the student cohort studying at these establishments were tracked over the last 10 years.

- The proportion of school sixth forms with no entries to AS- or A-level physics started and ended the last 10-year period at the same level (just over 9%). The high point for the period was 10.9%, which came in 2009.
- During the same 10-year period, the proportion of the AS- and A-level student cohort that was studying at these school sixth forms decreased by 25%, from 2.5% to 1.9%.
- The relative size of school sixth forms with no entries to AS- or A-level physics has therefore reduced.

Figure 2: School sixth forms with no entries to AS- or A-level physics, and the proportion of the student cohort that attends them

C What is the effect of school size?

All 2,591 schools with sixth forms were split into quintiles of around 520 schools, based on the total number of AS- and A-level students present in the school. Quintile one contains the smallest 1/5th of school sixth forms, whilst quintile five contains the largest 1/5th of school sixth forms.

- 188 of the 235 school sixth forms with no AS- or A-level physics entries lay in the 1st quintile, which comprises school sixth forms with between 1 and 57 students.
- School sixth forms in the 1st quintile are five times more likely than school sixth forms in the next smallest (4th) quintile to have no entries for AS- or A-level physics.
- In each of the remaining three quintiles of schools (3rd to 5th quintile), fewer than 1% of the schools were without a physics entry at AS- or A-level.

Figure 3: School sixth forms – what percentage have no physics or maths entries?

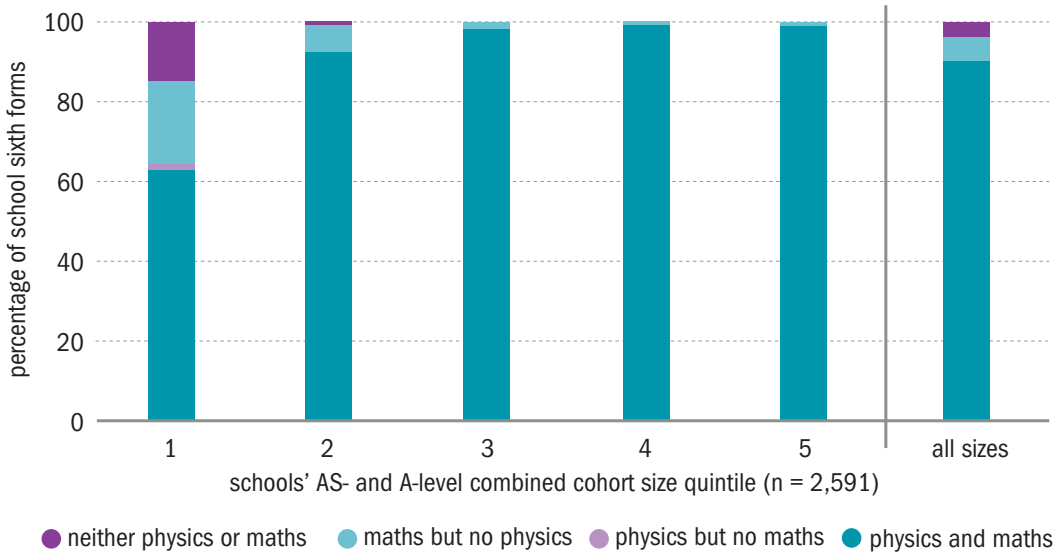


Table 2: School sixth forms – what percentage have no physics or maths entries?

Subjects	Q1		Q2		Q3		Q4		Q5		All sizes	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Neither physics nor maths	76	14.4	3	0.6	0	0	0	0	0	0	79	3
Maths but no physics	112	21.2	35	6.7	5	1	2	0.4	2	0.4	156	6
Physics but no maths	6	1.1	0	0	0	0	0	0	0	0	6	0.2
Physics and maths	334	63.3	482	92.7	508	99	515	99.6	511	99.6	2,350	90.7
Total	**528**	**100**	**520**	**100**	**513**	**100**	**517**	**100**	**513**	**100**	**2,591**	**100**

- It is particularly small school sixth forms in the smallest size quintile (those in the 0–10, 11–20 and 21–30 student groups) that most often have no entries for physics.
- The proportion of school sixth forms with no entries for AS- or A-level physics progressively reduces as the school size gets larger.
- School sixth forms not having any entries for AS- or A-level physics become far less common when they have more than 80 students.

Table 3: Number of schools with or without physics and maths entries, by fine school sixth form size band

Subjects	The number of AS- or A-level students at the school sixth form										
	0–10	11–20	21–30	31–40	41–50	51–60	61–70	71–80	81–90	91–100	101–110
Neither physics nor maths	52	9	8	4	1	2	1	1	0	1	0
Maths but no physics	29	24	28	13	12	11	12	8	4	3	3
Physics but no maths	3	1	0	2	0	0	0	0	0	0	0
Physics and maths	34	47	43	64	86	75	74	86	98	82	99
Total with no physics	**81**	**33**	**36**	**17**	**13**	**13**	**13**	**9**	**4**	**4**	**3**
Total	**118**	**81**	**79**	**83**	**99**	**88**	**87**	**95**	**102**	**86**	**102**
No physics %	**68.6**	**40.7**	**45.6**	**20.5**	**13.1**	**14.8**	**14.9**	**9.5**	**3.9**	**4.7**	**2.9**

D What is the effect of gender?

Significant gender differences exist, both in terms of the school types and non-participation by male and female students. To assess these differences, the schools were divided into quintiles based on the number of males or females studying at each school sixth form. Subject entries by the respective genders were used to create **figures 3** and **4**, and **tables 4** and **5**, below.

- Of the total number of schools with girls studying at them (which includes both co-educational and single-sex), 474 or 19% did not have any girls entered for A-level physics. The equivalent number for boys was 236 or 10.1%.

Figure 4: School sixth forms – what percentage have no physics or maths entries (girls' entries only)?

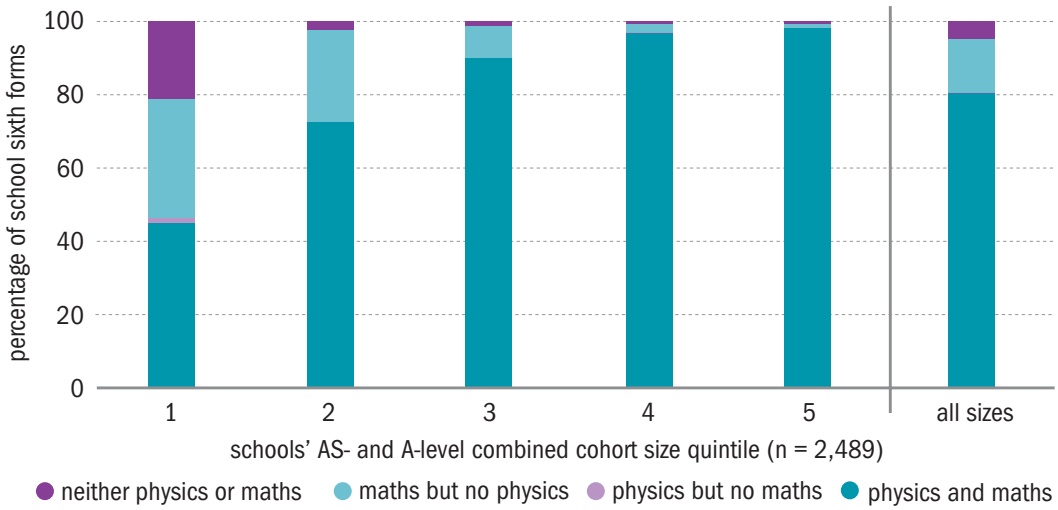


Figure 5: School sixth forms – what percentage have no physics or maths entries (boys' entries only)?

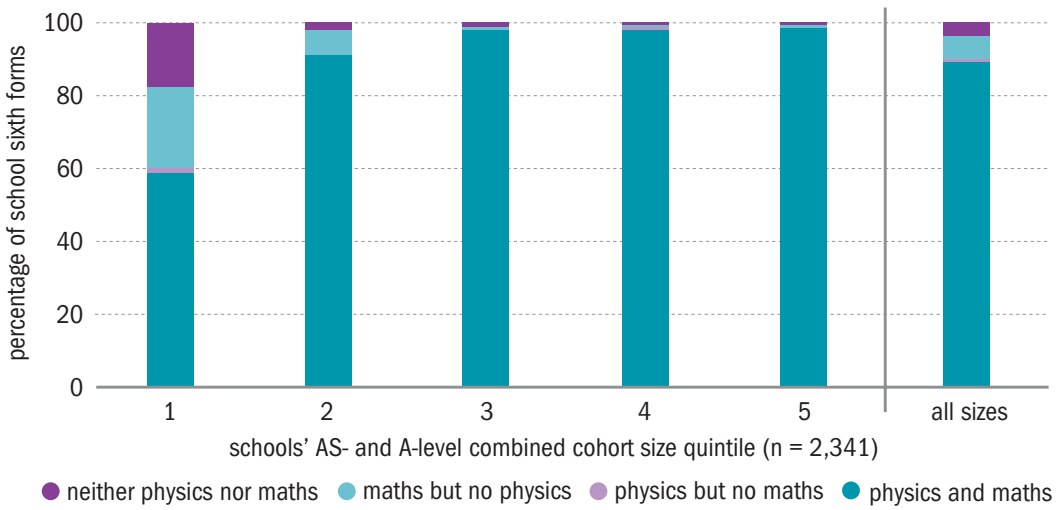


Table 4: School sixth forms – what percentage have no physics or maths entries (girls' entries only)?

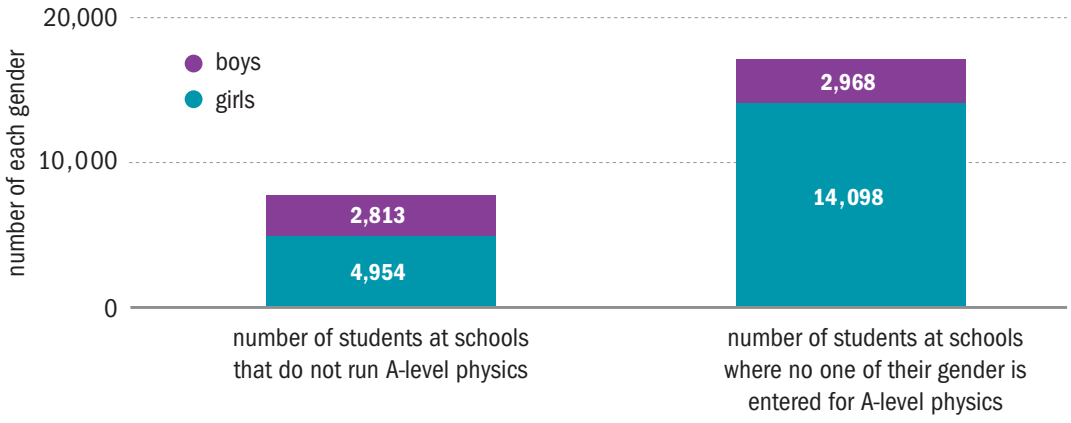
Subjects	Q1		Q2		Q3		Q4		Q5		All sizes	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Neither physics nor maths	100	20.9	13	2.5	4	0.8	2	0.4	2	0.4	121	4.9
Maths but no physics	158	33	126	24.5	47	9.4	14	2.8	8	1.6	353	14.2
Physics but no maths	6	1.3	1	0.2	0	0	1	0.2	0	0	8	0.3
Physics and maths	215	44.9	374	72.8	450	89.8	488	96.6	476	97.9	2,007	80.6
Total	**479**	**100**	**514**	**100**	**501**	**100**	**505**	**100**	**486**	**100**	**2,489**	**100**

Table 5: School sixth forms – what percentage have no physics or maths entries (boys' entries only)?

Subjects	Q1		Q2		Q3		Q4		Q5		All sizes	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Neither physics nor maths	74	17.1	7	1.5	4	0.8	2	0.4	2	0.4	89	3.8
Maths but no physics	101	23.3	34	7.3	4	0.8	5	1	3	0.6	147	6.3
Physics but no maths	4	0.9	1	0.2	0	0	1	0.2	0	0	6	0.3
Physics and maths	255	58.8	423	91	465	98.3	475	98.3	478	99	2,099	89.7
Total	**434**	**100**	**465**	**100**	**473**	**100**	**483**	**100**	**483**	**100**	**2,341**	**100**

- At the 474 school sixth forms with no girls entered for AS- or A-level physics, there were 14,098 girls studying AS- or A-levels. The corresponding number for boys was far fewer at 2,968.

Figure 6: Number of students entered for AS- or A-levels at school sixth forms where no one (or no one of their gender) is entered for physics



- Four of the top seven largest school sixth forms that did not run A-level physics were single-sex girls' schools.
- However, overall there were proportionally fewer single-sex girls' schools with no AS- or A-level physics entries than co-educational schools with no physics entries.
- Nationally, only 116 boys studied at the 12 single-sex boys' schools that did not run A-level physics. The equivalent figure for single-sex girls' schools is 1,406 at 27 schools.

Table 6: Comparing the number of single-sex and co-educational schools with or without entries to physics and maths

Subjects	Single-sex girls' schools		Single-sex boys' schools		Co-educational schools	
	No.	%	No.	%	No.	%
Neither physics nor maths	7	2.2	7	3.9	65	3.1
Maths but no physics	20	6.3	5	2.8	132	6.3
Physics but no maths	1	0.3	0	0	5	0.2
Physics and maths	290	91.2	169	93.4	1,890	90.3
Total	**318**	**100**	**181**	**100**	**2,092**	**100**

E Are there any differences between independent and state-maintained schools?

- Student entries for AS- or A-level physics do not appear to be significantly related to whether the school sixth form is independent or state-maintained.

Table 7: Comparing the number of Independent and state-maintained school sixth forms with or without entries to physics and maths (sixth forms from largest four cohort size quintiles only)

Subjects	Independent		State-maintained	
	No.	%	No.	%
Neither physics nor maths	1	0.3	2	0.1
Maths but no physics	4	1.2	40	2.3
Physics but no maths	0	0	0	0
Physics and maths	323	98.5	1,697	97.6
Total	**328**	**100**	**1,739**	**100**

F Are there any regional variations?

Some regional variation does exist in the prevalence of school sixth forms without AS- or A-level physics entries. Isolating the mechanisms that are responsible for these regional variations is difficult. We can, however, describe the regional differences that exist in the size of school sixth forms that have no entries for AS- or A-level physics, and the number of students who are affected by this (**table 8**).

- The average size of school sixth forms with no entries to AS- or A-level physics is greatest in the South East (45.6 students), and least in the North East (13.8 students).
- The South East again fares worst in terms of the proportion of students who study at school sixth forms without any entries to AS- or A-level physics (3.2%), while the North East again fares best (0.4%).
- The West Midlands is a region that has a relatively high proportion of school sixth forms that have no entries to AS- or A-level physics. The potential for this to inhibit the subject choices of students is limited because these school sixth forms are relatively small (26.4 students).

Table 8: Regional variation in the prevalence of school sixth forms without entries to AS- or A-level physics, and the number of students at such school sixth forms

Government office region	All school sixth forms			School sixth forms that have no entries to AS- or A-level physics		
	No. of school sixth forms (% national school sixth forms)	No. of students at these school sixth forms (% national students)	Average no. of students per school sixth form	No. of school sixth forms (% region's school sixth forms)	No. of students studying at these school sixth forms (% region's students)	Average no. of students per school sixth form
North East	93 (3.6)	15,602 (3.7)	167.8	5 (5.4)	69 (0.4)	13.8
North West	253 (9.8)	37,769 (9.1)	149.3	29 (11.5)	774 (2.0	26.7
Yorkshire and the Humber	218 (8.4)	35,815 (8.6)	164.3	27 (12.4)	992 (2.8)	3.7
East Midlands	222 (8.6)	38,179 (9.2)	172	12 (5.4)	399 (1.0	33.3
West Midlands	307 (11.8)	40,872 (9.8)	133.1	34 (11.1)	898 (2.2)	26.4
East of England	311 (12.0)	52,876 (12.7)	170	24 (7.7)	640 (1.2)	26.7
London	450 (17.4)	78,751 (18.9)	175	34 (7.6)	1,292 (1.6)	38
South East	467 (18.0)	72,474 (17.4)	155.2	51 (10.9)	2,328 (3.2)	45.6
South West	270 (10.4)	44,153 (10.6)	163.5	19 (7.0)	373 (0.8)	19.7
Total	**2,591 (100)**	**416,491 (100)**	**160.7**	**235 (9.1)**	**7,767 (1.9)**	**33.1**

G How do physics and maths compare with other subjects?

[3] www.russellgroup.ac.uk/for-students/school-and-college-in-the-uk/subject-choices-at-school-and-college/

The data was used to assess how many of the 2,591 school sixth forms had entries in each of the Russell Group facilitating subjects[3].

- More school sixth forms do not run A-level physics compared with A-level maths, biology, chemistry and history.
- Of the eight subjects analysed in the study, maths was the one that had entries at most school sixth forms, and further maths had the least.
- Maths A-level did not run at 86 school sixth forms out of 2,591. These school sixth forms were attended by a total of 1,136 students (763 female and 373 male). Four of the eight largest of these school sixth forms were single-sex girls' schools.
- In terms of the number of students who are studying at school sixth forms without any entries for a specific subject, physics displays middling results. There are more than twice as many students studying at school sixth forms that have no entries for AS- or A-level English literature and geography (17,560 and 19,013 respectively) than are studying at school sixth forms that have no entries for physics (7,767).

Table 9: Comparing the facilitating subjects: How many school sixth forms have no entries to each of them, and how many students study there?

Subjects	No. of school sixth forms with entries	School sixth forms with no entries		No. of girls in school sixth forms that have no entries	No. of boys in school sixth forms that have no entries	Total no. of students in school sixth forms that have no entries
		No.	%			
Physics	2,356	235	9.1	4,954	2,813	7,767
Maths	2,505	86	3.3	763	373	1,136
Further maths	1,970	621	24.0	24,199	18,607	42,806
English literature	2,297	294	11.4	8,291	9,269	17,560
Biology	2,434	157	6.1	1,849	1,632	3,481
Chemistry	2,400	191	7.4	3,246	2,402	5,648
Geography	2,218	373	14.4	10,414	8,599	19,013
History	2,397	194	7.5	2,431	2,680	5,111
French	1,354	1,237	47.7	62,782	55,506	118,288

H How have the facilitating subjects fared over the past decade?

To aid the interpretation of **figures 7** and **8**, alternative versions (**figures 7.1** and **8.1**) have been included. In these versions, French and further maths have been removed, to make the Y-axis scale more easily interpretable for the remaining subjects.

- One of the success stories of the period has been further maths, which has seen a 46% reduction in the number of school sixth forms with no entries to the subject. Maths and biology are the only other subjects to experience reductions (of 21% and 7%, respectively).
- The proportion of school sixth forms with no entries to French, and the number of students who study at such school sixth forms, have both increased by 22% from already high starting points in 2005. There has been a simultaneous increase of 22% in the number of students who study at school sixth forms with no entries to them (observable in **figure 8**).

Figure 7: School sixth forms with no AS- or A-level entries in facilitating subjects

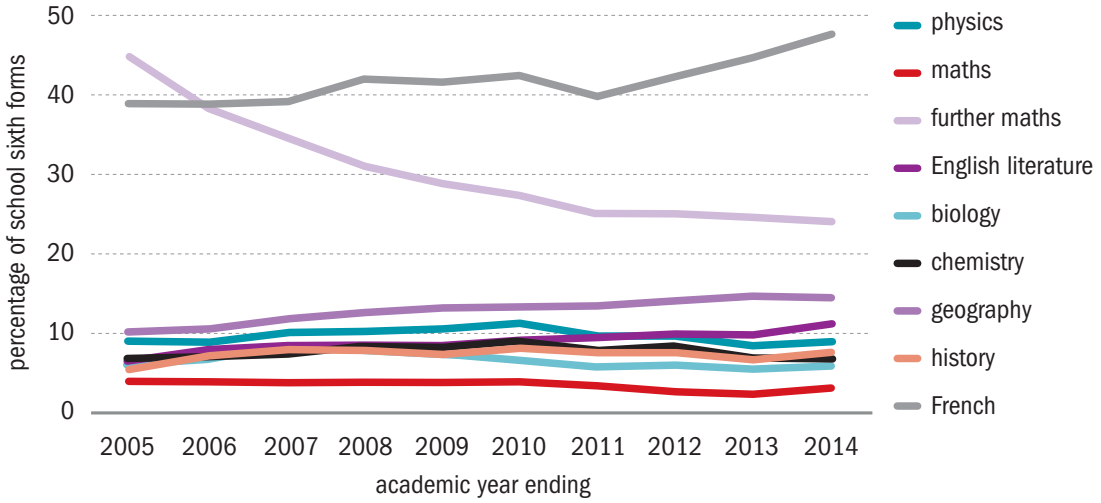
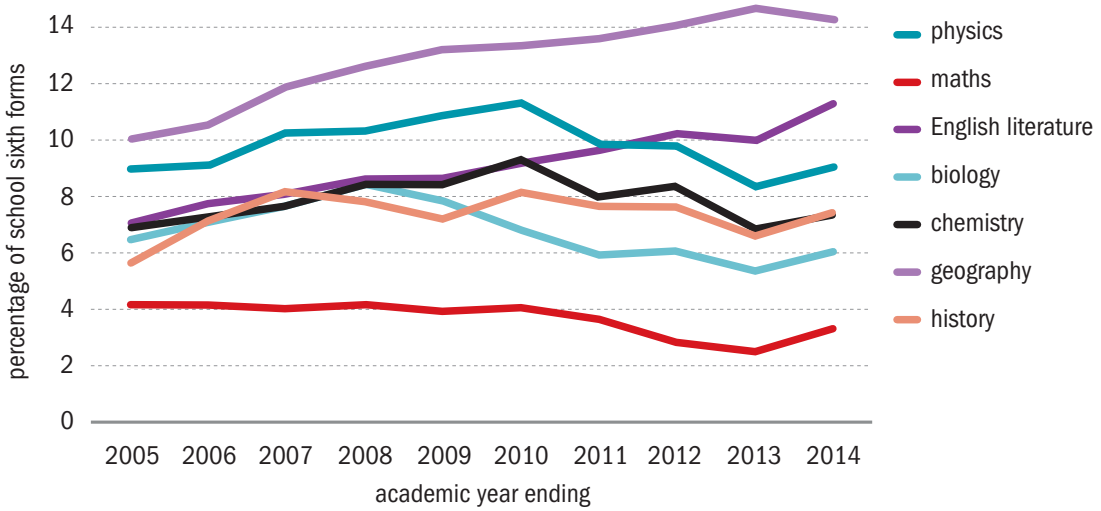
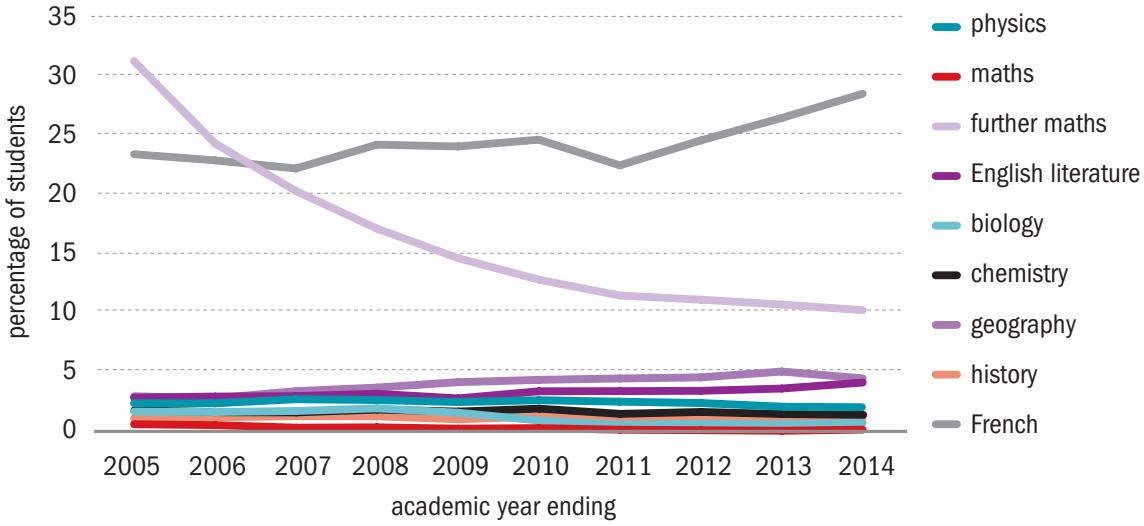


Figure 7.1: School sixth forms with no entries to facilitating subjects (further maths and French omitted)



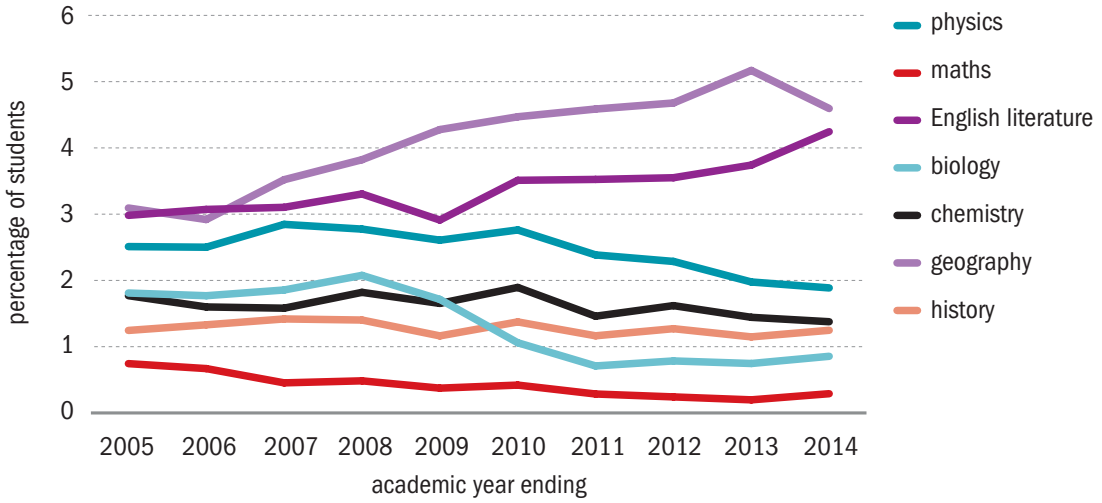
- English literature, geography and history have experienced significant increases (60%, 44% and 31%, respectively) in the number of school sixth forms with no AS- or A-level entries to them (albeit from starting points much lower than for further maths and French). There are significant corresponding increases in the number of students who study at school sixth forms without entries to English literature and geography (43% and 49%, respectively). However, the proportion of students studying at school sixth forms without any entries to history barely fluctuated over the period, and both started and finished the 10-year period at 1.2%. These trends are observable in **figure 8.1**.
- Maths, further maths and biology see the greatest percentage reductions in the number of students who study at such school sixth forms (60%, 67% and 54% respectively).

Figure 8: Students studying at school sixth forms with no AS- or A-level entries in facilitating subjects



- There have been increases in the proportions of the student cohort which study at school sixth forms which have no entries to geography, English literature and French. These are the only facilitating subjects for which this is the case.
- The very limited increases in the number of school sixth forms that have no entries to physics and chemistry, which can be observed in **figure 7.1**, are not matched by increases in the number of students studying at school sixth forms without entries to those respective subjects. In fact, the numbers of these students has fallen by 25% and 22% for physics and chemistry respectively.

Figure 8.1: Students studying at school sixth forms with no AS- or A-level entries in facilitating subjects (further maths and French omitted)



Students' movement between schools and associated likelihood of studying physics

Some students move school between sitting their GCSE exams and beginning their AS-level studies. This section looks at the associated likelihoods of studying AS-level physics for students who move and for those who don't move.

- For students who move school for their sixth-form study, they are similarly-likely to study physics A-level whether or not the school they studied their GCSEs at had entries to AS- or A-level physics (10% and 8.3% of students respectively).
- However, 16.9% of students who studied at the same school for their GCSEs and A-levels (and the school had AS- or A-level physics entries) had an entry to AS- or A-level physics.
- Students who study their GCSEs at a school whose sixth form has no entries to AS- or A-level physics are more than twice as likely to move school between their GCSE and A-level study. 62.1% of these students move establishment for their A-level study, compared to 28.7% of students who study at schools that have AS or A-level physics entries.

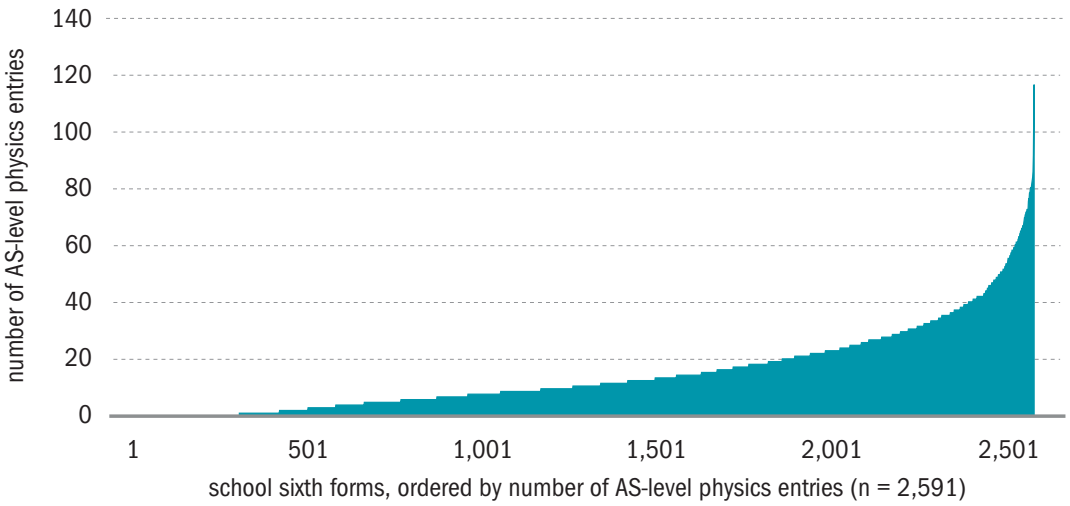
Table 10: AS-level physics entry rates for students who either do or do not move school for their sixth form studies

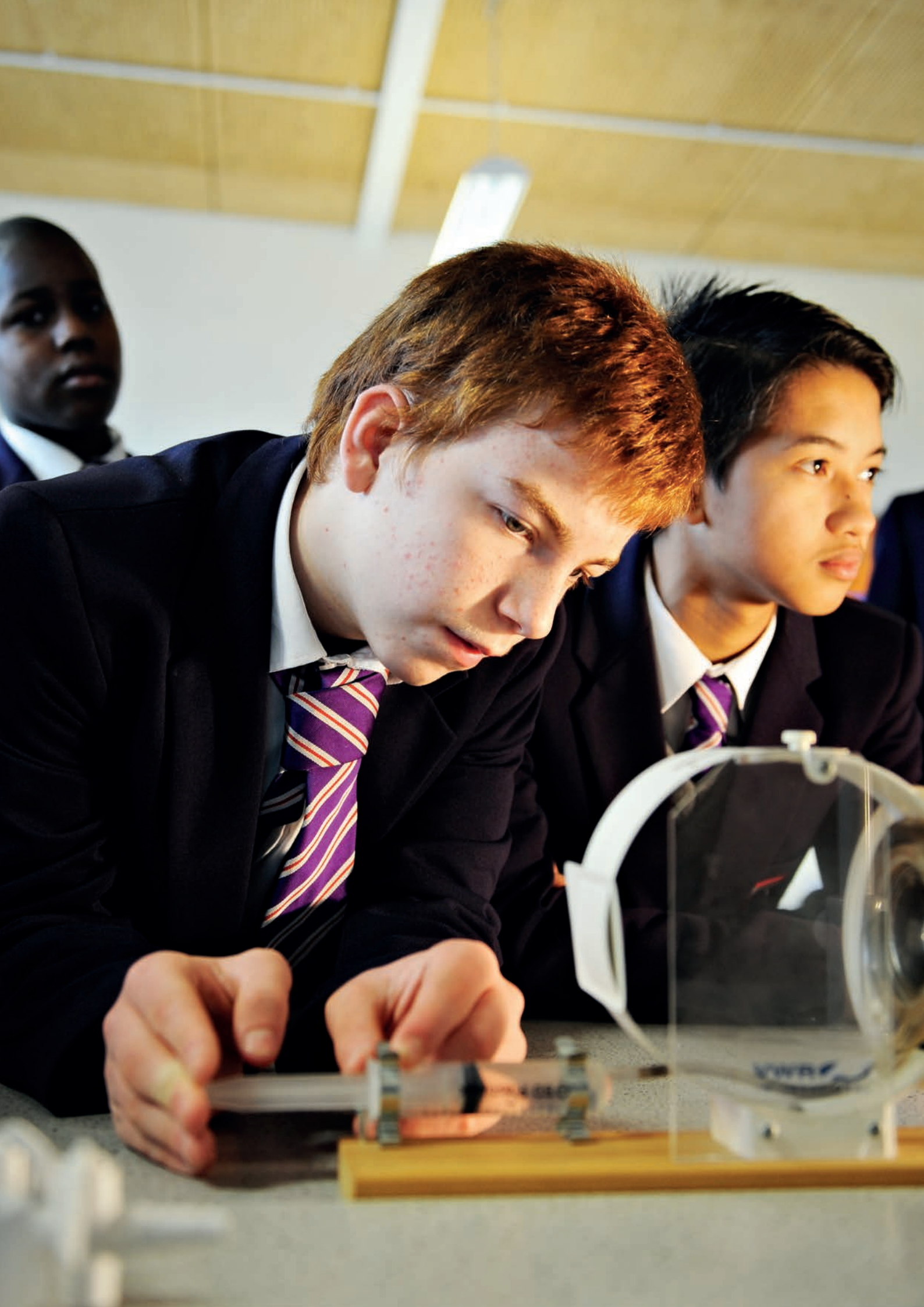
Subjects	KS4 school did have AS- or A-level physics entries in the sixth form				KS4 school did not have AS- or A-level physics entries in the sixth form			
	Students stayed at same school		Students moved school for A-level		Students stayed at same school		Students moved school for A-level	
	No.	%	No.	%	No.	%	No.	%
Students entered for AS-level physics	29,209	16.9	6,951	10.0	0	0	525	8.3
Students not entered for AS-level physics	143,821	83.1	62,825	90.0	3,857	100	5,789	91.7

J Small AS- and A-level physics classes

- 454 school sixth forms have AS-level physics classes of between one and five students. The equivalent number of A-level classes is 780. There is a risk that in the future, schools may decide that these classes are unviably small.
- Revisiting this issue as part of the follow-up to this project in the coming years will be essential for assessing the fragility of small physics classes over time and how they contribute to the wider issue of school sixth forms with no students entered for physics.

Figure 9: Number of AS-level physics entries at school sixth forms





Part 2: Survey of prospectuses and schools

K Are schools not *running* or not *offering* A-level physics?

The distinction between school sixth forms not *running* and not *offering* A-level physics is important. This report sought to identify whether the 235 school sixth forms that had no one entered for A-level physics *offered* the subject or not.

- This was checked by examining the prospectuses of the 191 largest school sixth forms that didn't have any students entered for AS- or A-level physics. Of the school sixth forms that did not run A-level physics, and which had four or more students studying AS- or A-levels, 100 establishments did not offer the subject at A-level while 62 schools did (this information was unavailable for 29 of the schools).
- Information for the remaining 44 school sixth forms that had three or fewer students entered for AS- or A-levels, was not sought as part of this study, due to difficulties in obtaining the details for particularly-small sixth forms.
- Schools without AS- or A-level physics entries that market themselves as schools with teaching specialisms other than science, offer physics less often than those without a stated specialism. Seven of the 20 largest school sixth forms without physics entries market themselves as a specialist in a particular subject area. Each of their specialisms lay in a combination of the arts and/or languages. Only one of these seven specialist school sixth forms offered physics.
- Schools that had no entries for AS- or A-level physics marketing themselves as specialists in a particular subject area was far less common for school sixth forms outside the 20 largest.

L What reasons do schools give for not *offering*?

A sample of schools that had no students entered for physics A-level and that did not *offer* the subject were contacted. Within the varied responses we received, several themes were repeated:

- **Insufficient student demand** was a theme shared by several schools. This perceived lack of demand from students was in several cases associated with a school culture that was focused away from scientific subjects. For example, one performing arts school, which formerly ran biology A-level until the course ceased due to insufficient numbers, has a sixth form cohort in the hundreds. The school, which currently has a teacher capable of teaching A-level physics, commented: "There hasn't been enough of a degree of interest – although it might not always be like that." This anecdote is an example of the issue of viability associated with very small A-level physics class sizes. Interest from a small handful of pupils in A-level physics may well be insufficient to justify the running of the course.
- **Inhibitingly low school size** was a reason attributed by some schools for them not offering A-level physics. One school cited "numbers" and "finances" as contributory factors for not offering A-level physics. It should be noted the school did offer biology.
- **No specialist physics teacher** was a reason cited by both the larger and smaller schools that did not offer A-level physics.
- The presence of **other local providers that offered academic subjects** was a reason cited by two schools, which operated in grammar school regions: "The most able students move on to grammar schools." One of these two schools said they were "rationalising our current offering" by shifting to mainly vocational qualifications, but both schools did have significant numbers of academic A-level entrants.

Part 3: Methodology

Data

- This analysis was performed on data extracted from the National Pupil Database for the academic year 2013/14.
- The National Pupil Database Key Stage 5 data set is an administrative record of the learning undertaken by individuals aged 19 and under at all independent and state-maintained schools in England.

Definitions

A-level physics entries

- In this report, schools that were identified as having no entries to A-level physics did not have a single AS- or A-level physics entry attributed to a student registered to the school during the academic year 2013/14. It is important to note that school sixth forms with no entries to physics had no students who were entered for the subject at an alternative establishment. The attendance of students is recorded at one particular school, and if any individuals were to study, and even be entered for a subject externally, their exam entries (in physics A-level, for example) would still be attributed to their "main" school.

School sixth form sizes

- The 2,591 school sixth forms that in 2013/14 had at least one AS- or A-level entry were divided into five quintiles based on the combined number of AS- and A-level students present. The number of school sixth forms in each quintile and the number of students studying at these establishments are shown in the table below.

Table 11: Number of schools and students in each school sixth form size quintile

Quintile	No. school sixth forms	No. of females	No. of males	No. of pupils
1 – smallest	524	8,450	6,100	14,500
2	521	24,503	20,005	44,508
3	514	38,539	33,256	71,795
4	518	58,624	49,892	108,516
5 – largest	514	90,861	86,261	177,122
Total	**2,591**	**220,977**	**195,514**	**416,491**

- **Table 12** shows the range of the number of students entered for AS- or A-levels in each of the school sixth form quintiles.
- Also shown is the percentage of students entered for AS- and A-level physics within each quintile. Although there are many school sixth forms in the smallest quintile that have no physics entries, the smallest quintile has an A-level physics entry rate that is broadly comparable with the next three smallest quintiles.

Table 12: Number of students and physics entries at schools in different quintiles

Quintile	No. students at largest school sixth form	No. students at smallest school sixth form	Average students at schools in quintile	Average students entered for AS-level physics	Average students entered for A-level physics	% students entered for AS-level physics	% students entered for A-level physics
1 – smallest	57	1	28	2	1.5	7.1	5.4
2	112	58	85	6.7	4.5	7.9	5.3
3	171	113	140	11.9	7.8	8.5	5.6
4	255	172	209	19.9	12.2	9.5	5.8
5 – largest	967	256	345	36.2	23.3	10.5	6.8

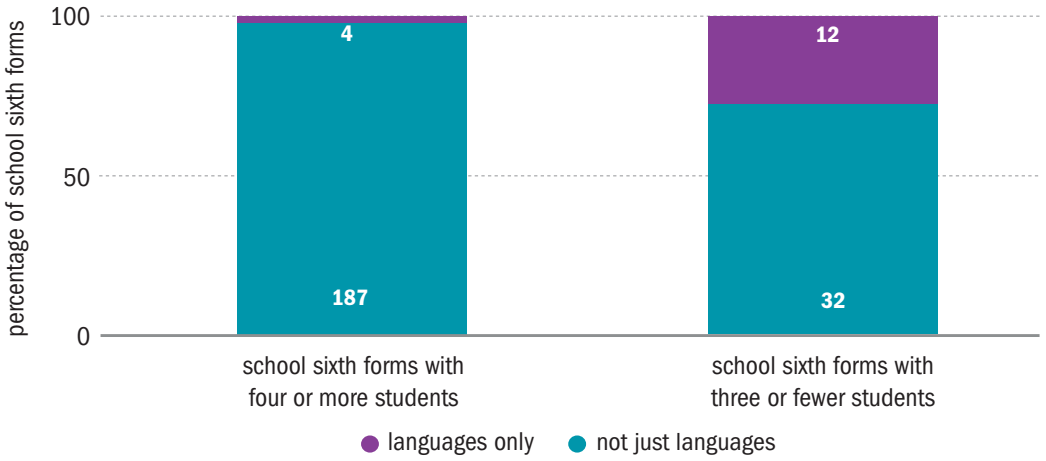
Contacting schools

- As part of the research, a random sample of schools from the group that did not offer A-level physics were contacted by phone to ask why they did not offer the subject.
- The resulting sample was to some extent defined by the non-response of several schools, that chose not to participate.

School sixth forms with only language entries

- A number of school sixth forms included in this data analysis have their AS- and/or A-level entries exclusively in language subjects. They are therefore a subset of the 235 schools that have been identified as having no AS- or A-level physics entries.
- This behaviour would be consistent with a school that may not have an active sixth form, but which enters students for whom English is an additional language to their first language.
- Urdu and Arabic are the most common languages studied at schools who have AS- and/or A-levels exclusively in language subjects.

Figure 10: School sixth forms without physics – are their AS- and A-level entries exclusively in language subjects?



Establishments not included in the analysis

Certain establishment types were deemed out of scope for the purposes of this report, and were removed from the main analyses.

Table 13: Student numbers at omitted learning establishments

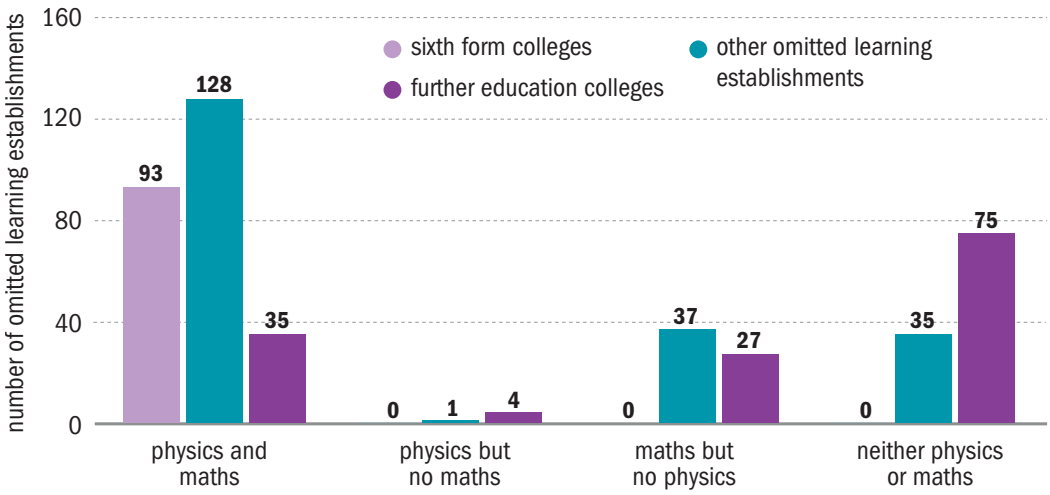
	Sixth form colleges (n = 93)	Further-education colleges (n = 201)	Other omitted learning establishments (n = 141)	Total (n = 435)
Male	51,453	23,152	742	75,347
Female	66,531	32,599	626	99,756
Total	**117,984**	**55,751**	**1,368**	**175,103**

- All 93 sixth form colleges had entries for AS- or A-level physics. This, along with them being exclusively 16+ learning establishments, was responsible for their removal from the main analyses.
- Some further-education colleges have made a deliberate decision to focus on vocational qualifications and therefore it seemed inappropriate to include them in this analysis. Further work would be desirable to understand the issues around offering physics in a further-education college environment.
- The 141 special school sixth forms and schools without sixth forms (*other omitted learning establishments*) were also omitted from the analysis.

Table 14: Physics entries at omitted learning establishments

	Sixth-form colleges		Further-education colleges		Other omitted learning establishments		Total	
	AS-level	A-level	AS-level	A-level	AS-level	A-level	AS-level	A-level
Male	6,584	3,814	2,823	1,689	86	48	9,493	5,551
Female	1,816	819	808	366	13	9	2,637	1,194
Total	**8,400**	**4,633**	**3,631**	**2,055**	**99**	**57**	**12,130**	**6,745**

Figure 11: Number of omitted learning establishments with or without entries for AS- or A-level physics



- There were a further 103 establishments (of both eligible and ineligible establishment types) that were omitted from the analysis due to having no students entered for AS- or A-level qualifications. There were a total of 15,008 students (7,386 boys and 7,622 girls) studying non-A-level qualifications at these establishments. 96.5% of these students were studying at one of the 41 further-education colleges that had no AS- or A-level entries.

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