

September 2017

'State of the nation' report of UK primary science education

Baseline research for the Wellcome Trust Primary Science Campaign



For more information about this report please contact
Sarah Leonardi, Senior Research Manager:

CFE Research, Phoenix Yard, Upper Brown Street, Leicester,
LE1 5TE

0116 229 3300 Sarah.Leonardi@cfe.org.uk
www.cfe.org.uk

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AUTHORS AND ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

CFE Research with the University of Manchester has been commissioned by the Wellcome Trust to monitor and evaluate the impact of its UK-wide Primary Science Campaign. The campaign's vision is that all pupils will experience an exciting, inspiring and relevant science education at primary school that leaves them well-prepared to progress further in science, and well-informed about science in their everyday lives. A key part of the campaign is Explorify; this is a free resource of engaging, creative science activities for all primary school teachers. It has been designed to stimulate curiosity, discussion and debate and will support teachers to encourage children to think like scientists. This report explores the nature of science delivery across the UK and captures baseline metrics prior to the campaign's full implementation in autumn 2017.

Context

Science teaching varies throughout the UK. In England, the National Curriculum dictates the programmes of study for science year-by-year for Key stages 1 and 2¹. However, schools can introduce additional content within the relevant key stage and can also extend it. The position in Wales is broadly comparable, although the Foundation Phase Framework covers Reception and Key Stage 1 with the National Curriculum for science in Wales adopted at Key Stage 2. By contrast, the Curriculum for Excellence in Scotland comprises a broad general education from the early years to age 18. Increased emphasis is on inter-disciplinary or cross-curricular learning, skills development and encouraging personal achievement. The position in Northern Ireland is similar, with science forming part of the 'world around us' area of learning.

Approach

Our research activity focusses on three over-arching objectives:

- Monitoring awareness and the geographical reach of the campaign across UK schools to examine the national picture at each time point.
- Measuring the impact of the campaign on the profile, quality and quantity of science teaching in primary schools.
- Examining how the campaign is bringing about changes within schools and the nature of the impacts on subject leaders and as well as on pupils and schools as a whole.

To capture the baseline position across the UK the following methodology was undertaken:

- A computer-assisted telephone interview of **902** Science Leaders (full definition below) or other senior leader to respond to a series of questions about the strategic direction of science in the school and models of delivery. A stratified random sample of schools were selected to be interviewed and weighted to be representative of

¹ Excluding academies

schools across the UK. The number of schools interviewed in Scotland, Wales and Northern Ireland were boosted to allow country level analysis and comparisons to be undertaken (England=595, Scotland=104, Wales=101 and Northern Ireland=102). Throughout this report, findings are reported as the **science leadership survey**.

- An online survey of **1,010** teachers disseminated through respondents to the science leadership survey and a UK-wide teacher panel (England=819, Scotland=77, Wales=41 and Northern Ireland=71). The survey asked respondents about how they teach science to classes that they are responsible for on either a standalone or cross-curricular basis. Throughout this report, findings are reported as the **teaching survey**. For key questions relating to science teaching the samples have been combined from across both surveys to aid analysis and reporting.
- An online survey of **1,906** pupils (aged 7-11) to explore their perceptions of science. Respondents to the science leadership survey were asked to survey pupils within their schools during class time.²

Due to variation in the delivery of science a Science Leader has been defined for this study as *an individual who is responsible for leading science development and teaching in schools either as an individual subject or cross-curricular topic area*.

The terminology used to refer to pupil's year groups differs throughout the UK. For consistency, we have adopted the English and Welsh terminology of year groups and key stages throughout the report (see table on page 12). Throughout the report all differences in the commentary are statistically significant.

Key findings

Science Leadership in UK schools

91% of UK schools have a Science Leader. Schools in England and larger schools (defined as having 100 or more pupils³) are more likely to have this role.

60% of schools report that science is included in their **School Development Plan**. The common ways it is included are:

- Actions for developing the **teaching of science** (80%)
- Targets for **improving pupil progress** in science (65%)
- An **allocated budget** for science equipment (53%)
- Actions for developing the **leadership of science** (51%)

² In total, responses were received from at least 49 schools but this is likely to be an under-estimate as 195 pupil responses were not linked to a school name. Therefore these findings should be treated as illustrative only as they are not representative of the population.

³ A small school is defined by Ofsted as less than 100 pupils.

Science Leaders

86%

Of Science Leaders are classroom teachers. **7%** are Headteachers and the remaining **7%** hold other roles in schools.

51%

Get **specific release** time to **lead science** in addition to planning their own lessons. One-third take 10 hours (or less) a year, one-third take 11-20 hours and one-third take more than 21 hours.

52%

Have **undertaken external Continuing Professional Development** lasting one day or more in the last year **to help them lead or develop science** throughout their school.

Importance of science

Respondents to both surveys indicate **how important** they think certain subjects are to the Senior Leadership Team of their school:

- **83%** think **English** is **‘very important’** and 11% ‘important’
- **84%** think **maths** is **‘very important’** and 11% ‘important’
- **30%** think **science** is **‘very important’** and 50% ‘important’

57% of Headteachers/Acting Headteachers or Deputy Headteachers state that **science** is **‘very important’** compared to **25% in all other roles**.

Views of science

It is important for pupils to study science

82% of Science Leaders ‘strongly agree’ and 16% ‘agree’

57% of individuals who are not Science Leaders ‘strongly agree’ and 39% ‘agree’

The skills taught in science are transferrable

50% of Science Leaders ‘strongly agree’ and 47% ‘agree’

36% of individuals who are not Science Leaders ‘strongly agree’ and 59% ‘agree’

Support for teachers to deliver science

The extent to which teachers agree with the statement that they feel **supported** by their school to teach science is as follows:

- **15%** ‘strongly agree’
- **50%** ‘agree’
- **24%** ‘neither agree nor disagree’
- **9%** ‘disagree’
- **2%** ‘strongly disagree’

73% ‘strongly agree’ or ‘agree’ that their **Science Leader is available to coach or mentor** them in teaching science.

Teachers identified **what support their school had given them** to improve their science teaching in the last 12 months. The most frequently reported methods are:

- The school providing **access to lesson plans and materials (34%)**
- **Coaching or mentoring** from their Science Leader (**31%**)
- **Science training** from their Science Leader (**23%**)
- **Lesson observations (21%)**

70% report that they have **received** some form of **support for science teaching** from their school in the last 12 months. There are differences between groups:

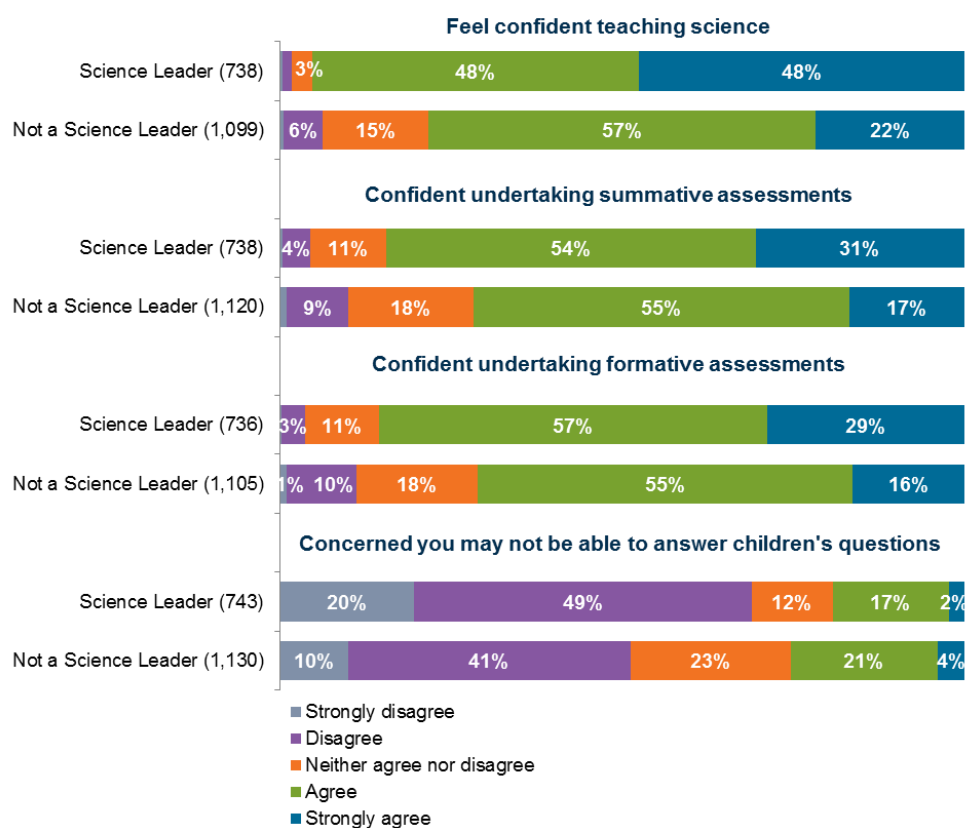
- **90%** of teachers in schools with the **Primary Science Quality Mark⁴** (or are currently applying for it) received support compared with **68%** of teachers in schools who do not hold the award.
- **86%** of teachers report support in schools where the **Science Leader has received CPD in the last 12 months** compared to **67%** who had a **Science Leader who has not received CPD**.
- **86%** of teachers in schools where the Science Leader or other leader state that science is **‘very important’** to the Senior Leadership Team received support compared to **72%** in schools where science is not rated as ‘very important’.
- **81%** of teachers in **Scotland** received support compared with **69%** in **other UK countries**.

⁴ The Primary Science Quality Mark is an award scheme to enable primary schools across the UK to evaluate, strengthen and celebrate their science provision. <http://www.psqm.org.uk/>



Confidence teaching science

Respondents to both surveys were asked to what extent they agree or disagree with confidence statements about teaching and assessing science. **Science Leaders agree that they are more confident** than those who are not.



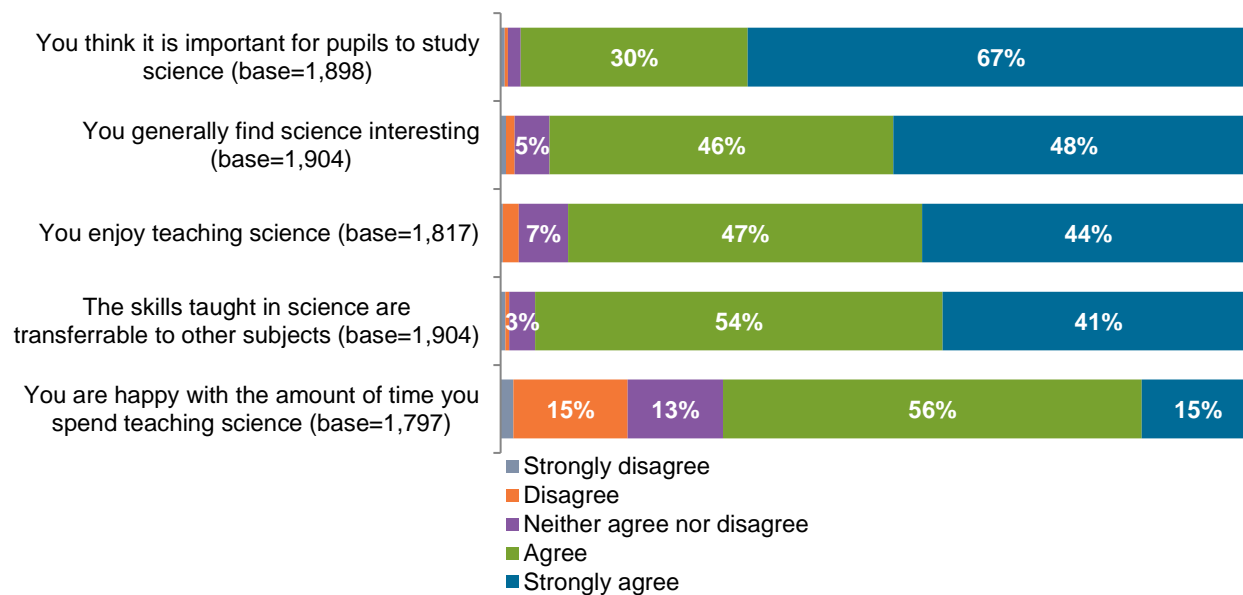
Characteristics which influenced an individual's confidence in teaching science were:

- Those **holding a science A level**⁵ or Advanced Higher are **more** confident
- Being a **Science Leader increases** their confidence
- **Headteachers, Acting Headteachers or Deputy Headteachers** are more confident when compared to **other roles**
- Teachers in **Scotland**, and then **Northern Ireland**, are **less** confident
- Those who have been **longer** in the teaching profession have **increased** confidence
- Those in a school with a Science Leader are **more** confident
- Male teachers are **more** confident

⁵ This has been defined as holding a Biology, Chemistry or Physics A level or Advanced Higher.

Views of science

Participants from both surveys have **positive views** towards **science** but **only 15%** ‘strongly agree’ that they are **happy with the amount of time they spend teaching science** and **56%** ‘agree’.



Science resources

Respondents to the science leadership survey answered a series of statements about the suitability of science resources in their school.

58%

of schools have science equipment suitable for different ages

47%

of schools have a good range of science equipment to carry out hands-on science investigations

41%

of schools have appropriate budget for resources

Science delivery

Respondents to the science leadership survey report that in **89%** of UK schools **classroom teachers deliver** most **science lessons**. **5%** of schools **have a dedicated science teacher** who takes science lessons whilst the remaining **6%** have a mix of the two.

Weekly science teaching

75% of schools across the UK deliver science on a weekly basis **to all year groups** in their school **either** through **standalone lessons**, **cross-curricular** work or a **mix of both** (as reported in the science leadership survey). **13%** provide **weekly** science lessons to **some year groups within their school (but not all)** and **12%** deliver **no weekly science** to any year groups.

Standalone lessons are more prevalent for older year groups (around 40% deliver standalone lessons and a further 44% deliver a mix of standalone and cross-curricular to **years 3-6**). Younger pupils (especially Reception) are more likely to receive cross-curricular work (**59%** of weekly lessons are delivered through **cross-curricular work only** for Reception).

On average, science is **taught weekly** for an **average of 1.4 hours** (1 hour and 24 minutes) as reported across both surveys. Lower year groups receive fewer hours of weekly lessons with the amount of science taught increasing as pupils become older. Across year groups **on average 58% of classes are not receiving two hours of weekly science**.

Dedicated science weeks

52% of schools have dedicated science weeks **for all year groups** in their school and an additional **7%** run these for **some** year groups (but not all). Across the majority of schools this is an additional activity which complements other science delivery. In **each science week** most schools typically teach science for between **7 and 8 hours across the week**.

Science teaching across the year

Science is taught across schools in a **wide variety of ways** (as reported in the science leadership survey). The majority of schools teach some form of science weekly and around two-thirds combine this with other types of activity such as dedicated science weeks, science days and visits. Other methods used by schools are dedicated science weeks only, standalone methods (such as block teaching or fortnightly lessons) or a variety of methods (which are not weekly).

In both **England and Wales, the weekly delivery of science is common** with schools in England being more likely to combine this with other delivery methods. Weekly delivery is also common in Northern Ireland. **Scotland shows the greatest variation in how science is delivered** with science weeks only, a variety of methods and standalone other methods being used more often than in other countries.

Across all of these methods science is taught on average for **1.7 hours** a week (1 hour and 42 minutes – as reported across both surveys). Lower year groups receive on average fewer hours. Across year groups on average **54% of classes are not receiving the equivalent of two hours of science per week**.

Characteristics which influence the weekly average hours a respondent teaches science for are shown in order of importance below:

- being a teacher in **Northern Ireland** or then **Scotland** reduces the number of hours
- not having a **Science Leader** in the school **increases** the number of hours
- being a teacher **in Wales reduces** the number of hours
- being **male increases** the number of hours
- viewing **science as important to the school increases** the number of hours
- holding a **science A level or Advanced Higher⁶ increases** the number of hours
- being in a **larger** school **increases** the number of hours

How science is taught

Across both the science leadership and teaching surveys respondents report that different activities are undertaken with pupils when teaching science⁷:

	'Always'	'Frequently'
You arrange for pupils to design their own science investigations when applicable	15%	38%
You demonstrate science investigations to pupils when applicable	32%	41%
You teach science by encouraging pupils to do investigations	33%	50%
You arrange for pupils to record data or observations from science investigations	37%	44%
You encourage pupils to interpret their science data or observations	40%	42%

What pupils think of science

44% of pupils **like science** at school **'a lot'**. **41%** **'like it'** and **15%** **'don't like it'** or **'really don't like it'**.

93% of pupils **'agree a lot'** or **'agree'** that they **'like to understand how things work'** whilst **87%** **'find science interesting'** and **81%** **'like to find the answers to questions themselves'**. Views about whether someone needs to be **'clever to do science'** vary: **43%** **'agree'** or **'agree a lot'** whilst **57%** **'disagree'** or **'disagree a lot'**.

⁶ This has been defined as holding a Biology, Chemistry or Physics A level or Advanced Higher.

⁷ Response options to this survey question were 'always', 'frequently', 'occasionally', 'never', 'don't know' and 'not applicable'.



30% of pupils report a **science related job** when asked what job they would like when they grow up. The type of job differs by gender:

- **boys** are more likely to want a job in **engineering** (or a related industry) or as a **‘scientist’**
- **girls** are more likely to state they wish to be a **vet** (or another job related to animals) or pursue a career in **healthcare/medicine**

‘Finding new species of animals and sea life’

‘I would like to be an astronomer’

‘Either a professional footballer or engineer’

‘I would like to be a scientist and help people’

‘I would like to have a job in forensics’

‘I would love to be a chemist mixing elements’

01. INTRODUCTION AND METHODOLOGY

This section introduces the aims and objectives of the study, summarises the research methods implemented for the baseline activity, and provides contextual information on science teaching throughout the UK.

Aims and objectives of the study

CFE Research with the University of Manchester has been commissioned by the Wellcome Trust to undertake monitoring and evaluation of its Primary Science Campaign which launched as a pilot in spring 2017, will launch fully in autumn 2017 and runs for four years. The campaign's vision is that all pupils will experience an exciting, inspiring and relevant science education at primary school that leaves them well-prepared to progress further in science, and well-informed about science in their everyday lives. A key part of the campaign is Explorify; this is a free resource of engaging, creative science activities for all primary school teachers. It has been designed to stimulate curiosity, discussion and debate and will support teachers to encourage children to think like scientists. CFE Research with the University of Manchester was commissioned to explore the nature of science delivery across the UK and to evaluate the impact of the campaign until 2021. Specifically, our research activity focusses on three over-arching objectives:

- Monitoring awareness and the geographical reach of the campaign across UK schools to examine the national picture at each time point.
- Measuring the impact of the campaign on the profile, quality and quantity of science teaching in primary schools, in particular the average number of hours taught per week by classroom teachers on either a discrete or cross-curricular basis.
- Examining how the campaign is bringing about changes within schools and the nature of the impacts on subject leaders as well as on pupils and schools as a whole.

This report summarises baseline findings about science teaching in the four countries of the UK against which the outcomes and impacts of the campaign will be determined.

Context

Science teaching varies throughout the UK. In England, the National Curriculum dictates the programmes of study year-by-year for Key stages 1 and 2⁸. However, schools can introduce additional content within the relevant key stage and can also extend it. The National Curriculum for science aims to equip young people with: (i) scientific knowledge and conceptual understanding; (ii) an understanding of the nature, processes and methods of science; and (iii) the scientific knowledge required to understand the issues and

⁸ Excluding academies

implications of science.⁹ The Early Years Foundation Stage Framework¹⁰ outlines the requirements for Reception pupils with science being delivered through the *Understanding the World* programme on a cross-curricular basis. The position in Wales is broadly comparable, although the Foundation Phase Framework¹¹ covers Reception and Key Stage 1 with the National Curriculum for science in Wales¹² adopted at Key Stage 2.¹³ This is supported by a non-statutory Skills Framework for 3-19 year olds in Wales to provide guidance and continuity throughout the various stages. In the Foundation Phase, science is similarly taught through *Knowledge and Understanding of the World* which equips children to embrace science. Pupils at Key Stage 2 are then given the opportunity to build on the skills, knowledge and understanding acquired to apply science in everyday life, including current issues. Activities should foster creativity and curiosity, and be interesting, enjoyable and relevant to young people.

By contrast, the Curriculum for Excellence in Scotland comprises a broad general education from the early years to age 18. It emphasises inter-disciplinary or cross-curricular learning, skills development and encouraging personal achievement. The curriculum is intended to develop four capacities in all young people: successful learners, confident individuals, responsible citizens and effective contributors.¹⁴ The position in Northern Ireland is similar, with science forming part of the ‘world around us’ area of learning. The revised Northern Ireland Curriculum covers the Foundation Stage (Years 1 and 2), Key stage 1 (years 3 and 4) and Key Stage 2 (Years 5, 6 and 7), and is set out in six Areas of Learning with science as part of the ‘world around us’ area. There is an expectation that teachers integrate learning to make relevant connections for children. It is intended that the learning opportunities presented through the Northern Ireland Curriculum help young people to develop cross-curricular skills (which include communication, and using maths and ICT) and thinking skills and personal capabilities. These include: thinking, problem-solving and decision-making; self-management; working with others; and managing information.¹⁵

As of August 2014, teachers in Scotland have been mandated to engage in professional learning, self-evaluate the learning, and maintain a record of the learning by the General Teaching Council for Scotland as a condition of their registration.¹⁶ This is intended to help maintain and improve the quality of teachers in order to enhance the impact they have on pupils’ learning, and provides teachers with a responsibility to consider their development needs and an entitlement to a system of supportive professional review and development. There is no such requirement for teachers in England, Wales and Scotland.

⁹ Department for Education (2015). *National curriculum in England: science programmes of study*. London: DfE.

¹⁰ Department for Education (2017). *Statutory framework for the early years foundation stage*. London: DfE

¹¹ Welsh Assembly Government (2015). *Foundation Phase Framework*. Cardiff: Welsh Assembly Government.

¹² The Welsh Curriculum is currently under review.

¹³ Welsh Assembly Government (2008). *Science in the National Curriculum for Wales Key Stages 2-4*. Cardiff: Welsh Assembly Government.

¹⁴ Scottish Government: Curriculum for Excellence (Available from: <http://www.gov.scot/Topics/Education/Schools/curriculum>)

¹⁵ Council for the Curriculum Examinations and Assessment (2007). *The Northern Ireland Curriculum Primary*. Belfast: CCEA.

¹⁶ The General Teaching Council for Scotland (2014). *Professional Update Guidance Notes*. Edinburgh: GTC Scotland.

The terminology used to refer to pupils’ year groups differs throughout the UK. For consistency, we have adopted the English and Welsh terminology of year groups and key stages throughout the report. The equivalent year groups for Scotland and Northern Ireland are summarised in Table 1 for information:

Table 1: Year groups by country

Age during school year	Key stage	England and Wales	Northern Ireland	Scotland
4-5	Foundation	Reception/Foundation	Year 1/P1	P1
5-6	Key Stage 1	Year 1	Year 2/P2	P2
6-7		Year 2	Year 3/P3	P3
7-8	Key Stage 2	Year 3	Year 4/P4	P4
8-9		Year 4	Year 5/P5	P5
9-10		Year 5	Year 6/P6	P6
10-11		Year 6	Year 7/P7	P7

Approach

To capture the baseline position of teaching in science, two separate but complementary surveys were undertaken between October 2016 and March 2017 as outlined below.

Science leadership survey

A computer-assisted telephone interview of **902** Science Leaders (or other senior leaders where there was no Science Leader in the school or they were unavailable at the time of interview) to respond to a series of questions about the strategic direction of science. A database of schools in the UK was compiled and a sub-sample were identified via a random stratified sample to ensure a representative sample in regard to key characteristics such as type and local authority area that is amenable to statistical analysis at the UK level. The number of schools interviewed in Scotland, Wales and Northern Ireland were boosted to allow country level analysis and comparisons to be undertaken. The dataset was weighted to reflect the school population in each of the four countries. The surveys were undertaken between November 2016 to January 2017.

The key characteristics of those responding to this survey are outlined below (a full description can be seen in Appendix 1):

Country	School size
— England = 595	— 99 or less pupils = 209
— Scotland = 104	— 100 - 199 pupils = 236
— Wales = 101	— 200 - 299 pupils = 215
— Northern Ireland = 102	— 300 or more pupils = 214 ¹⁷

¹⁷ Where totals do not add up to 902 this is due to unknown data

- | | |
|--|---|
| <p>Role in the school</p> <ul style="list-style-type: none"> — Classroom teacher = 534 — Headteacher = 294 — Other role = 74 | <p>Science leadership role</p> <ul style="list-style-type: none"> — Respondent was the science lead = 572 — There is a science leader in the school but not the respondent = 217 — There is no science leader in the school = 110 |
|--|---|

The survey asked respondents about how their school teaches science, their role as a science leader (where applicable) and their views of science. Throughout this report, findings are reported as the **science leadership survey**.

Teaching survey

An online survey of **1,010** teachers was disseminated through two routes: (i) via respondents to the science leadership survey described above (yielding 460 responses); and (ii) through a UK-wide teacher panel (yielding 550 responses). The key characteristics of those responding to this survey are outlined below (a full description can be seen in Appendix 1):

- | | |
|--|--|
| <p>Country</p> <ul style="list-style-type: none"> — England = 819 — Scotland = 41 — Wales = 71 — Northern Ireland = 77) | <p>School size</p> <ul style="list-style-type: none"> — 99 or less pupils = 82 — 100 - 199 pupils = 179 — 200 - 299 pupils = 243 — 300 or more pupils = 474 |
| <p>Science leadership role</p> <ul style="list-style-type: none"> — Respondent was a science lead = 177 — Not a science leader = 833 | <p>Role in the school</p> <ul style="list-style-type: none"> — Classroom teacher = 970 — Other role = 39 |

In total, responses were received from at least 232 schools but this is likely to be an underestimate as 552 teacher responses did not include the school name (primarily from the teacher panel). The surveys were completed between December 2016 and March 2017. The dataset is weighted to reflect the teacher population within each country of the UK. A minority of respondents indicated that they were Science Leaders (n=177). The views of these individuals were excluded from questions where their role could bias the teacher only findings.

The survey asked respondents about how they teach science within their school and their views of science. Throughout this report, findings are reported as the **teaching survey**. For key questions relating to science teaching across both surveys the samples have been combined to aid analysis and reporting.

Pupil survey

The study also included an online survey of **1,906** Key stage 2 pupils (aged 7-11) to explore their perceptions of science. Respondents to the science leadership survey were asked to give the survey to pupils within their schools during class time.

The key characteristics of pupils responding to this survey are outlined below (a full description can be seen in Appendix 1):

Country	Year group
— England = 1,213	— Year 3 = 446
— Scotland = 218	— Year 4 = 456
— Wales = 292	— Year 5 = 462
— Northern Ireland = 53	— Year 6 = 451

In total, responses were received from at least 49 schools but this is likely to be an underestimate as 195 pupil responses were not linked to a school name. Therefore these findings should be treated as illustrative only as they are not representative of the population. The surveys were completed between December 2016 and March 2017.

About the report

This report presents the findings from the three surveys. Differences in the findings by country are explored, along with any differences by school and respondent characteristics. All differences have been tested for statistical significance and only those that are statistically significant at the 5% level are reported in the commentary of the report¹⁸. Multivariate analysis was also undertaken with information about the nature of the tests performed provided in footnotes. The characteristics of the respondents in each sub-group are provided in Annex 1.

Following this introduction, the report is structured in four main chapters: **Chapter 2** describes how science is led in primary schools whilst **Chapter 3** looks at attitudes towards science and confidence in science teaching. **Chapter 4** explores how science is taught including the number of hours of teaching by year group and **Chapter 5** summarises the key conclusions emerging about science teaching from the baseline activity.

¹⁸ It is important to note that not all findings summarised in the supporting graphs are statistically significant. Please refer to the main report for statistically significant differences.

02. LEADING SCIENCE IN PRIMARY SCHOOLS

This section explores how science is led in primary schools across the UK. It describes who leads science, whether release time is provided, and the perceived importance of science in a school.

Who leads science

Respondents to the science leadership survey were asked if there is a Science Leader in their school. This is an individual who is responsible for leading science development and teaching in schools either as an individual subject or cross-curricular topic area. Across the UK nine out of ten (91%) schools report having a Science Leader. This role is more common in English schools with 95% indicating that there is a nominated Science Leader compared to 88% in Wales, 82% in Northern Ireland and 54% in Scotland. A higher proportion of schools with 100 or more pupils have a Science Leader (94%) when compared to small schools (defined as less than 100 pupils) at 79%.

The majority of respondents to the teaching survey similarly indicated that there is a Science Leader in their school (88%). One-tenth (9%) state that there is not and 3% are not sure.

Logistic regression analysis was undertaken to explore how the impact of school size and country interact given known differences in school composition across the UK¹⁹. Analysis reveals that both country and size affect the likelihood of having a Science Leader, shown in order of importance:

- A school being in Scotland reduces the likelihood of having a Science Leader (when compared to England)
- A school being in Northern Ireland reduces the likelihood (when compared to England)
- Being a larger school increases the likelihood

Collectively, this indicates that the relationship is strongest for country but school size also influences whether or not a school has a Science Leader.

Over four-fifths (86%) of Science Leaders in UK schools are classroom teachers. A further 7% are Headteachers whilst the remaining 7% are in other school-based roles (such as Deputy Headteacher or Head of Year). In larger schools (with 300 or more pupils) most Science Leaders (95%) are classroom teachers compared to 86% of schools with 200-299 pupils and 76% with 199 or less pupils. A higher proportion, 88%, of Science Leaders in England are classroom teachers compared with 72% in other UK countries. As with the

¹⁹ Within England 64% of schools have 200 or more pupils compared with 44% to all other countries in the UK

findings above, country and school size both impact on the likelihood of a Science Leader being a classroom teacher.

More than four-fifths (86%) of Science Leaders have overall responsibility for a class/es either on their own or as part of a job share. The year groups they have responsibility for is shown in Table 2 highlighting that Science Leaders work across a range of year groups.

Table 2: Classroom responsibility of Science Leaders as reported in the science leadership survey

	Has classroom responsibility for one year group	Has classroom responsibility for more than one year group or a mixed year group
Reception	10%	12%
Year 1	13%	28%
Year 2	13%	29%
Year 3	12%	49%
Year 4	19%	52%
Year 5	16%	44%
Year 6	17%	39%
Base	339	136

Science Leaders have led their subject for varying lengths of time either at their current school or in a previous school:

- 28% for one year or less
- 20% for two years or less (but more than one year)
- 24% for five years or less (but more than two years)
- 14% for 10 years or less (but more than five years)
- 14% for more than 10 years

Science Leaders have also worked in the teaching profession for varying amounts of time:

- 7% for two years or less
- 17% for five years or less (but more than two years)
- 27% for 10 years or less (but more than five years)
- 28% for 20 years or less (but more than 10 years)
- 21% for more than 20 years

Two-fifths (40%) of Science Leaders also lead another subject in their current school. Of these, 60% lead one other subject, 27% two other subjects with the remaining 13% leading three or more other subjects. The most commonly reported subject area is ICT/computing (25%) followed by maths, design and technology, English and PE (see full list in Appendix 2 (Table 13)).

Just under half (43%) of Science Leaders hold an A-Level or Advanced Higher in Biology, Chemistry or Physics (24% hold one qualification, 14% hold two and 6% hold all three). This is a higher proportion when compared to 29% of teachers.

Table 3: Proportion of Science Leaders who hold qualifications as reported in the science leadership survey

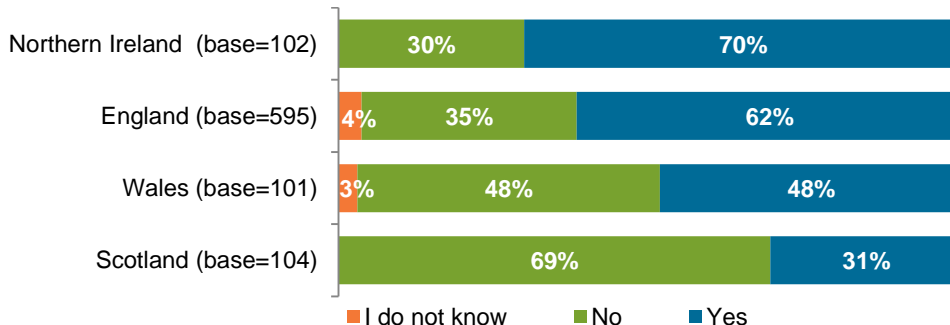
	% of Science Leaders who hold qualification
Biology A level or Advanced Higher	36%
Chemistry A level or Advanced Higher	19%
Physics A level or Advanced Higher	11%
None of the above	57%
Base	572

Science leadership in schools

School Development Plan

Across the UK, 60% of schools report that science is included in their School Development Plan for the 2016/17 academic year. Differences by UK country are evident with a higher proportion of schools in Northern Ireland (70%) and England (62%) stating yes in response to this question when compared to 48% in Wales and 31% in Scotland.

Figure 1: Whether science is included in the School Development Plan for 2016/17 as reported in the science leadership survey.

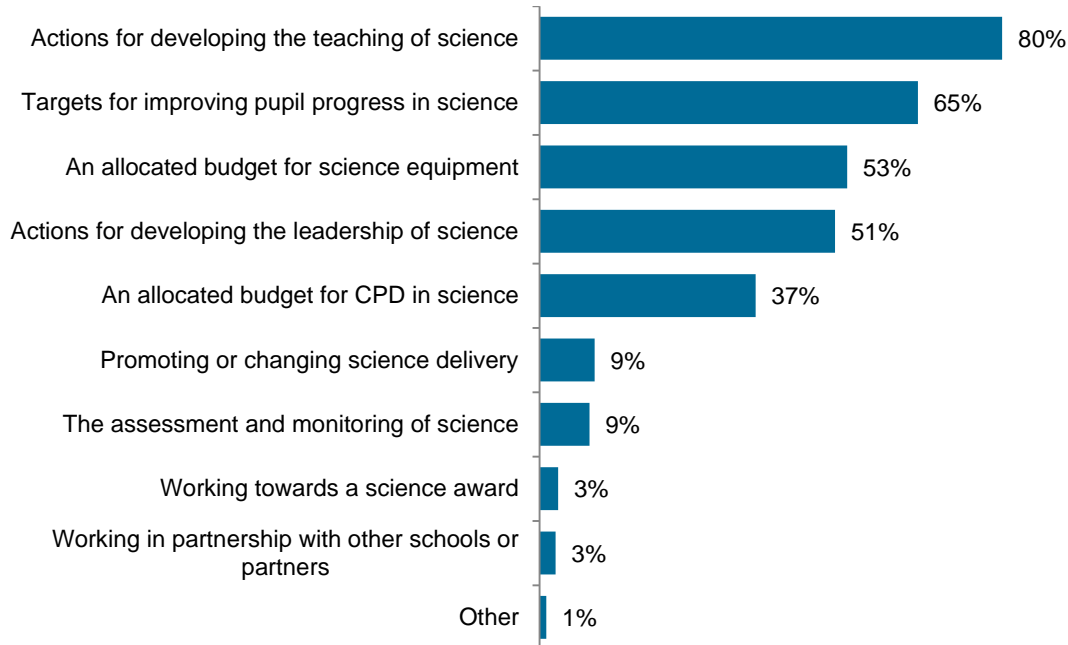


A higher proportion of schools with 100 or more pupils also report that science is included (63%) in their School Development Plan when compared to small schools (less than 100 pupils) at 51%. As with previous findings, the school's country²⁰ and size both impact on the likelihood of science being included within Development Plans.

²⁰ A school being in Northern Ireland does not influence the likelihood of having science in the School Development Plan.

Respondents who stated that science is included in their School Development Plan were asked to describe how. The findings indicate that science is included in a variety of ways: four-fifths (80%) have actions for developing the teaching of science, two-thirds (65%) have targets for improving pupil progress in science, 53% have an allocated budget for science equipment and 51% have actions for developing the leadership of science.

Figure 2: How Science is included in School Development Plans for 2016/17 (for those with a Development Plan) as reported in the science leadership survey. Unweighted base=506.



Release time for Science Leaders

Just over half (51%) of Science Leaders across the UK get specific release time to lead science in addition to time to plan their own lessons. At the country level, Science Leaders are more likely to get release time in England and Wales (53%) when compared to Northern Ireland and Scotland (25%). Moreover, there is a correlation between school size and likelihood of receiving release time, in that, as the size of the school increases in terms of pupil numbers so does the proportion of Science Leaders getting release time with 36% of Science Leaders in schools with less than 200 pupils receiving it compared with 57% in schools with 200 pupils or more.

The amount of release time taken by Science Leaders varies across schools: one-third (32%) take release time approximately once a term; 27% take it once every half-term; one-third (32%) take it at least once a month or more and 7% report that they take it less than termly.

Table 4: Frequency of release time for Science Leaders as reported in the science leadership survey

Frequency of release time	Proportion
Approximately every week	17%
Approximately every two weeks	8%
Approximately every month	7%
Approximately every half term	27%
Approximately every term	32%
Once or twice a year	7%
Ad hoc when needed	2%
Base	269

One-third (30%) of Science Leaders in receipt of release time take 10 hours or less a year and a similar proportion (32%) take between 11 and 20 hours. Just one-in-ten (11%) Science Leaders take 41 hours or more which equates to at least one hour per week.

Table 5: Number of hours of release time taken by Science Leaders as reported in the science leadership survey

Number of hours of release taken each year	Proportion
10 hours or less	30%
11-20 hours	32%
21-30 hours	9%
31-40 hours	18%
41 hours or more	11%
Base	263

Respondents to the teaching survey were asked for each subject they lead whether they have specific release time to fulfil the requirements of the role outside of time to prepare their own lessons (Table 6). This is most common for English at 68% closely followed by maths (65%) – both of which are higher than that reported for science at 51% in the science leadership survey.

Table 6: Release time for subject leadership as reported in the teaching survey (excluding science)

Subject	% of respondents who receive release time by subject	Base
English	68%	124
Maths	65%	113
Art	55%	64
History	54%	65
ICT/computing	54%	86
Religious Education	52%	34
Music	52%	46
Personal, social, health and economic education	48%	26
Geography	46%	50
Design and technology	44%	23
Topic/cross-curricular work	42%	45
PE	41%	69
French or another language	40%	40
Other	30%	17

Respondents were asked to state how often they took release time for the subject/subjects they lead (for 78% this is for one subject only). Just over one-third take release time every week (37%), 15% every two weeks and 10% every month.

Table 7: Frequency of release time as reported in the teaching survey

Frequency of release time for all subjects except science	Proportion
Approximately every week	37%
Approximately every two weeks	15%
Approximately every month	10%
Approximately every half term	12%
Approximately every term	24%
Other	2%
Base	277

One-fifth (21%) take 10 hours or less release time a year; a similar proportion take 11-20 hours and 5% take 21-30 hours. Over one-third (35%) take 41 hours or more.

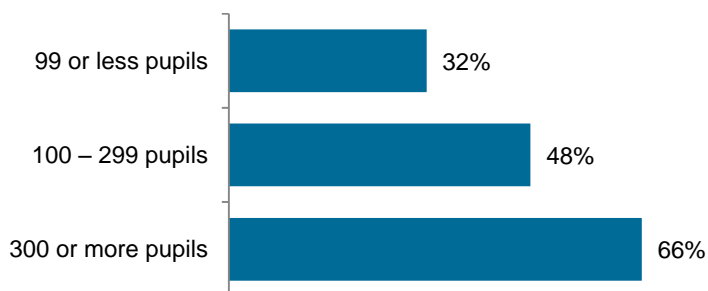
Table 8: Number of hours of release time per year as reported in the teaching survey

Number of hours of release time taken each year for all subjects except science	Proportion
10 hours or less	21%
11-20 hours	20%
21-30 hours	5%
31-40 hours	19%
41 hours or more	35%
Base	256

Science CPD for Science Leaders

In the last 12 months just over half (52%) of all Science Leaders state that they had undertaken external Continuing Professional Development (CPD) lasting one day or more to help them lead or develop science throughout their school. Science Leaders in larger schools are more likely to have undertaken CPD: two-thirds (66%) of those from schools with 300 or more pupils undertook CPD in the last 12 months compared to only one-third (32%) with less than 100 pupils (Figure 3).

Figure 3: Proportion of Science Leaders who have undertaken CPD by school size as reported in the science leadership survey. Unweighted base: 99 pupils or less=98, 101-299 pupils=285, 300 or more pupils=168.



Amongst those Science Leaders who took part in CPD in the last 12 months, 39% undertook one day, 24% undertook two days, 20% undertook three days and the remaining 18% undertook four or more days.

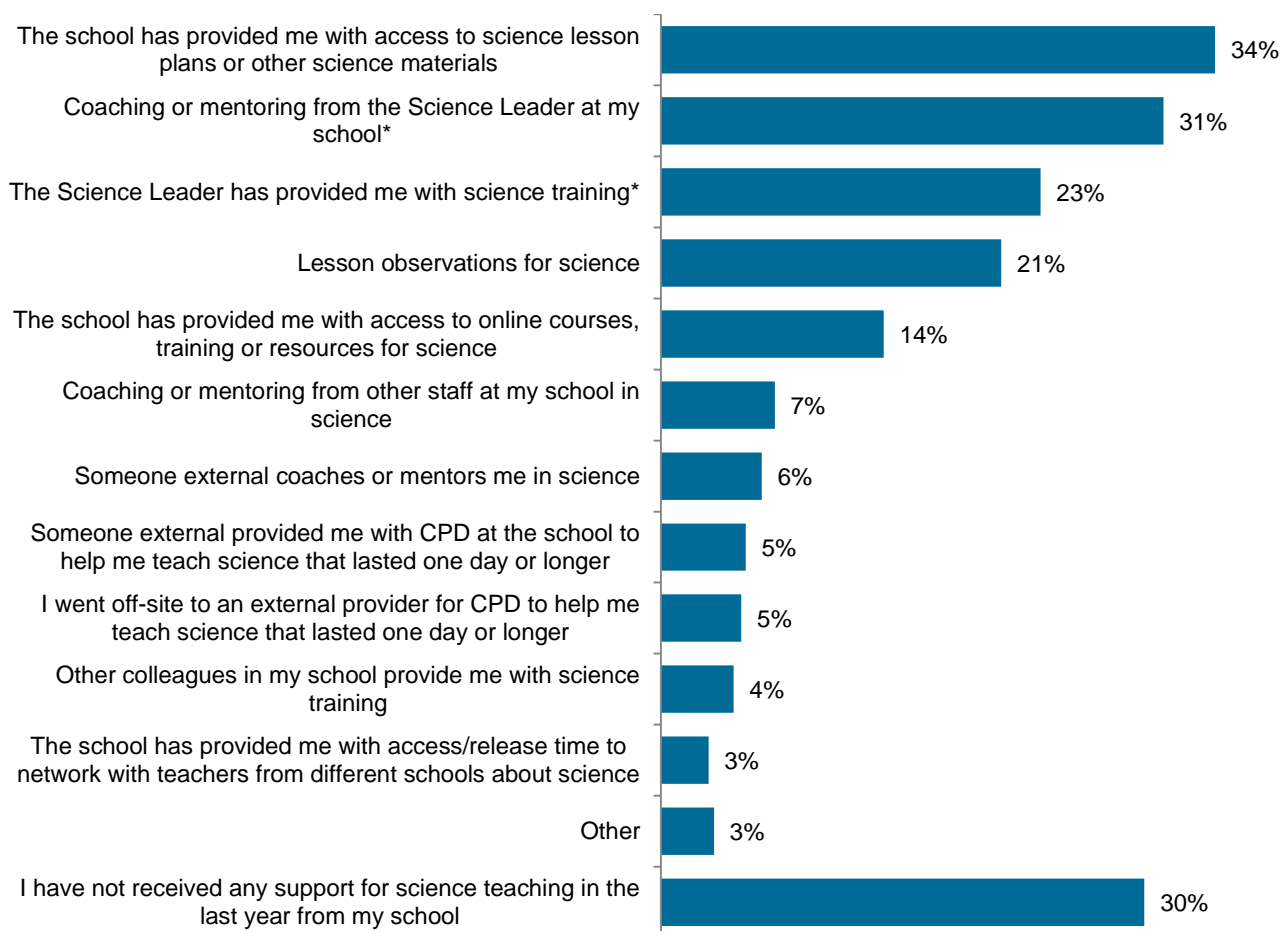
Science Leaders undertook CPD which covered a range of different topic areas. Over two-fifths (41%) of those who undertook training relating to pedagogy and science subject knowledge and teaching practices, for example, outdoor learning, embedding science in other curriculum areas and using science investigations. Nearly one-third (32%) report undertaking training relating to the leadership of science in their school and one-quarter (25%) indicate development in the assessment of science. Just over one-in-ten (12%) had undertaken training to enable them to achieve the Primary Science Quality Mark²¹ in their school.

Science CPD for teachers

Respondents to the teaching survey were asked to state what support their school had given them to improve their science teaching in the last 12 months. The most frequently reported methods are the school providing access to lesson plans and materials (34%), coaching or mentoring from their Science Leader (31%), science training from their Science Leader (23%), and lesson observations (21%). Just under one-third (30%) had not received any support.

²¹ The Primary Science Quality Mark is an award scheme to enable primary schools across the UK to evaluate, strengthen and celebrate their science provision. <http://www.psqm.org.uk/>

Figure 4: Support received to improve science teaching in the last 12 months as reported in the teaching survey (excluding Science Leaders). Unweighted base=833, those with a * base =723.



Length of time in the teaching profession does not influence likelihood of receiving support to teach science but many other factors do.

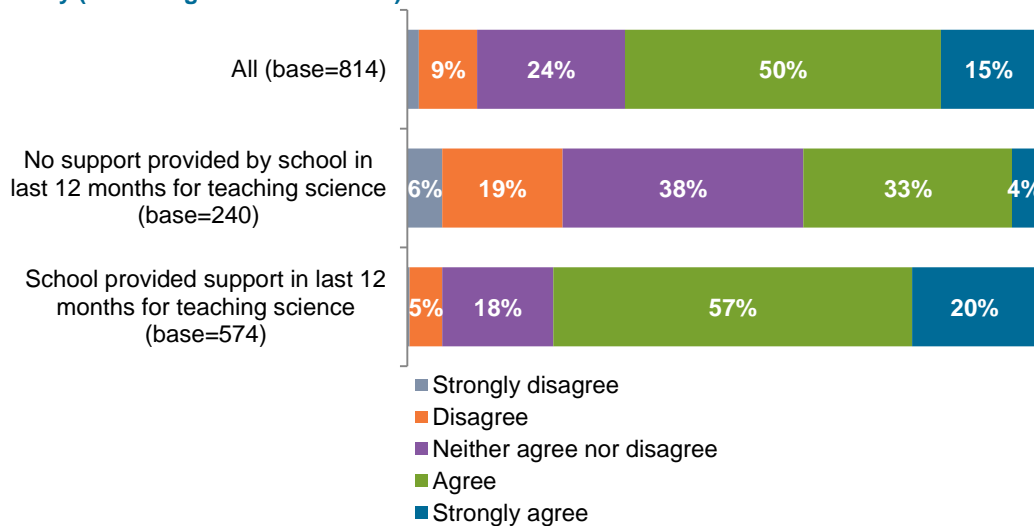
- 32% of teachers in schools who do not hold the Primary Science Quality Mark did not receive support, this fell to 10% for schools with the award (or who are currently applying for the award).
- Schools in which the Science Leader has received CPD in the last 12 months have fewer unsupported teachers (14%) as compared to schools in which the Science Leader has not received CPD (33%).
- Schools in which the Science Leader/Headteacher state that science is ‘very important’ to the Senior Leadership Team had fewer unsupported teachers (14%) than schools where views of science ranged from ‘very unimportant’ through to ‘important’ (28%).
- A lower proportion of teachers in Scotland say they received no support (19%) compared with other UK countries (31%); this may reflect the mandatory nature of CPD in Scotland.

Of the 9% who report accessing external CPD lasting one day or more (either going off-site or delivered at the school), 54% undertook one day, 18% two days, 13% three days and the remaining 15% undertook 4 days or more.

In the last 12 months just over one-quarter (15%) of teachers report accessing other forms of support to improve their science teaching independently of their school²². The majority (58%) of these had accessed a range of online resources followed by 18% having undertaken a course or some form of training (7%). Just over 1 in 10 had collaborated with other teachers to share effective practice (11%). A small number of teachers also commented that they had sought advice from informal networks including friends, family or local employers.

Teachers were asked to state to what extent they agreed that they feel supported by their school to teach science. Two-thirds (65%) state that they either ‘agree’ or ‘strongly agree’ whilst one-quarter (24%) ‘neither agree nor disagree’ and 11% either ‘disagree’ or ‘strongly disagree’. This was further examined by whether a respondent had received any support to improve their teaching in the last 12 months (see Figure 5 overleaf). A higher proportion of teachers who received no support state they don’t feel supported by their school to teach science with 25% stating ‘strongly disagree’ or ‘disagree’ compared to 6% who received support.

Figure 5: Extent to which teachers feel supported to teach science by their school as reported in the teaching survey (excluding Science Leaders)

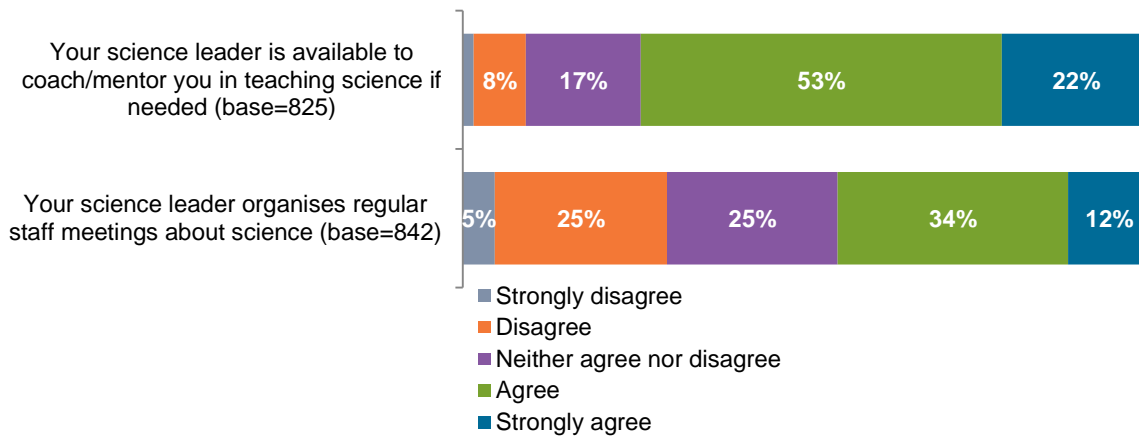


A higher proportion of teachers state ‘strongly agree’ or ‘agree’ to feeling supported to teach science where the school currently hold or are applying for PSQM at 76% compared with 63%. Where respondents report there is a Science Leader in their school 69% of teachers ‘strongly agree’ or ‘agree’ compared with 41% where there is no Science Leader.

²² There was no difference by whether an individual had received support from the school

Those respondents to the teaching survey who reported that there was a Science Leader in their school were asked to what extent they agreed or disagreed with the statements in Figure 6. Three-quarters (73%) ‘strongly agree’ or ‘agree’ that their Science Leader is available to coach or mentor them in teaching science; however, less than half (45%) ‘strongly agree’ or ‘agree’ that their Science Leader organises regular meetings about science. Just under one-third (30%) ‘strongly disagree’ or ‘disagree’ with this.

Figure 6: Extent to which respondents agree with statements about their Science Leader as reported in the teaching survey (excluding Science Leaders)



Moderating the assessment of science

Across schools in the UK just under one-third (28%) moderate the assessment of science with other schools: 70% do not and 1% did not know. Moderation is more evident in Wales with 88% of schools reporting this practice compared to 28% in England, 23% in Scotland and 11% in Northern Ireland. There is little difference by school size.

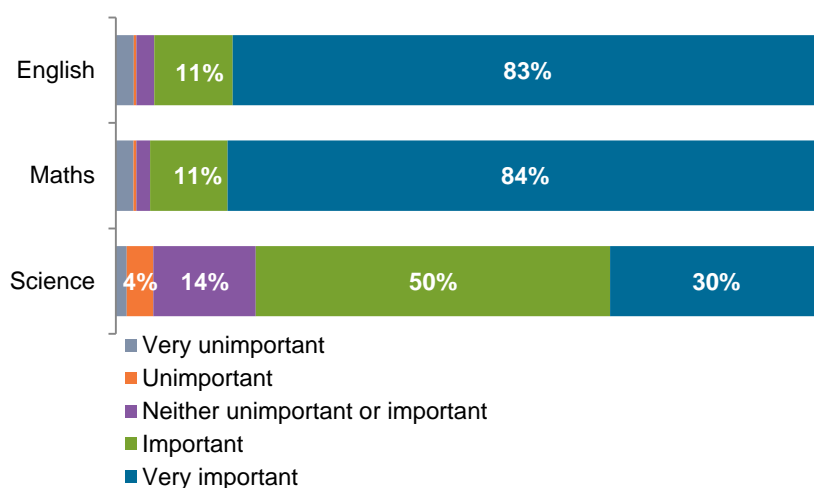
03. VIEWS OF SCIENCE

This section explores attitudes towards and confidence in the teaching of science in primary schools across the UK.

The importance of science

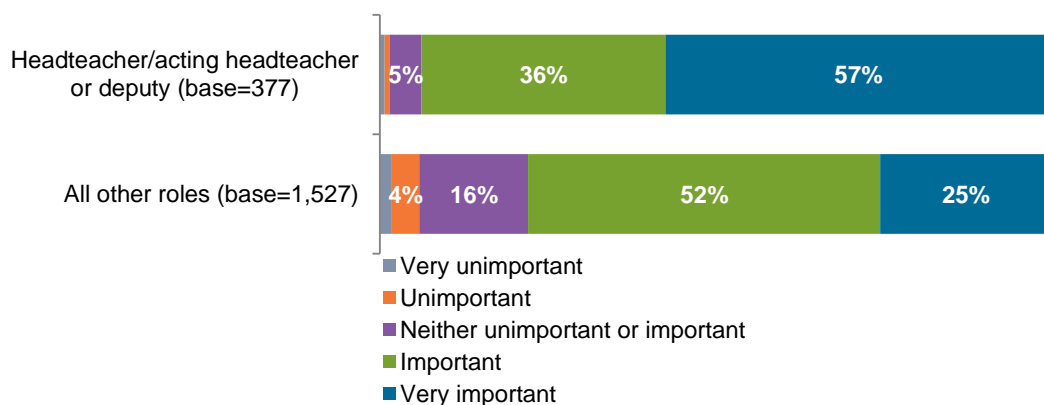
Respondents to both the science leadership and teaching surveys were asked to state how important they think certain subjects are to the Senior Leadership Team of their school. The majority (95%) state that both English and maths is ‘very important’ or ‘important’ whilst only 80% consider that their school view science in the same way. Only one-third (30%) think science is ‘very important’ compared with 83% for English and 84% for maths. A further 14% state it is ‘neither important nor important’.

Figure 7: The perceived importance of subjects in school as reported in the science leadership and teaching surveys. Unweighted base=1,905.



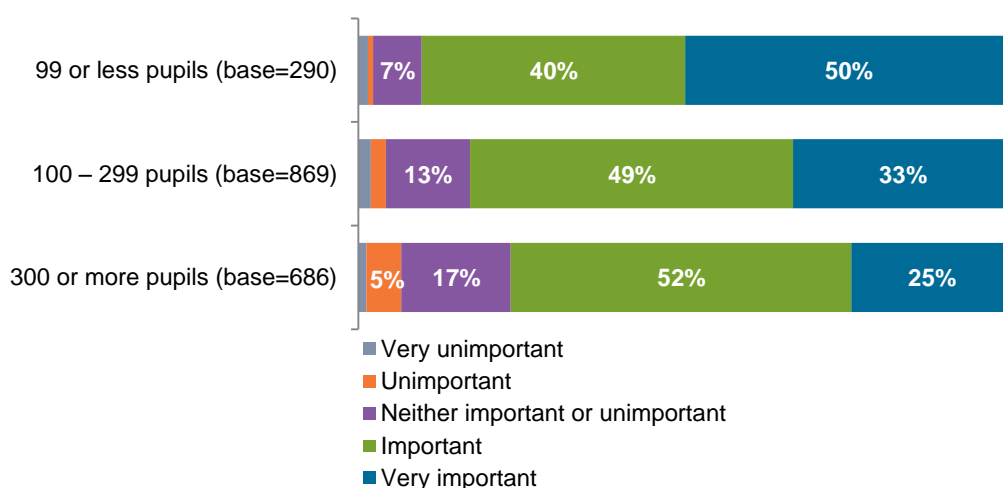
Whether someone is a Science Leader makes little difference to their perceived importance of science in a school. However, the role of the participant does reveal differences. A much higher proportion (57%) of Headteachers, Acting Headteachers and Deputy Headteachers state that science is ‘very important’ to their school compared with 25% in other roles (predominantly as classroom teachers).

Figure 8: The perceived importance of science in school by role as reported in the science leadership and teaching surveys



There are also differences by school size with a higher proportion of respondents in small schools (50%) stating ‘very important’ compared with 33% for schools with 100-299 pupils and 25% for larger schools. There is little difference by country alone when combining the categories ‘very important’ and ‘important’. A higher proportion of schools in Wales (49%) state ‘very important’ when compared with 29% across other UK countries.

Figure 9: The perceived importance of science in school by size as reported in the science leadership and teaching surveys



Further analysis²³ was undertaken to determine which of the following have the greatest influence on whether an individual state science is ‘very important’: school size, country or the role of respondents. The findings shows that all three characteristics are influential. Those which significantly increase a school’s likelihood of saying that science is ‘very important’ are shown in order of importance:

- respondents who are Headteachers, Acting Headteachers and Deputy Headteachers when compared to all other roles
- a school being in Wales (when compared to England)
- being a smaller school

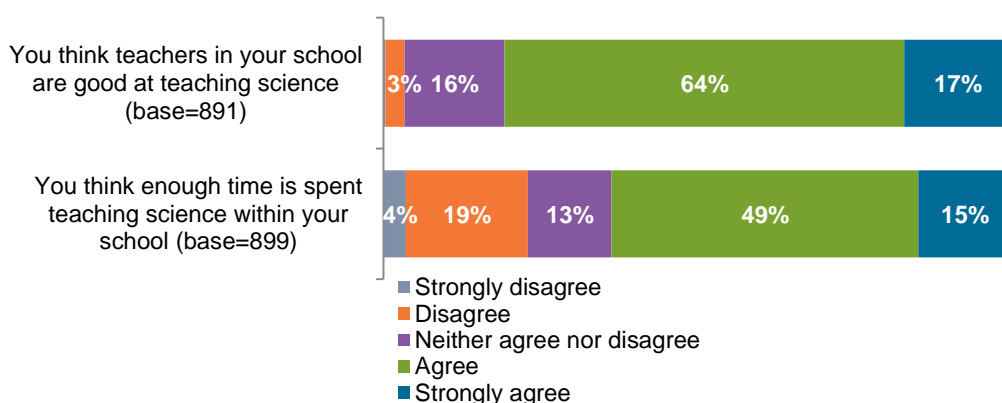
²³ Logistic regression

Attitudes towards the teaching of science

Two-thirds (64%) of Science Leaders report that enough time is spent teaching science in their school. When exploring differences at the country level, it is apparent that respondents to the science leadership survey in Northern Ireland are markedly more dissatisfied with science teaching time than their counterparts in England, Wales and Scotland: 8% of respondents in Northern Ireland indicate ‘strongly disagree’ and 40% ‘disagree’ when asked if they thought enough time was spent teaching science within their school. Whilst a minority of all respondents disagree that teachers are good at teaching science (with 3% stating ‘strongly disagree’ and 16% ‘disagree’), most participants consulted consider that it is well taught within their schools. This is applicable across all countries of the UK.

Just under three-fifths (58%) of respondents state they ‘strongly agree’ or ‘agree’ that enough time is spent teaching science *and* that teachers are good at teaching science in their schools. Only 3% ‘strongly disagree’ or ‘disagree’ with both statements. Analysis indicates that one-tenth of those who ‘strongly agree’ or ‘agree’ that teachers in their school are good at teaching science ‘strongly disagree’ or ‘disagree’ that enough time is spent teaching science in their school.

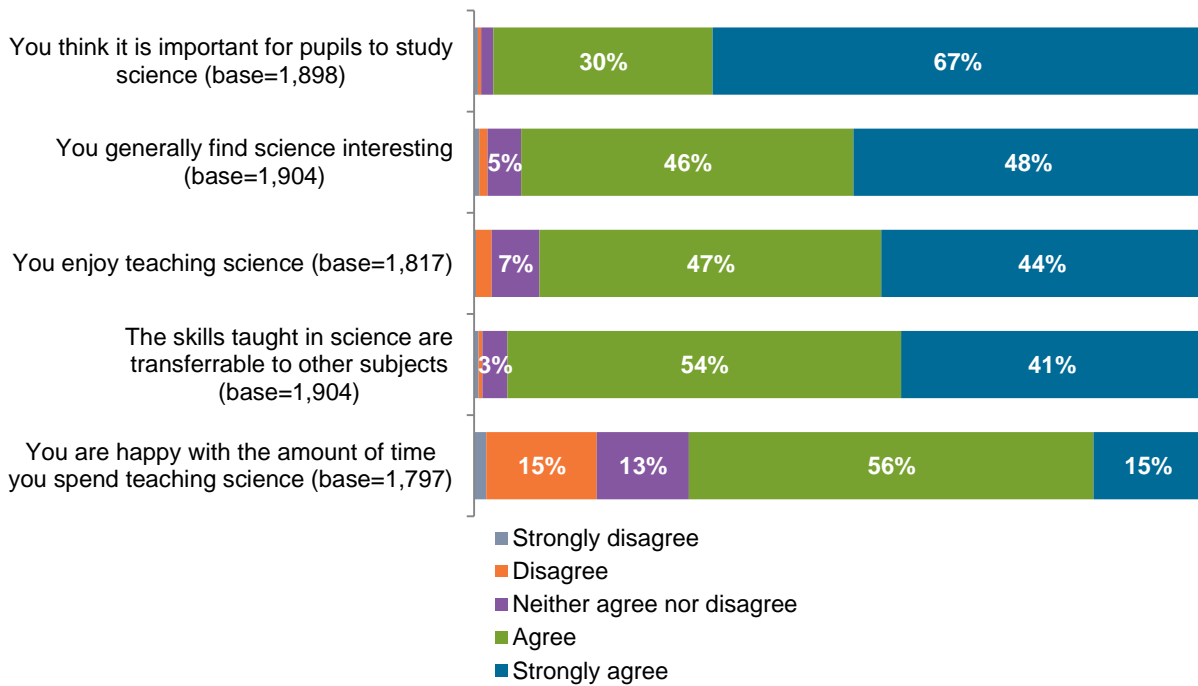
Figure 10: Extent of agreement about time spent teaching science and how good teachers are at teaching science as reported in the science leadership survey



Respondents to the science leadership and teaching surveys were asked to state to what extent they ‘agree’ or ‘disagree’ with statements about their views of science. The majority of participants (97%) ‘strongly agree’ or ‘agree’ that it is important for pupils to study science. Moreover, a similar proportion (95%) ‘strongly agree’ or ‘agree’ that the skills taught in science are transferrable to other subjects; however, the proportion indicating ‘strongly agree’ is noticeably lower when compared to the previous statement.

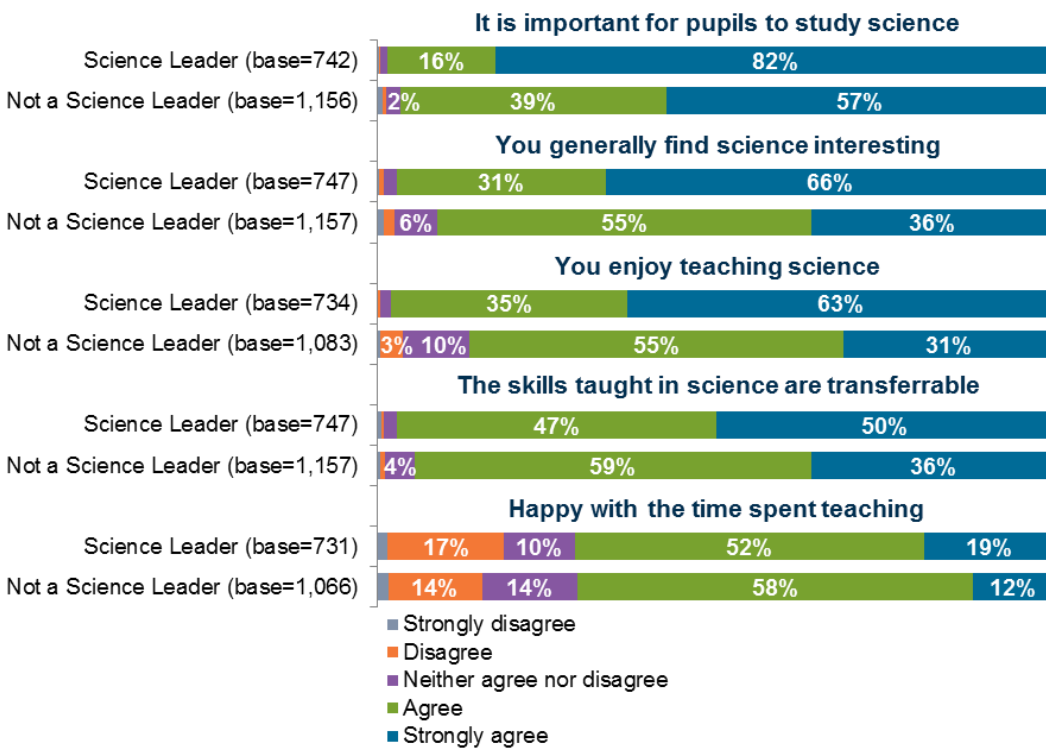
Nearly one-sixth (15%) ‘strongly agree’ and 56% ‘agree’ that they are happy with the amount of time they spend teaching science’, whilst one-sixth (17%) ‘strongly disagree’ or ‘disagree’ and 13% ‘neither agree nor disagree’. This differs by country with 43% of respondents in Northern Ireland stating they ‘strongly agree’ or ‘agree’ compared with 67% in Wales, 69% in Scotland and 72% in England.

Figure 11: Extent of agreement about science views as reported in the science leadership and teaching surveys



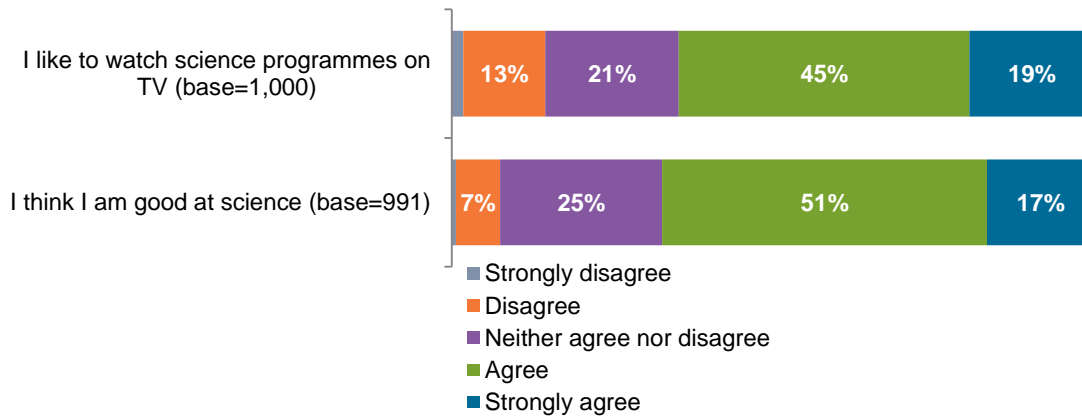
These statements were further explored to examine if differences were found by role. A higher proportion of Science Leaders ‘strongly agree’ to all statements when compared to other respondents.

Figure 12: Extent of agreement about science views by role as reported in the science leadership and teaching surveys



Those who responded to the teaching survey were asked to rate a further two statements about their personal views of science. Two-thirds (67%) ‘strongly agree’ or ‘agree’ that they consider themselves to be good at science whilst a similar proportion like to watch science programmes on TV (45% ‘strongly agree’ and 19% ‘agree’).

Figure 13: Extent of agreement about own teaching as reported in the teaching survey

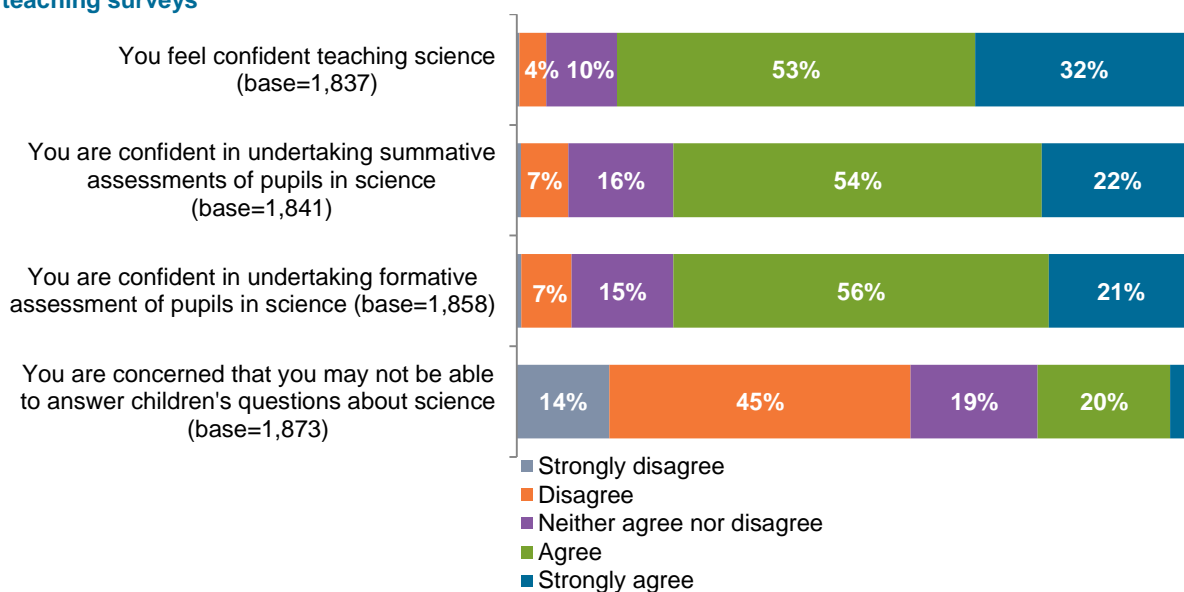


Teachers were asked to state the first three words which come to mind when describing science. Over two-fifths (41%) of the responses provided relate to scientific experiments or investigations (with words such as ‘Investigation’, ‘Experiment’ and ‘Practical’ cited) whilst 4% state specific science subject areas. One-third (34%) report words which relate to a positive emotion about science, such as ‘Fun’, ‘Exciting’, ‘Interesting’ and ‘Engaging’. Conversely, around 5% indicate negative emotions or those which relate to science being ‘Challenging’ or ‘Difficult’.

Confidence

Respondents to both surveys were asked to state to what extent they ‘agree’ or ‘disagree’ with confidence statements about teaching and assessing science. Just under one-third (32%) ‘strongly agree’ that they are confident in teaching science, with a slightly lower proportion providing the same response in regard to their confidence undertaking summative assessments (22%) and formative assessments (21%). Less than one-quarter (23%) of respondents ‘strongly agree’ or ‘agree’ that they are concerned that they might not be able to answer children’s questions about science.

Figure 14: Extent of agreement about confidence teaching science as reported in the science leadership and teaching surveys



Further analysis was undertaken to explore if individual or school level characteristics influence confidence.²⁴ Differences were found although these only account for 18% of the variance in confidence levels with other factors which have not been measured through the study accounting for this instead. Those characteristics that influence confidence are shown in order of importance:

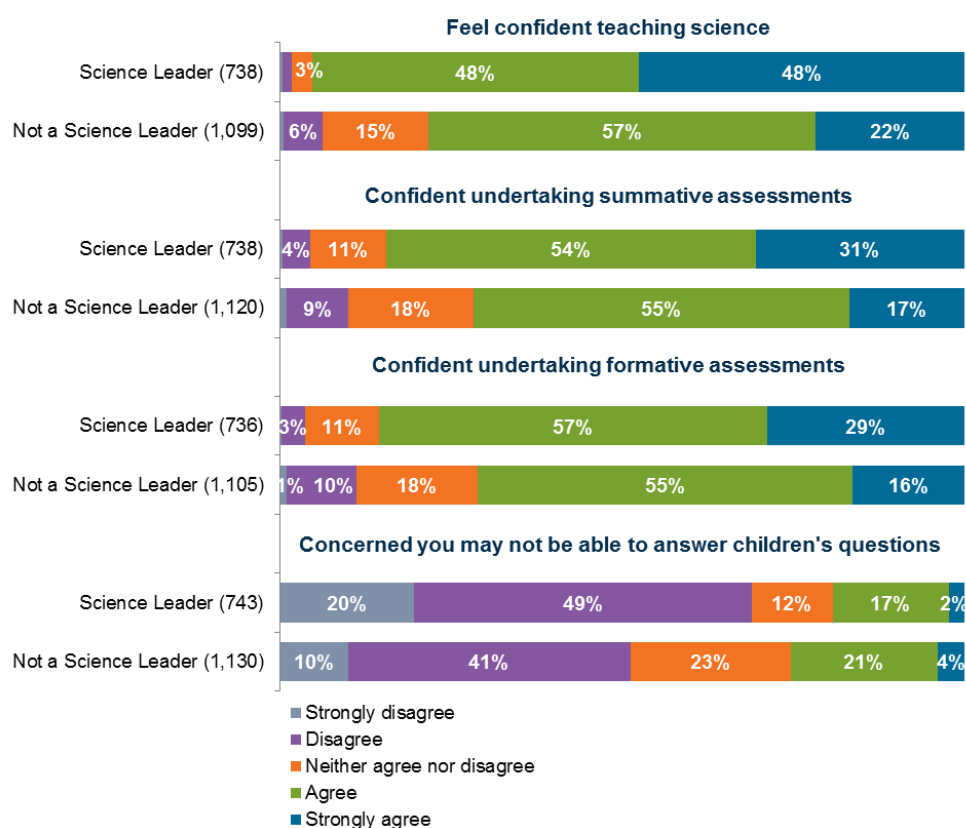
- Those holding a science A level²⁵ or Advanced Higher are more confident
- Being a Science Leader increases their confidence
- Headteachers, Acting Headteachers or Deputy Headteachers are more confident when compared to other roles
- Teachers in Scotland and then Northern Ireland are less confident
- Those who had been longer in the teaching profession had increased confidence
- Those in a school with a Science Leader are more confident
- Males are more confident

Figure 15 shows the breakdown of confidence by whether or not someone is a Science Leader highlighting that 48% of Science Leaders state they ‘strongly agree’ they are confident teaching science compared to 22% of those who are not. One-quarter (25%) of those respondents who state that they have been in the teaching profession for 5 years or less ‘strongly agree’ they are confident teaching science compared with 35% of those who have been teaching for more than 5 years (a full breakdown can be seen in Table 14 of Appendix 2, the breakdown by country can also be seen in Figure 38 of Appendix 2).

²⁴ Multiple regression. Variables added into the model but no differences found for: number of pupils in a school, if an individual works full or part-time, and the school being in Wales.

²⁵ This has been defined as holding a Biology, Chemistry or Physics A level or Advanced Higher.

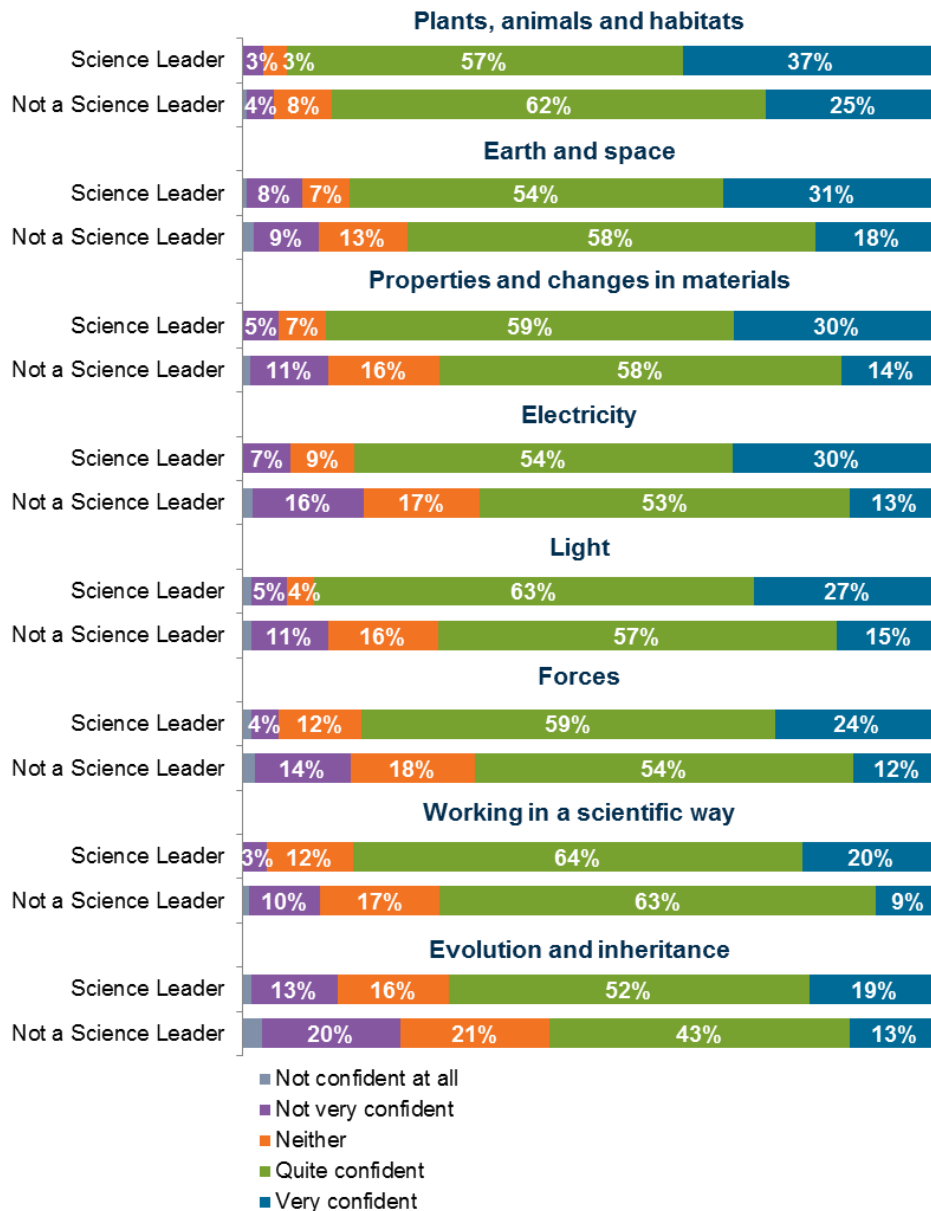
Figure 15: Extent of agreement about confidence teaching science by role as reported in the science leadership and teaching surveys



Analysis was also undertaken on responses to the teaching survey to further explore confidence. Over three-quarters (76%) of those teachers (excluding Science Leaders) who state that they ‘strongly agree’ they are good at science also ‘strongly agree’ they are confident teaching science. Just under half (47%) of all teachers who ‘strongly agree’ that they like to watch science programmes also ‘strongly agree’ they are confident teaching science (see Figure 39 in Appendix 2). Additional analysis also highlights that a lower proportion (13%) of teachers (who were not Science Leaders) who have not received any support from their school in the last 12 months ‘strongly agree’ they are confident teaching science when compared to 20% of those who received some form of support in the preceding year.

Respondents to the teaching survey were asked how confident they were in teaching the aspects of science shown in Figure 37 in Appendix 2. A higher proportion state they are ‘very confident’ or ‘confident’ at teaching plants, animals and habitats (88%), followed by earth and space (78%), light (75%), and properties and changes in materials (75%). Only 59% state this for evolution and inheritance.²⁶ A higher proportion of respondents to the teaching survey who are Science Leaders report they are ‘very confident’ or ‘quite confident’ in all of these topics (Figure 16).

Figure 16: Confidence teaching aspects of science by role as reported in the teaching survey. Base=Science Leader=175, non-Science Leader=830.

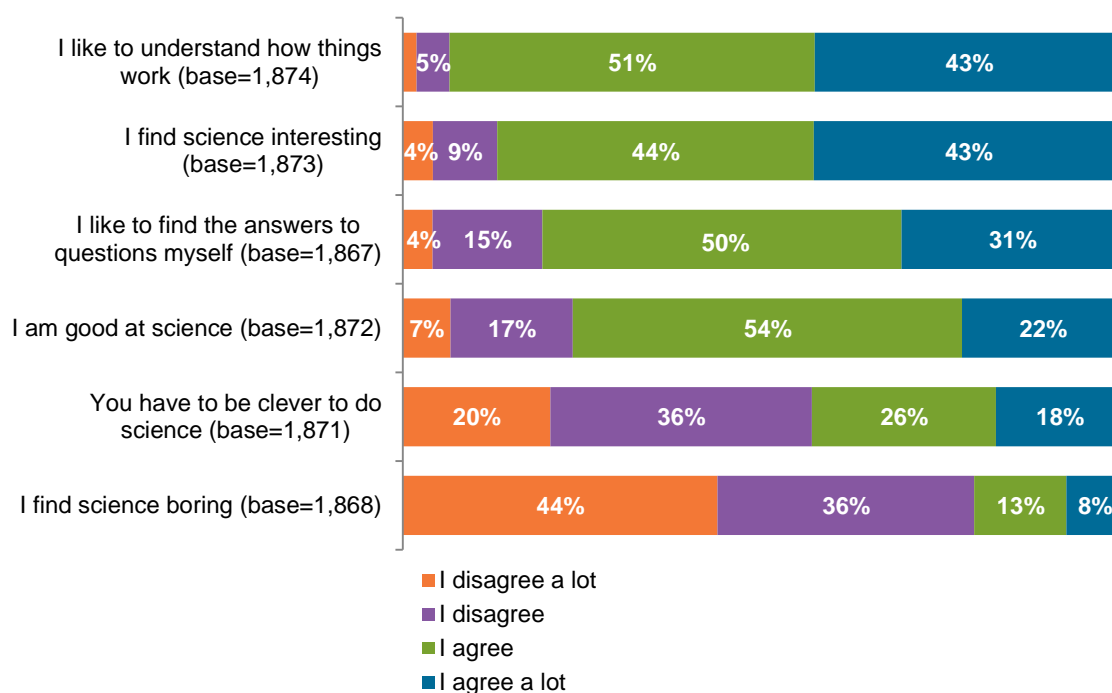


²⁶ The areas listed apply to the National curriculum in England although it is important to note that not all topics are taught to all year groups which may explain some of the variation in confidence levels reported (in that, a teacher may not be required to teach the topic to their year group). Furthermore, not all of the curriculum areas listed apply to all the other countries of the UK with some differences observed.

Pupils perspectives of science

Pupils were asked to rate to what extent they agreed with statements about their personal views of science. The majority of pupils (93%) ‘agree a lot’ or ‘agree’ that they like to understand how things work whilst 87% find science interesting and 81% like to find the answers to questions themselves. Views about whether someone needs to be clever to do science varied: 43% ‘agree’ or ‘agree a lot’ whilst 57% ‘disagree’ or ‘disagree a lot’.

Figure 17: Extent to which pupils agree with science statements



A higher proportion of male pupils report ‘a lot’ in response to the statements:

- ‘I find science interesting’ (47% compared to 39% of females)
- ‘You have to be clever to do science’ (21% compared to 15%)
- ‘I like to find answers to questions myself’ (33% compared to 28%)
- ‘I like to understand how things work’ (46% compared to 40%)

They are also more likely to state ‘I disagree a lot’ in response to the statement ‘I find science boring’ (47%) compared with 40% of female students.

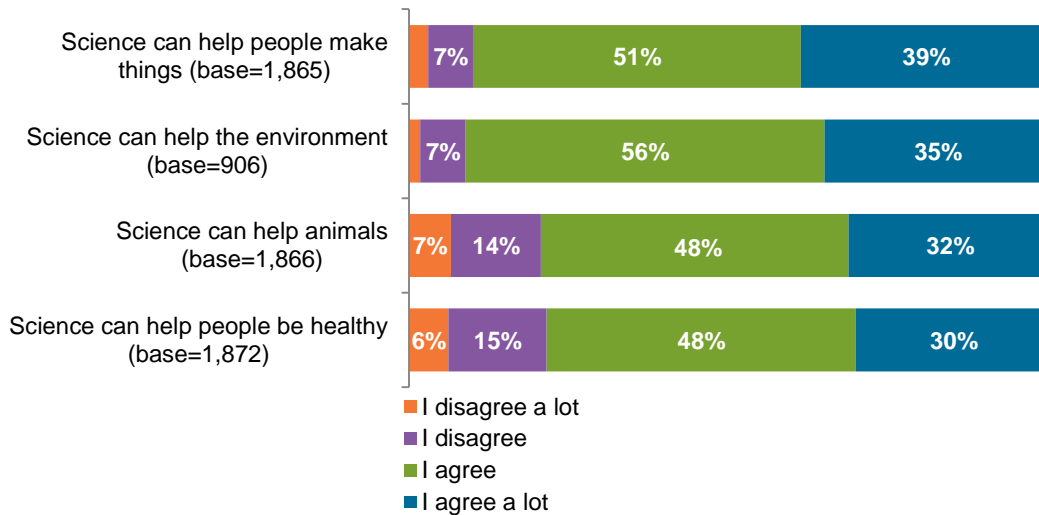
Across three statements (as shown in Table 9) a lower proportion of pupils in older year groups state ‘a lot’ when compared to younger age groups.

Table 9: Proportion of pupils that state ‘a lot’ by year group to science statements

	Proportion of pupils stating ‘I agree a lot’			
	I like to find answers to questions myself	I like to understand how things work	You have to be clever to do science	Base
Year 3	42%	56%	31%	430-432
Year 4	33%	45%	24%	446-447
Year 5	24%	37%	11%	456-458
Year 6	24%	34%	7%	447-450

Nearly all pupils ‘agree a lot’ or ‘agree’ (91%) that ‘science can help the environment’ followed by ‘science can help people make things’ (90%). Over three-quarters (80%) ‘agree a lot’ or ‘agree’ that ‘science can help animals’.

Figure 18: Extent to which pupils agree with how science can help



A higher proportion of male students report ‘a lot’ to the statements (all statements excluding helping the environment as shown in Table 15 Appendix 2) when compared to female students, as were younger year groups. However, when combining ‘I agree a lot’ and ‘I agree’ for statements ‘science can help animals’ and ‘science can help people be healthy’ a higher proportion of pupils in older year groups state these things.

Over one-third of pupils (36%) in Years 5 and 6 ‘agree a lot’ (13%) or ‘agree’ (24%) that when they grow up they would like a job that uses science. A higher proportion of boys state ‘agree a lot’ (16%) compared to 9% of girls. Pupils were asked to state what job they would like when they grow up. Nearly one-third (30%) report a science related job with little difference by gender. The type of job did, however, differ by gender; for example, boys are more likely to want a job in engineering (or a related industry) or as a ‘scientist’ whereas girls are more likely to state they wish to be a vet (or another job related to animals) or pursue a career in healthcare/medicine.

Table 10: Science related job reported by pupils

Science job	Boys	Girls
Vet/animal related	10%	42%
Engineering	35%	2%
Healthcare/medical	12%	38%
Astronaut	10%	2%
Scientist	30%	13%
Base	115	126

‘Finding new species of animals and sea life’
 ‘I would like to be an astronomer’
 ‘Either a professional footballer or engineer’
 ‘I would like to be a scientist and help people’
 ‘I would like to have a job in forensics’
 ‘I would love to be a chemist mixing elements’

Just under half (49%) of pupils who state ‘I agree a lot’ or ‘I agree’ to wanting a job that uses science went on to state a science related job when they were grown up. Alongside this nearly one-fifth (19%) who ‘disagree’ or ‘disagree a lot’ report a science related job.

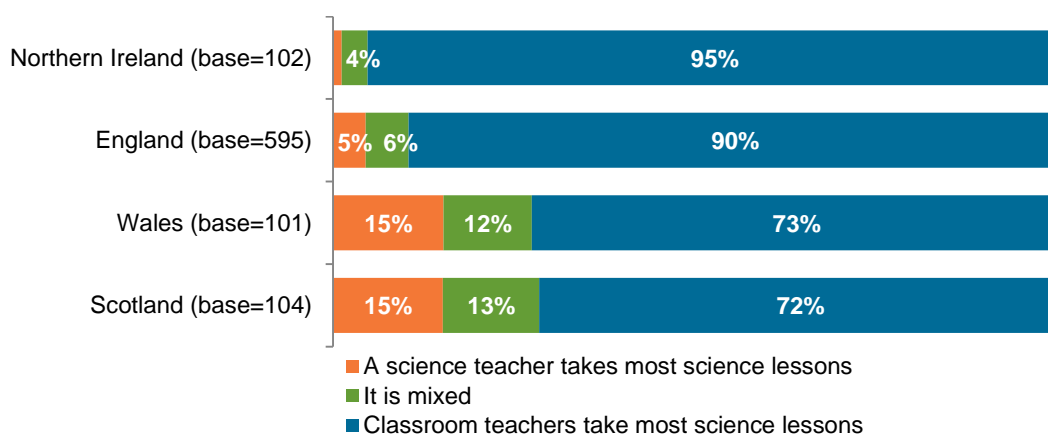
04. THE DELIVERY OF SCIENCE

This section explores how science is taught in UK primary schools. It examines the overall delivery model and hours of teaching by year group.

Who teaches science

In the vast majority (89%) of UK schools, classroom teachers deliver most science lessons. Just 5% of schools have a science teacher who takes science lessons whilst the remaining 6% have a mix of the two. A higher proportion of schools in Wales and Scotland (15%) have a specific science teacher compared to 5% in England and 1% in Northern Ireland.

Figure 19: Who teaches science in schools as reported in the science leadership survey



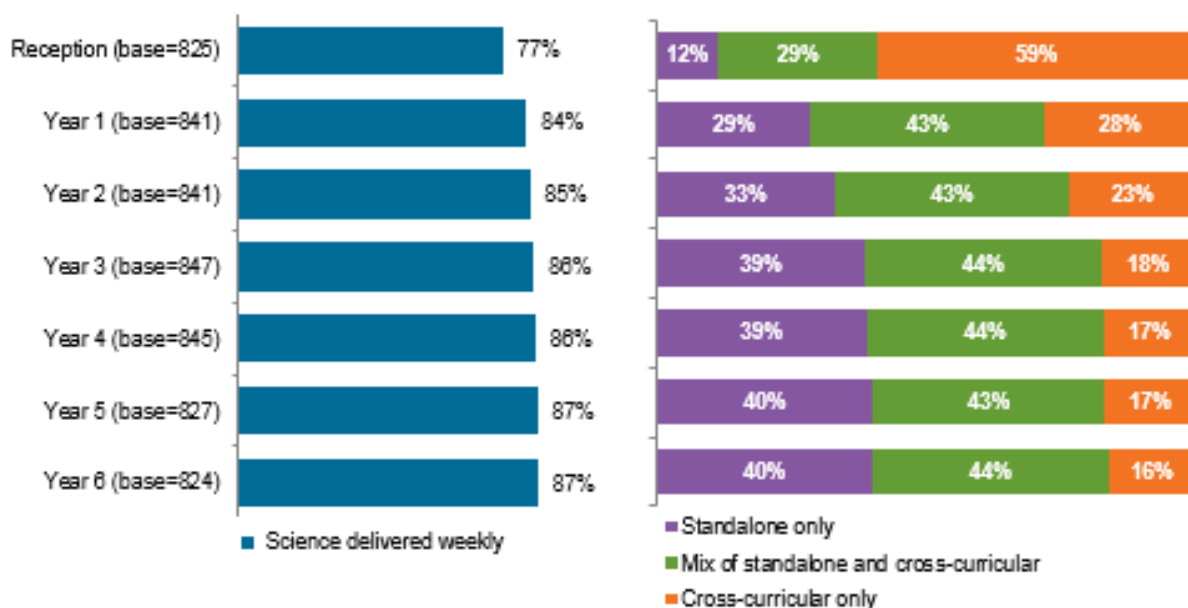
When examining the differences by school size, 13% of small schools (less than 100 pupils) have a specific science teacher when compared to larger schools with only 2% at schools with 300 or more pupils (see Figure 40 in Appendix 2 for a full breakdown). As with previous analysis, both country and school size impact on the likelihood of classroom teachers teaching science.

Regularity of science teaching

Teaching science weekly

Respondents to the science leadership survey were asked whether their school taught science weekly either as an individual subject or as part of cross-curricular work. Across UK schools a high proportion of year groups are taught science weekly; this is more common in Years 1-6 when compared to Reception. Standalone lessons are more prevalent for older year groups with younger pupils (especially Reception) more likely to receive cross-curricular work.

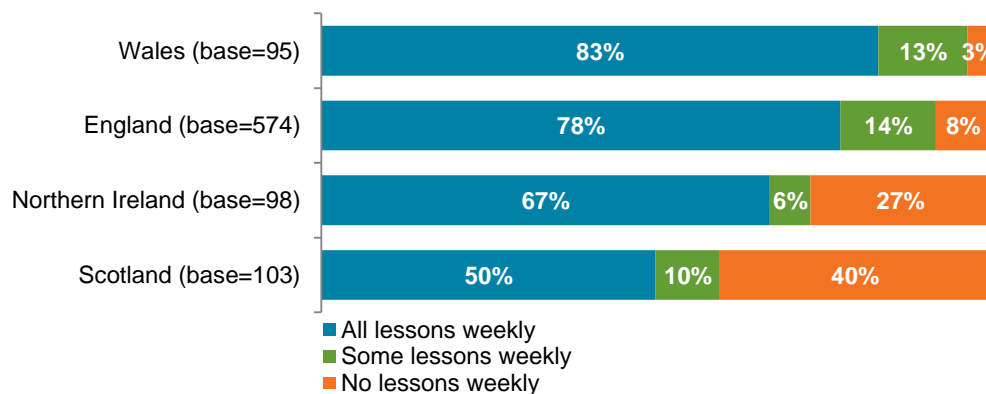
Figure 20: Weekly science delivery by year group and mode of delivery as reported in the science leadership survey



The same analysis was undertaken on the merged teaching and science leadership survey (where individuals personally taught science). A similar proportion of teachers reported delivering science weekly to their pupils (see Figure 41 in Appendix 2).

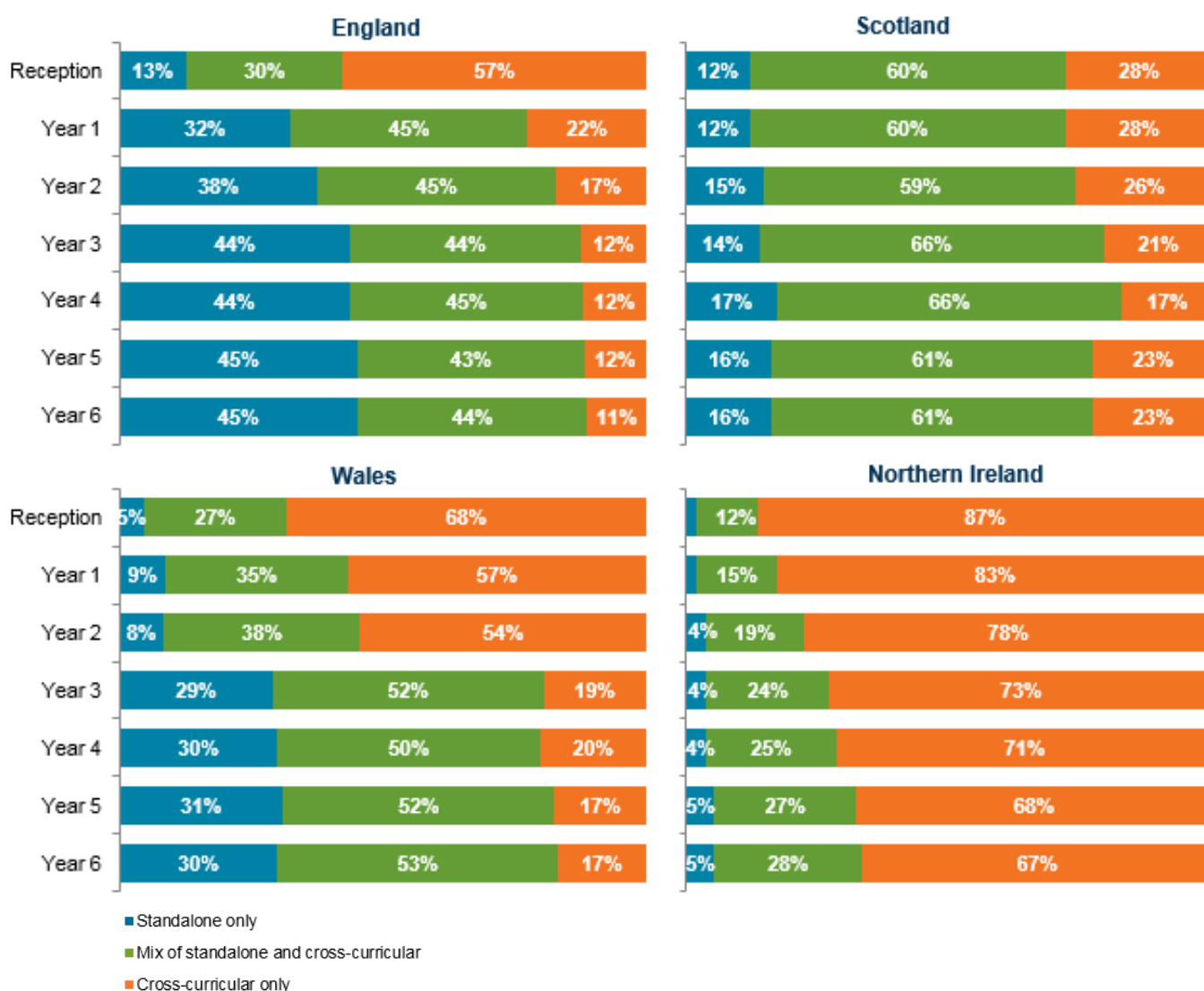
Weekly science lessons either as standalone lessons or as part of cross-curricular work are more common in England and Wales than in Northern Ireland and Scotland. Three-quarters (75%) deliver science weekly to all years in their school either through standalone lessons, cross-curricular work or a mix of both. 13% provide weekly science lessons to some years whilst 12% deliver no weekly science to any year groups.

Figure 21: Weekly delivery at the school level by country as reported in the science leadership survey.



Standalone lessons are more common in England and Wales for older year groups. Cross-curricular lessons are more popular for all year groups in Northern Ireland, for Reception pupils in England, and for Reception and Key Stage 1 pupils in Wales. This reflects the differences in curriculums across the countries (as discussed in the introductory section).

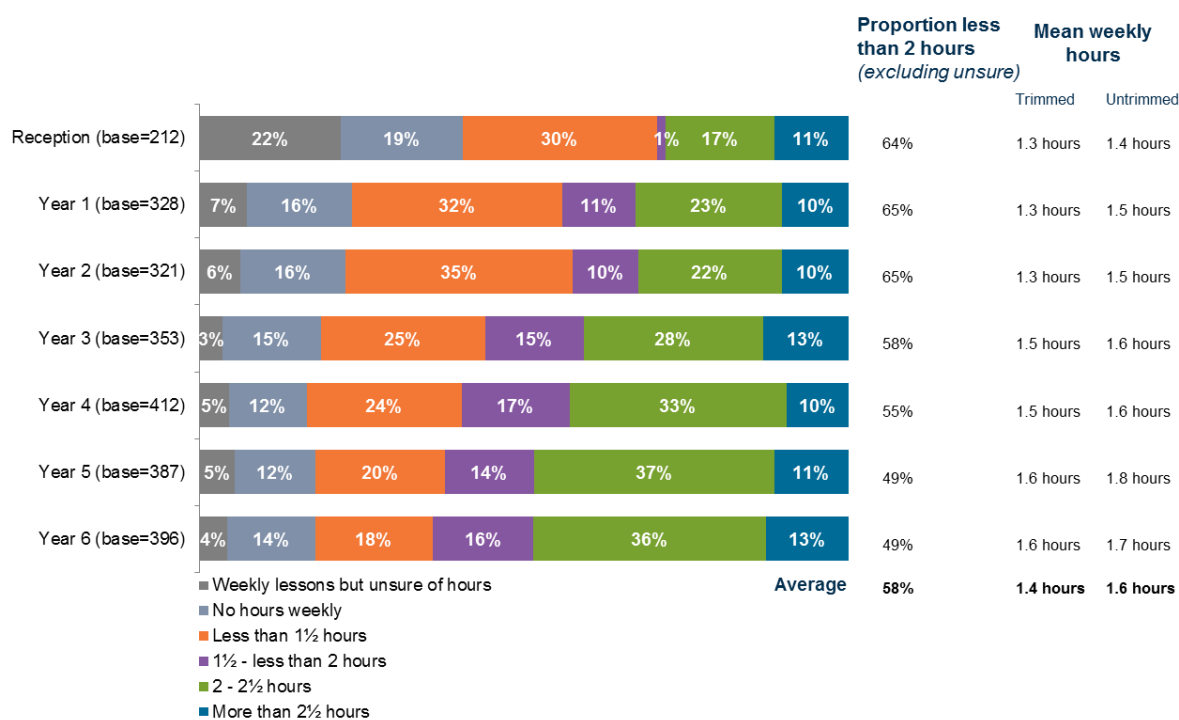
Figure 22: Weekly science delivery by mode and country as reported in the science leadership survey. Base=variable. England 422-489, Scotland 52-63, Wales 69-91 and Northern Ireland 64-69).



Weekly hours of delivery

Those participants (in the science leadership and teaching surveys) who taught science weekly as either standalone lessons or as part of cross-curricular work were asked how many hours of science they teach each week. Nearly one-quarter (22%) of those teaching Reception pupils are unable to estimate the amount of time they spend teaching science. For the remaining year groups, the proportion who could not indicate the number of hours of science teaching is much lower. On average, science is taught weekly for 1.4 hours a week (1 hour and 24 minutes) and 58% of classes receive less than 2 hours a week. Lower year groups received fewer hours of weekly lessons with the amount of science taught increasing as pupils become older.

Figure 23: Hours of weekly science delivery by year group as reported in the science leadership and teaching surveys²⁷



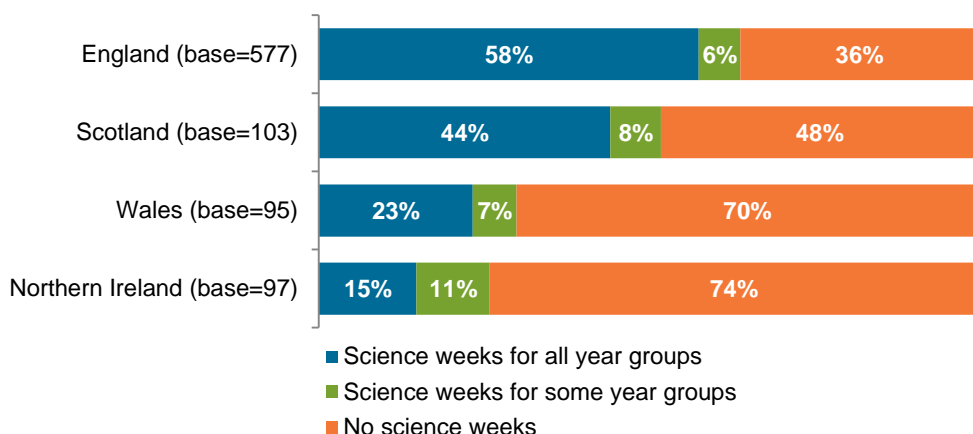
Dedicated science weeks

Just over half of all UK schools (56%) deliver science through dedicated science weeks. Across most schools (see Figure 26 later in the chapter) this is an additional activity that complements other delivery methods rather than as a standalone approach. For the overwhelming majority of schools offering this provision, science weeks are delivered once a year (92%). Only a small minority delivered two or more science weeks a year (See Figure 43 in Appendix 2 for a full breakdown by year group). The same analysis was undertaken on the merged teaching and science leadership survey (where individuals personally taught science). A similar proportion of teachers reported delivering dedicated science weeks to their pupils (see Figure 45 in Appendix 2).

Across the UK dedicated science weeks are more common in England and Scotland, with schools in Northern Ireland and Wales least likely to offer this provision. Variation by year groups can be seen in Figure 45 in Appendix 2. Across all UK schools, 52% have science weeks for all year groups in their school and 7% for some year groups (but not all).

²⁷ A trimmed mean at 5% was used to calculate these figures. This excludes 5% of responses in the sample (2.5% of cases from the lower end of the scale and 2.5% from the higher end of the scale) to prevent the mean being skewed by schools with extremely high or low figures. This ensures that the mean more accurately reflects the majority of schools in the sample. This analysis could not be split by country due to low base sizes.

Figure 24: Dedicated science week delivery across the school by country as reported in the science leadership survey

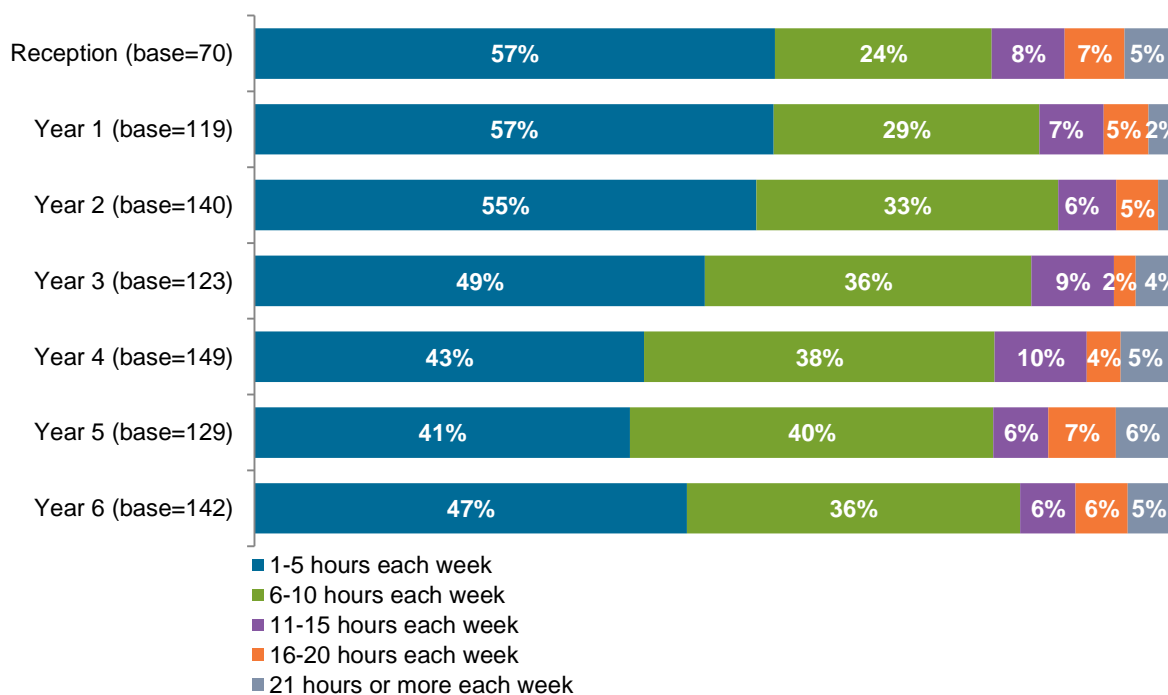


Science weeks across all or some year groups are more common in schools with a higher number of pupils and is at its peak for schools with 200-299 pupils (66%) (see Appendix 2 for full breakdown).

Dedicated science week hours of delivery

Those participants who taught science through dedicated science weeks were asked how many hours of science they teach during each one of these weeks. Figure 25 shows the total number of hours delivered to year groups in each dedicated science week. In each science week most schools typically teach science for up to 10 hours with an average of between 7 and 8 hours across the week.

Figure 25: Total number of hours delivered through each science week in the school year as reported in the science leadership and teaching surveys



Main delivery methods

Science is taught across the school year in a wide variety of ways. The majority of schools do teach some form of science weekly, although most combine this with other types of activity such as dedicated science weeks, science days and visits. The likelihood of this increases for older year groups. Only a small proportion (3%-4%) of schools teach science through dedicated science weeks only. Just over 5% of schools teach science through a variety of methods (more than 1 method used but none weekly) or 3% through a standalone method (such as block teaching or fortnightly lessons).

Figure 26: Overall delivery method by year group as reported in the science leadership survey

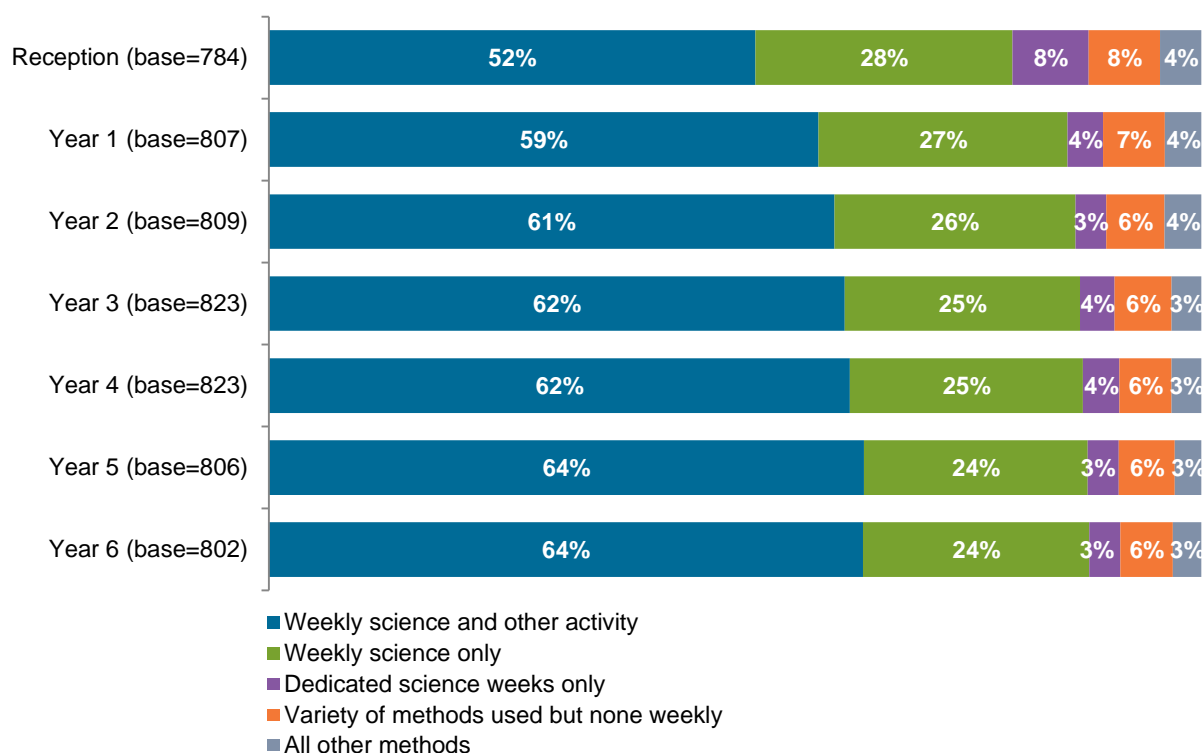


Figure 27 indicates delivery methods by country. In both England and Wales, the weekly delivery of science is common with schools in England being more likely to combine this with other delivery methods. Weekly delivery is also common in about 70% of schools in Northern Ireland, although similarly to Wales is less likely to combine this with other methods. Scotland shows the greatest variation in how science is delivered with science weeks only, a variety of methods and standalone other methods being used more often.

Figure 27: Overall delivery methods by year groups and country as reported in the science leadership survey. Base=variable. England 520-540, Scotland 97-100, Wales 80-95 and Northern Ireland 87-91.

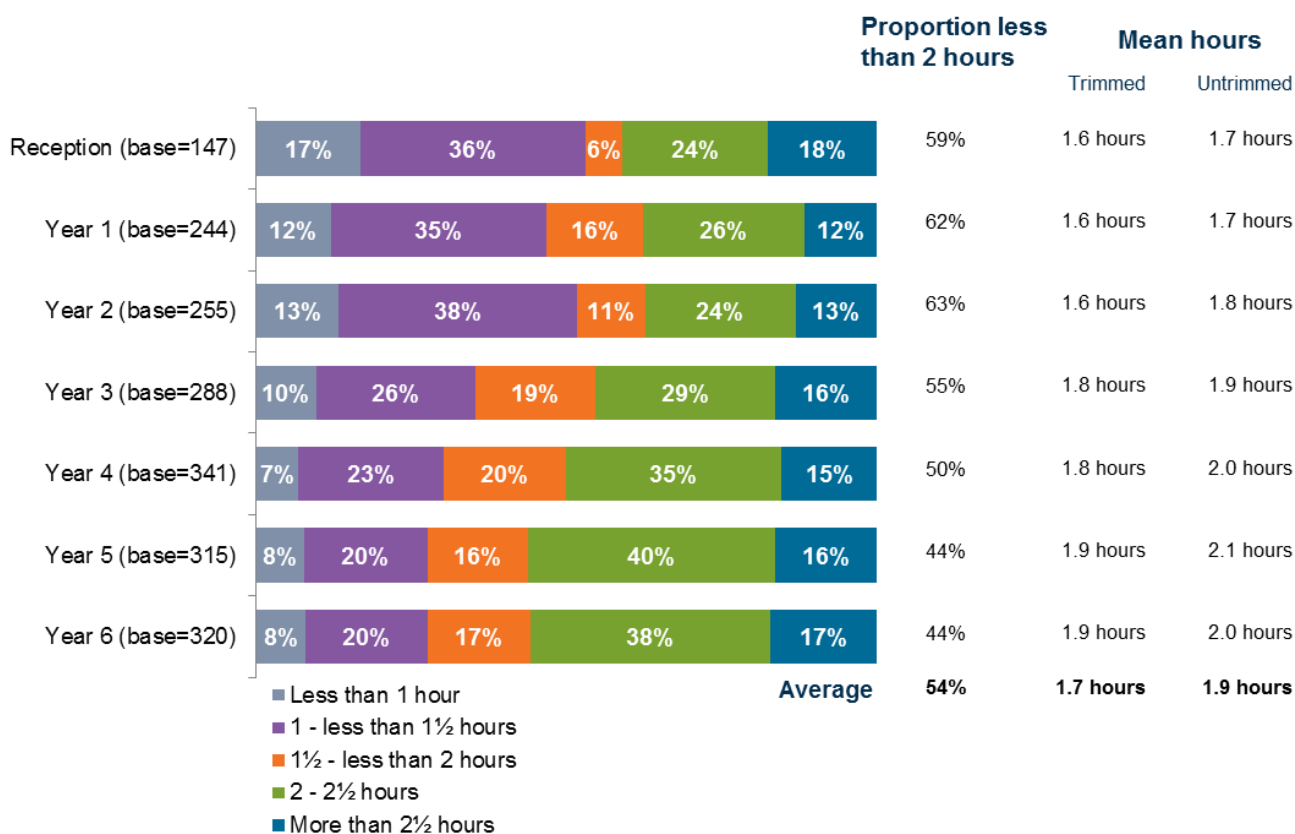


Total hours of delivery

Across the various methods used the number of hours of teaching was combined to calculate a total number of hours taught in a year. This was then averaged across the school year to calculate a weekly average.²⁸ This indicates that on average pupils across all year groups receive between 1.6 and 1.9 hours of science a week. On average, science is taught on average for 1.7 hours a week (1 hour and 42 minutes). Other than Reception where teaching hours start off higher, the proportion of year groups receiving less than 2 or more hours of science teaching a week decreases by age from 59% in Year 1 to 44% in Year 6.

²⁸ This was averaged across 39 weeks a year.

Figure 28: Average number of hours of science delivery per week by year group as reported in the science leadership and teaching surveys

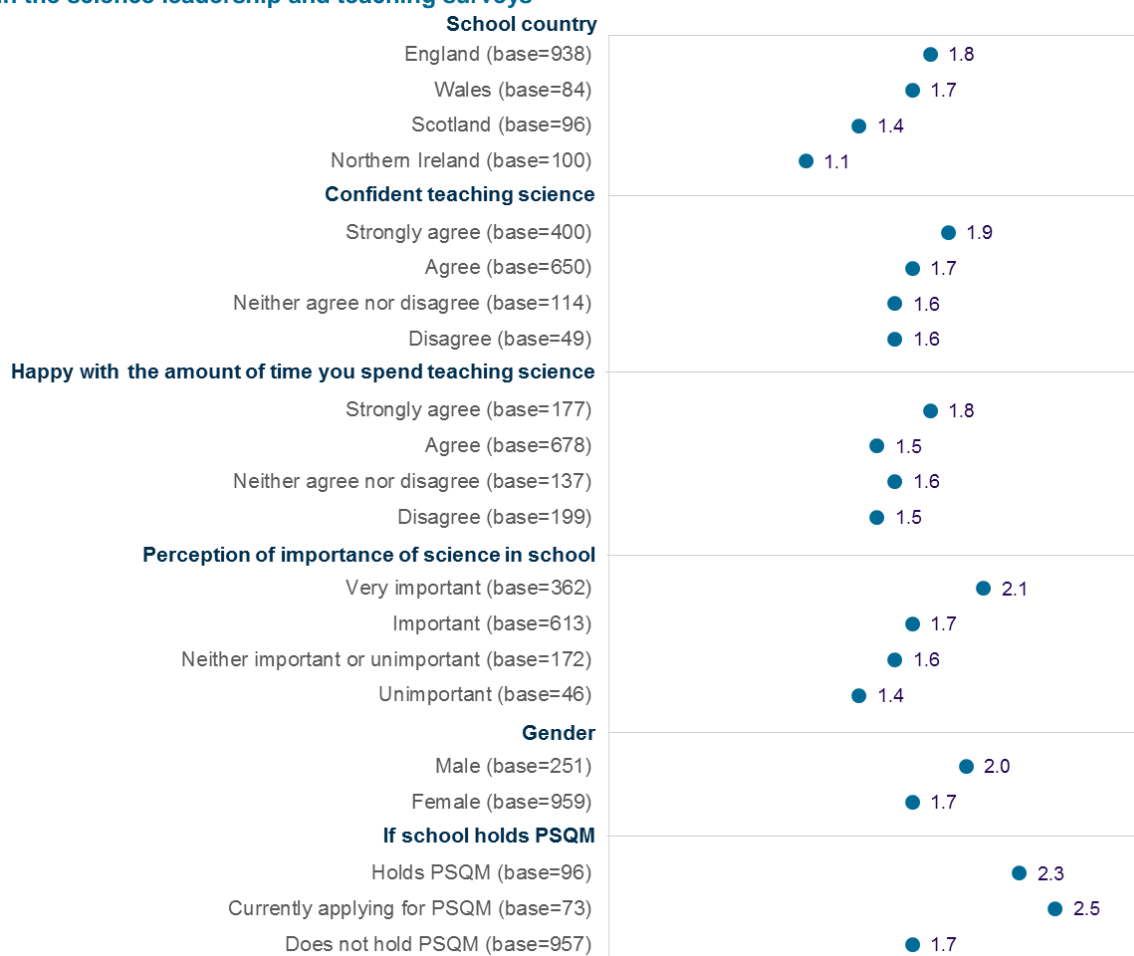


Total hours of delivery – differences explored by key characteristics

To examine the amount of time spent teaching by key characteristics (school and individual level characteristics) a new ‘hours’ variable was created. This combines all teaching undertaken irrespective of the year they are delivering it to. An average was taken for individuals teaching more than one year group. Figure 29 shows the average amount of time spent teaching by key characteristics. There are no differences by role, whether respondent is a Science Leader, whether there is a Science Leader in the school, and school size. The following showed an increased time spent teaching science

- being in England
- being more confident
- being male
- being happy with the amount of science being taught
- perceiving science to be important
- being in a school that holds the Primary Science Quality Mark or is applying for it

Figure 29: Average (trimmed mean) number of hours spent teaching science by key characteristics as reported in the science leadership and teaching surveys



Total hours of delivery – differences in the interaction of key characteristics

Further analysis was undertaken to explore how the combination of individual and school level characteristics influence the number of hours of science taught.²⁹ Differences are found; however, they account for only 8% of the variance. Characteristics which influence the weekly average hours a respondent teaches science for are show in order or importance below:

- being a teacher in Northern Ireland or then Scotland reduces the number of hours
- not having a Science Leader in the school increases the number of hours
- being a teacher in Wales reduces the number of hours
- being male increases the number of hours
- viewing science as important to the school increases the number of hours
- holding a science A level or Advanced Higher³⁰ increases the number of hours
- being in a larger school increases the number of hours.

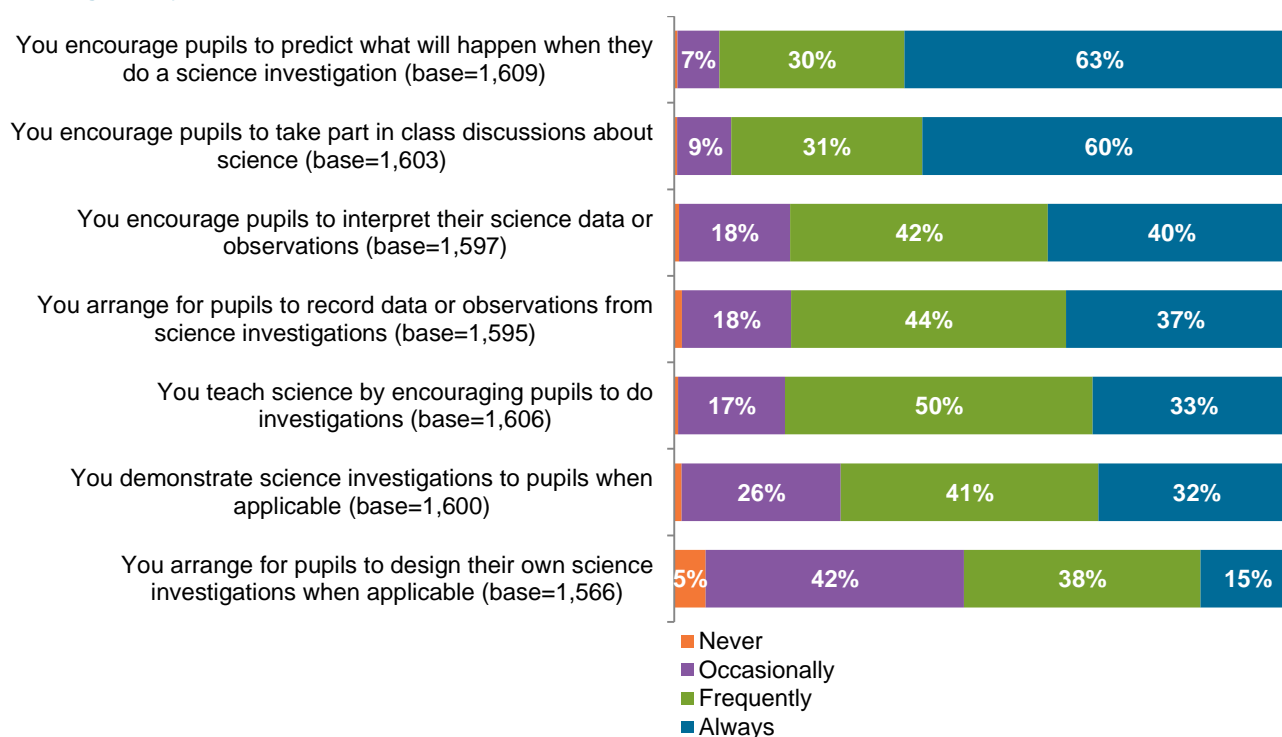
²⁹ Multiple regression. Variables added into the model but no differences found for: If an individual is a Headteacher or not, If the respondent is a Science Leader, If the individual works full time or part time, the year group an individual teaches and length of time in teaching profession.

³⁰ This has been defined as holding a Biology, Chemistry or Physics A level or Advanced Higher.

How often different teaching methods used

Those participants who had responsibility for teaching science were asked how often they undertook different activities with pupils when teaching science. The majority of respondents ‘always’ or ‘frequently’ encourage pupils to predict what will happen when they do science investigations and encourage pupils to take part in class discussions. A much lower proportion state they ‘always’ or ‘frequently’ arrange for pupils to design their own science investigations.

Figure 30: Frequency of science delivery methods used in lessons as reported in the science leadership and teaching surveys



Further analysis was undertaken to explore whether school or individual level characteristics affected an individuals’ likelihood of stating ‘always’ or ‘frequently’. The modelling techniques³¹ revealed the significant indicators that positively influence each question as shown in Table 16 (Appendix 2).

³¹ Logistic regression analysis

For each question the characteristics which impact on the likelihood score are shown in rank order of importance with '1' as the most important. Across the different questions there were common school and individual level characteristics that affect an individual's likelihood of stating 'always' or 'frequently':

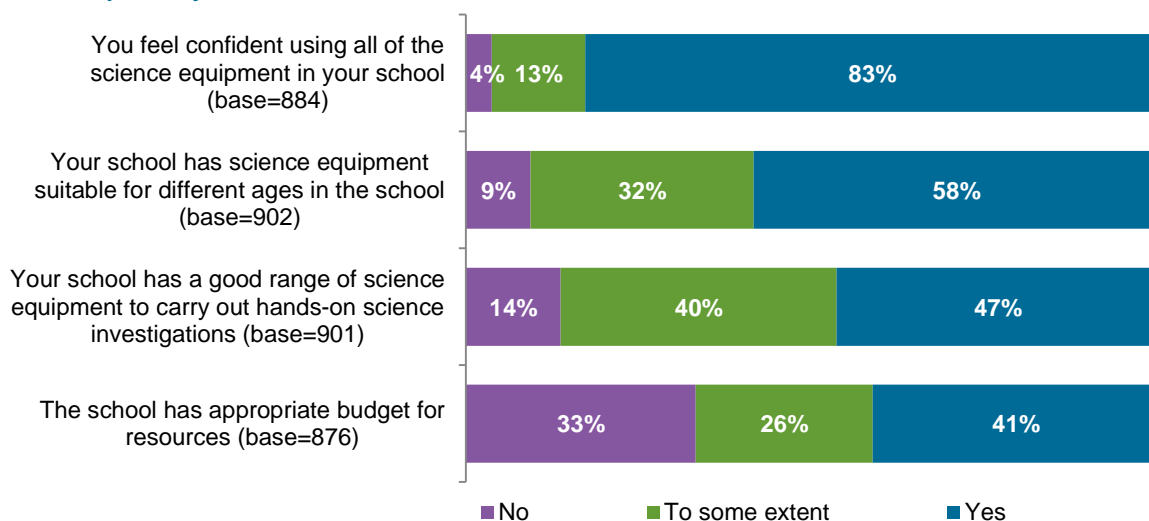
- in England compared to Northern Ireland
- being a Science Leader
- being a Headteacher, Acting Headteacher or Deputy Headteacher
- agreeing with the statement 'You enjoy teaching science'
- viewing science as important to the school

A breakdown of the differences by country and whether or not an individual is a Science Leader are shown in Figure 48 and Figure 49 in Appendix 2.

Science resources in the school

Respondents to the science leadership survey were asked whether they agree with a series of statements about the suitability of science resources. Four-fifths (83%) feel confident using all of the science equipment in their school whilst over half (58%) considered that the science equipment is suitable for different ages. A further 47% deem that their school has a good range of equipment to enable children to carry out hands-on science investigations. However, one-third (33%) disagree with the statement that their school has appropriate budget for resources in the school.

Figure 31: Extent of agreement about the suitability of science resources in schools as reported in the science leadership survey



When examining confidence of using the equipment by country, only 73% of respondents in Northern Ireland state they are confident using all of the science equipment in their school compared with 90% in Scotland, 84% in England and 88% in Wales. A smaller proportion (39%) of respondents in Northern Ireland also agree that their school has a good range of science equipment to carry out hands-on science investigations compared

with 41% in Wales, 47% in England and 54% in Scotland. There were also differences in the rates at which respondents agreed they had the appropriate budget for resources in school: 44% of respondents in England agreed compared with 30% in Northern Ireland, 28% in Wales and 27% in Scotland. 51% of schools in Northern Ireland said that their school did not have the appropriate budget.

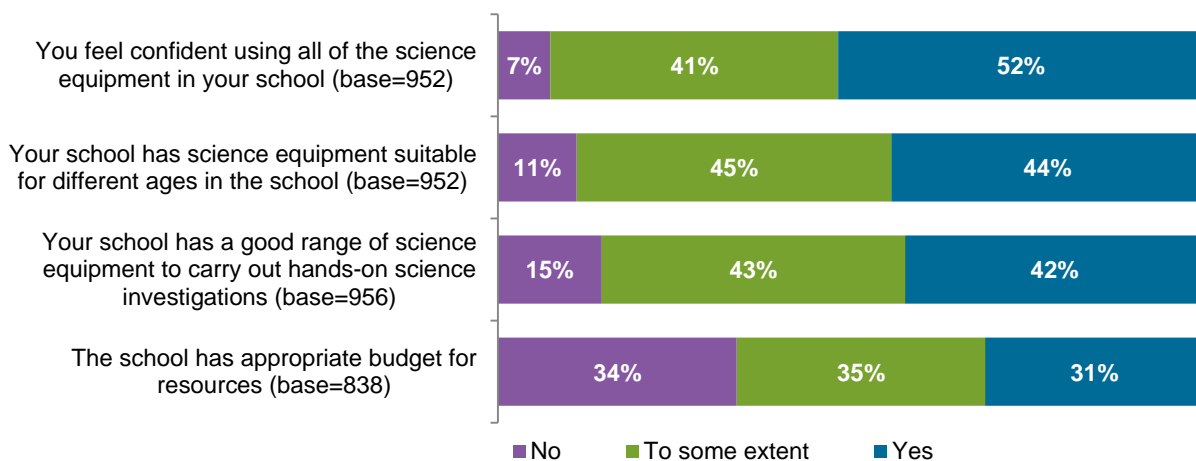
Table 11: Extent of agreement about the suitability of science resources in schools by country as reported in the science leadership survey

	Proportion stating 'Yes'			Base
	Your school has a good range of science equipment to carry out hands-on science investigations	You feel confident using all of the science equipment in your school	The school has appropriate budget for resources	
England	47%	84%	44%	578- 594
Scotland	54%	90%	27%	98-104
Wales	41%	88%	28%	98-101
Northern Ireland	39%	73%	30%	101-102

Respondents in larger schools are more likely to agree that they have a good range of equipment for hands-on science and that the school has the appropriate budget (see Table 17 in Appendix 2). A higher proportion of those who state that science is 'very important' to the school indicated 'yes' to the statements listed above when compared to those stating any other response option.

Respondents to the teaching survey were also asked whether they agree with the statements listed in Figure 31. Compared to those responding to the science leadership survey overall they are less likely to agree with these statements. Just under half (49%) feel confident using all of the science equipment in their school and 42% state to 'some extent'. Just over two-fifths (42%) agree that the science equipment is suitable for different ages. Only one-third (30%) state they agree that their school has appropriate budget for resources, 35% state to some extent and 36% state no.

Figure 32: Extent of agreement about the suitability of science resources in schools as reported in the teaching survey (excluding Science Leaders)

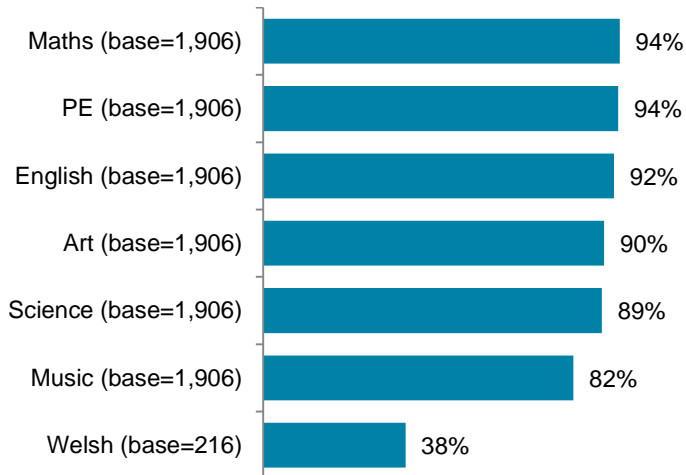


Pupils views of science delivery

Subjects studied at school and perceived difficulty and enjoyment

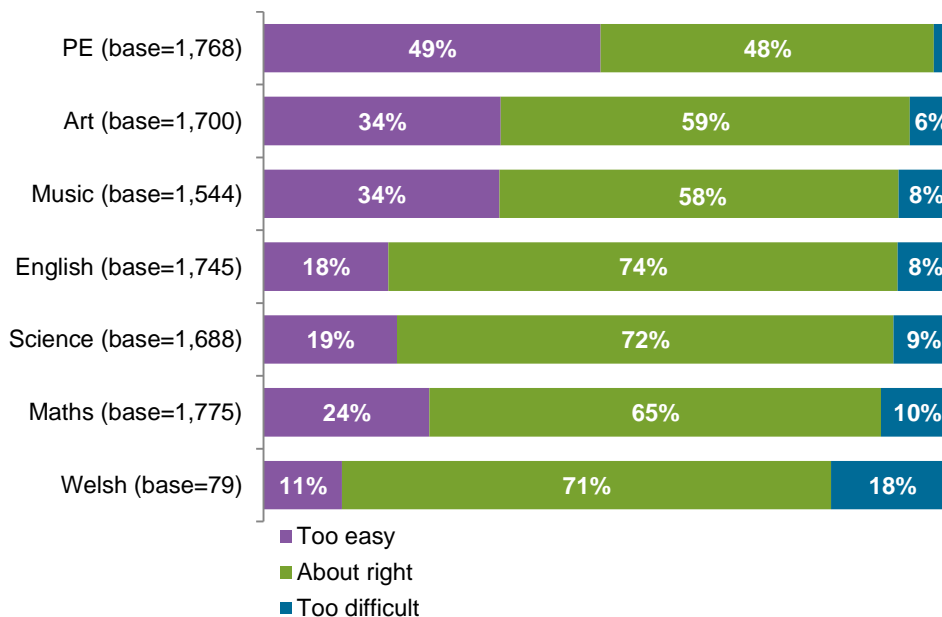
Pupils (in Years 3-6) were asked what subjects they have studied since starting their current school year. Most pupils reported maths, PE, English, art and science (see Figure 33).

Figure 33: Subjects studied at school by pupils



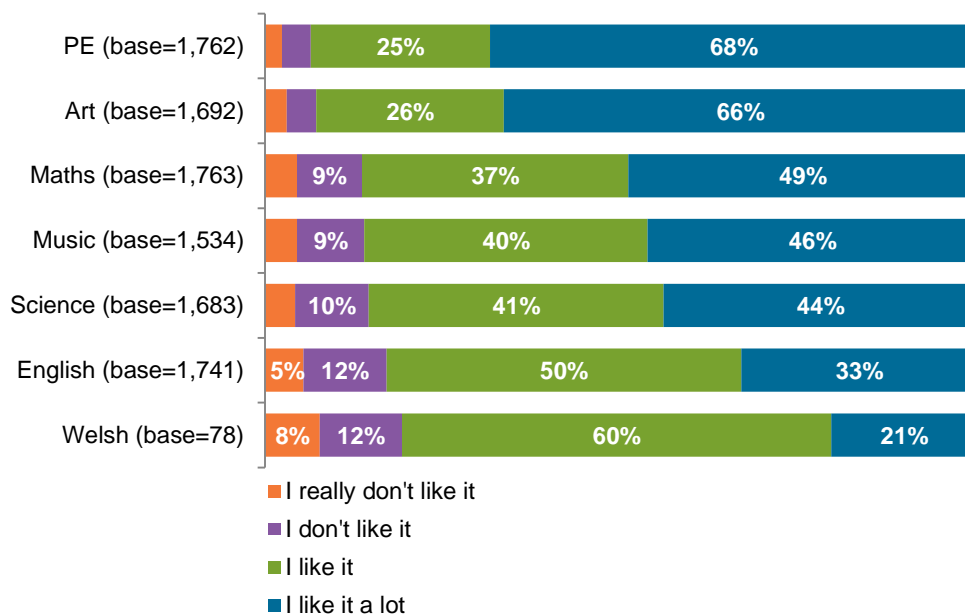
Pupils who are aware of the subjects they had studied were asked to state whether they thought the subjects were 'too easy', 'about right' or 'too difficult'. Only 9% report that they find science 'too difficult' which is in line with most other subjects identified. Less than one-fifth (19%) state that science is 'too easy' indicating that it is stimulating them.

Figure 34: Extent to which subjects are easy or difficult



Pupils were asked how much they liked these subjects at school. Two-thirds like PE and art ‘a lot’ followed by nearly half (49%) for maths. 44% state this about science; a further 41% ‘like it’ and 15% do not (10% ‘don’t like it’ and 5% ‘really don’t like it’).

Figure 35: Extent to which subjects are liked by pupils



A higher proportion of pupils who thought that science is ‘too easy’ state they like science ‘a lot’ (70%) when compared to those who indicated ‘about right’ (40%) or ‘too difficult’ (21%). Nearly one quarter (24%) of those who state ‘too difficult’ report they ‘really don’t like it’ and 28% indicate ‘I don’t like it’. A slightly higher (46%) proportion of male pupils state that they ‘like science a lot’ compared to female students (41%).

Those in younger year groups are also more likely to report that they ‘like science a lot’:

- Year 3 – 55%
- Year 4 – 50%
- Year 5 – 39%
- Year 6 – 36%

However, a similar pattern is found for other subjects (with the exception of PE) with pupils less likely to state they like subjects ‘a lot’ the older they are.

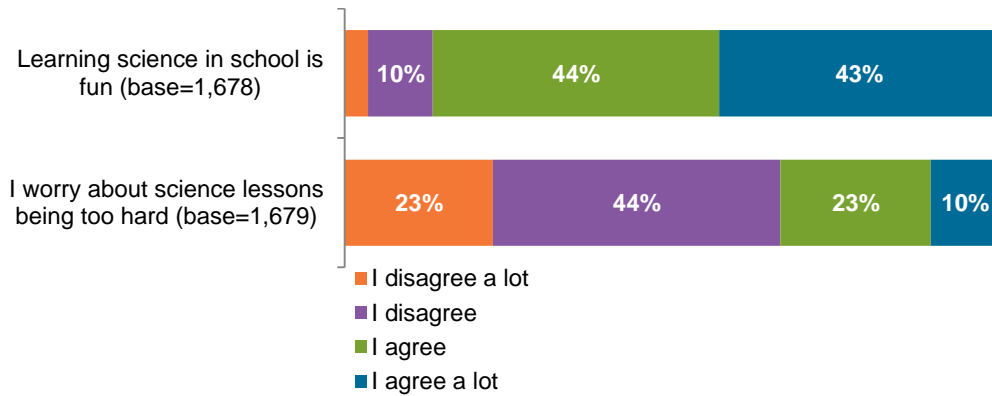
Table 12: Proportion of pupils who state “like [subject] a lot” by year group

	English	Maths	Music	Art
Year 3	43%	57%	58%	72%
Year 4	35%	49%	42%	73%
Year 5	29%	46%	43%	61%
Year 6	26%	43%	37%	60%

Further views of science

Those pupils who said that they had studied science at school were asked to what extent they agreed or disagreed with statements about science at school. Over four-fifths (87%) of pupils ‘agree’ or ‘agree a lot’ that learning science in school is fun which reflects the amount they like studying it (as shown in Figure 36). However, one third of pupils (33%) worry about science lessons being too hard.

Figure 36: Extent to which pupils agree with science learning in school



A higher proportion of male pupils (45%) selected ‘agree a lot’ in response to the statement learning science in school is fun compared to female pupils (40%). Pupils in younger year groups are more likely to ‘agree a lot’ that they worry about science lessons being too hard:

- Year 3 – 19%
- Year 4 – 11%
- Year 5 – 7%
- Year 6 – 5%

05. DISCUSSION AND CONCLUSIONS

This section summarises the key conclusions emerging in relation to the leadership and delivery of science in UK primary schools.

Strategic issues relating to science delivery

The findings relating to the leadership of science in UK primary schools is varied. Whilst there is evidence to indicate that the vast majority of schools have a dedicated staff member responsible for leading science development and teaching, their capacity to fulfil this role is constrained by a number of factors.

Science Leaders are typically classroom teachers with overall responsibility for a class and, for a significant minority, the leadership of another subject (which can include English and maths). Moreover, only half of all Science Leaders receive release time specifically for this role and even then only a relatively small amount is taken throughout the year. This is in contrast to the position for English and maths in particular where leaders are more likely to receive release time. Just over half of all Science Leaders have participated in CPD in the last 12 months to help them lead or develop science in their school.

More positively, science is included in School Development Plans for well over half of schools and is indicative of their intention to strengthen this aspect of the curriculum. In most instances, this focusses on developing the teaching of science. Despite the emphasis on improving the quality of teaching at the strategic level, one-third of teachers in UK primary schools report not having received support from their school in the last 12 months to improve their science teaching although it is important to acknowledge that there may have been training before this time period. There is clear evidence that where science is viewed as a strategic priority (for example, through having obtained the Primary Science Quality Mark or invested in training for the Science Leader) teachers are more likely to have received support to develop their science teaching. When provided, it was more likely to include lesson plans and materials rather than more resource intensive support such as training.

Two-thirds feel supported by their school to teach science and indicate that their Science Leader is available to coach and mentor them. That said, there was an acknowledgement that regular science meetings are not widespread. This suggests that arrangements for supporting science teaching in schools are more informal in nature and include ad hoc discussions rather than more formal instruction at a specified time.

These findings appear to confirm the perceptions of both Science Leaders and teachers about the priority afforded to science by the Senior Leadership Teams of schools when compared to English and maths which were much more likely to be considered ‘very

important'. Whilst the Headteachers/Acting Headteachers and Deputy Headteachers were more likely to say that science is 'very important' than other respondents, it did not reach the same level of importance as English and maths.

Notable differences in regard to arrangements for the leadership of science were evident across the UK and by school size. Science Leaders are more common in larger schools and in England and Wales (reflecting the emphasis on cross-curricular science teaching within Northern Ireland and Scotland). It follows that Science Leaders are also more likely to get release time in England and Wales; however, it is interesting to note that despite being more likely to have Science Leaders, science is less likely to be included within School Development Plans in Wales. In this context, Science Leaders do not necessarily result in an increased emphasis on science improvement in terms of Development Plans. Moreover, differences are apparent between England and Wales, with respondents in Wales more likely to consider science 'very important' when compared to England. This indicates diversity amongst those countries which are stronger in terms of science leadership.

Perceptions of science

There is strong evidence to indicate that teachers value science learning: most consider that it is important for pupils to study science and acknowledge the transferable nature of science learning to other subjects. A significant minority are unsatisfied with the amount of time they are able to teach science to the classes they are responsible for and/or by their school more broadly - this dissatisfaction reinforces their perception of science being treated as a low priority by Senior Leadership Teams. Schools in Northern Ireland are more likely to be dissatisfied with the amount of science teaching (and deliver the least amount) when compared with other UK countries.

Those responsible for science delivery are broadly confident in their ability to teach science and describe science in a positive manner that is in line with the investigative nature of science teaching. Confidence is higher amongst those with science qualifications, Science Leaders, members of Senior Leadership Teams, teachers in England and Wales, and those longer in the profession. However, a significant minority are concerned that they are unable to answer pupils' questions about science or lack confidence in undertaking formative and summative assessments. Confidence in teaching different aspects of science varies suggesting that teachers require more support in some aspects of the curriculum than others. That said, the overwhelming majority consider that science is well taught in their schools. Findings indicate that those teachers who have received support for developing their science teaching in the last 12 months report higher levels of confidence.

Pupils view science positively and like the opportunities it presents to understand how things work and find the answers to questions themselves, although a significant minority describe science as boring and an even larger proportion perceive that you need to be clever to do science. Whilst boys were more likely to perceive science in a positive manner,

girls are as likely as boys to report wishing to pursue a career in a science-related occupation when they are older. However, there are clear differences in the types of jobs referenced with boys and girls conforming to more traditional gender stereotypes.

The delivery of science

Science in UK primary schools is typically taught by classroom teachers; whilst dedicated science teachers are relatively uncommon, they are more prevalent in Wales and Scotland and indicates that the cross-curricular nature of science teaching is not the only determinant of delivery arrangements. Importantly, all pupils in three-quarters of schools are taught science weekly either as a standalone subject or through cross-curricular work; however, the way in which science is delivered and the average number of hours taught varies depending on the year group of pupils. Younger pupils typically receive cross-curricular science teaching rather than standalone lessons and for fewer hours. This equates to a difference of approximately 20 minutes lesson time between Reception and Year 6 pupils per week. Differences by UK country align with the differing curriculums in operation, with pupils in England and Wales more likely to receive standalone lessons.

Whilst half of all UK primary schools employ dedicated science weeks as part of their science teaching, they are typically used to support science teaching as additional delivery rather than a standalone activity. Perhaps surprisingly, science weeks are more common in Scotland as well as England given Scotland's cross-curriculum teaching.

When combined with the number of hours of science teaching delivered on a weekly basis, the total amount of science delivered throughout the year equates to less than two hours for all year groups. The volume of science teaching is comparable in Years 1 and 2 and then gradually increases to a maximum of 1.9 hours for Year 6. On average classes are taught science for the equivalent of 1.7 hours a week and 54% of classes receive less than 2 hours a week. Pupils in England typically receive more science teaching than those in other countries.

A variety of activities are undertaken in science lessons with more limited opportunities for pupils to design their own science investigations. The variety is influenced by UK country, job role, enjoyment teaching science and the importance afforded to science by the school. Key individual and school level characteristics therefore influence not only the number of hours taught but also the types of activities undertaken.

Next steps

The Wellcome Trust are launching their Primary Science Campaign with a vision that all pupils will experience an exciting, inspiring and relevant science education at primary school that leaves them well-prepared to progress further in science, and well-informed about science in their everyday lives. Explorify is a key aspect of the campaign; this is a free

resource of engaging, creative science activities for all primary school teachers. It has been designed to stimulate curiosity, discussion and debate and will support teachers to encourage children to think like scientists. The evaluation will examine the extent to which Science Leaders and teachers are aware of the campaign and crucially the impact it has on the quality and quantity of science teaching.

APPENDIX 1: RESPONDENT CHARACTERISTICS UNWEIGHTED DATA

Characteristics of those responding to the Science Leader survey

School country

	Number	Percentage
England	595	66%
Wales	101	11%
Northern Ireland	102	11%
Scotland	104	12%

School size

	Number	Percentage
99 or less pupils	209	23%
100 – 199 pupils	236	26%
200 – 299 pupils	215	24%
300 or more pupils	214	24%
Unknown	28	3%

School role

	Number	Percentage
Classroom teacher	534	59%
Deputy/Assistant Headteacher	49	5%
Acting Headteacher	7	1%
Headteacher	294	33%
Other role	18	2%

Years have working in the teaching profession

	Number	Percentage
0-10 years	311	35%
11-20 years	273	30%
21-30 years	244	27%
31 years or longer	71	8%
Mean	17 years	
Range	0-42 years	

Full time or part time work

	Number	Percentage
Full time	792	88%
Part time	110	12%

Gender

	Number	Percentage
Female	682	76%
Male	220	24%

School years taught by school

	Percentage
Reception	93%
Year 1	94%
Year 2	94%
Year 3	94%
Year 4	94%
Year 5	92%
Year 6	91%
Our school does not have specified school years due to offering special/alternative provision	2%
Base	902

School years taught by Science Leader

	Percentage
Reception	8%
Year 1	13%
Year 2	13%
Year 3	16%
Year 4	21%
Year 5	19%
Year 6	20%
Our school does not have specified school years due to offering special/alternative provision	1%
None	28%
Base	902

Characteristics of those responding to the teacher survey

School country

	Number	Percentage
England	819	81%
Wales	41	4%
Northern Ireland	71	7%
Scotland	77	8%
Unknown	2	0%*

School size

	Number	Percentage
99 or less pupils	82	8%
100 – 199 pupils	179	18%
200 – 299 pupils	243	24%
300 or more pupils	474	47%
Unknown	32	3%

School role

	Number	Percentage
Classroom teacher	970	96%
Deputy/Assistant Headteacher	15	2%
Acting Headteacher	2	0%*
Headteacher	11	1%
Other role	11	1%

How many years have you been working in the teaching profession?

	Number	Percentage
0-5 years	319	32%
6-10 years	199	20%
11-20 years	277	28%
21-30 years	140	14%
31years or longer	53	5%
Mean		12 years
Range		0-47 years

Do you work full time or part time?

	Number	Percentage
Full time	804	80%
Part time	196	20%

What is your gender?

	Number	Percentage
Female	810	81%
Male	179	18%
Prefer not to say	12	11%

School years taught by teachers

	Percentage
Reception	15%
Year 1	22%
Year2	20%
Year 3	20%
Year 4	22%
Year 5	20%
Year 6	20%
Our school does not have specified school years due to offering special/alternative provision	2%
Base	1,010

Characteristics of those responding to the pupil survey

Country

	Number	Percentage
England	1,213	64%
Wales	218	11%
Northern Ireland	292	15%
Scotland	53	3%
Unknown	130	7%

Gender

	Number	Percentage
Girl	933	49%
Boy	962	51%
Unknown	11	1%

Age

	Number	Percentage
7 years old	216	11%
8 years old	486	26%
9 years old	487	26%
10 years old	445	23%
11 years old	264	14%
Unknown	8	1%

School year

	Number	Percentage
Year 3	446	23%
Year 4	456	24%
Year 5	462	24%
Year 6	451	23%
Unknown	91	5%

APPENDIX 2: ADDITIONAL ANALYSIS

Table 13: Additional subject responsibilities of Science Leaders as reported in the science leadership survey

Subject	% of Science Leaders who lead another subject
ICT/Computing	25%
Maths	14%
Design and Technology	14%
English	13%
PE	13%
Geography	13%
Topic/cross curricular work	12%
History	10%
Religious Education	10%
Music	10%
Art	9%
French or another language	8%
Personal, social, health and economic education	7%
Other	12%
Base	264

Figure 37: Confidence teaching aspects of science as reported in the teaching survey. Base=1,005.

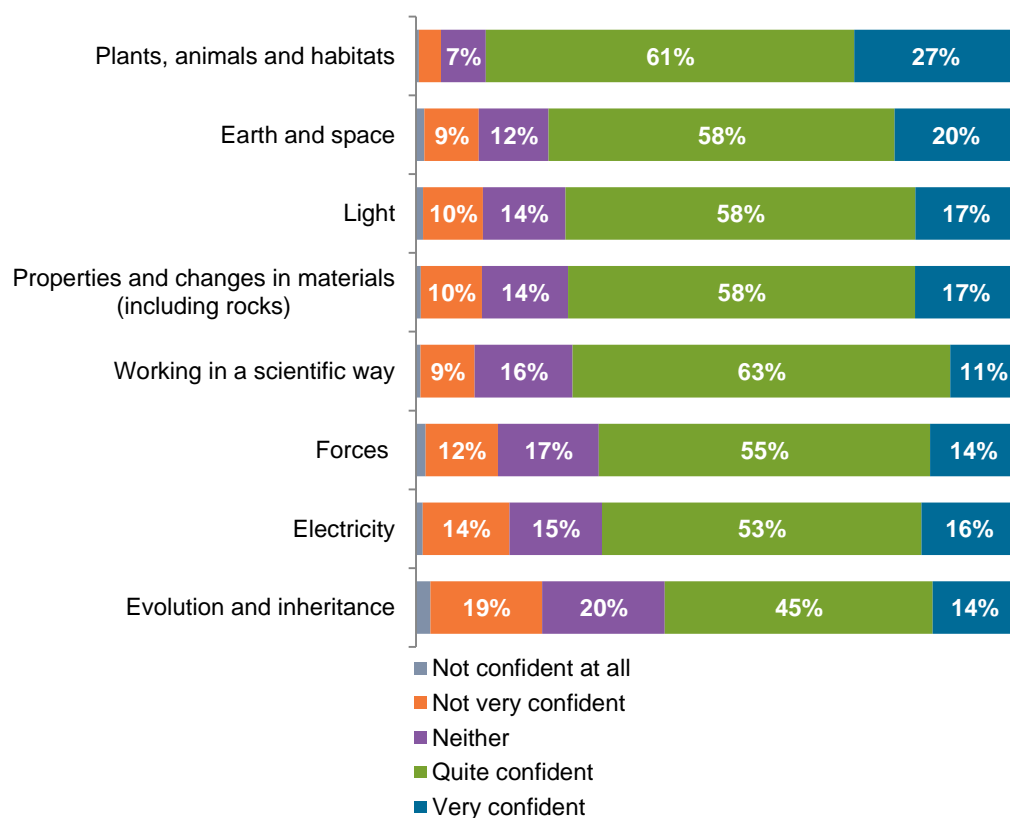


Table 14: Extent of agreement about confidence teaching science by length of time in teaching profession as reported in the science leadership and teaching surveys

Length of time in teaching profession	Proportion stating 'Strongly agree'	Base
5 years or less	25%	448
10 years or less (more than 5)	33%	362
20 years or less (more than 10)	34%	530
30 years or less (more than 20)	37%	352
More than 30 years	44%	116

Figure 38: Extent of agreement about confidence teaching science by country as reported in the science leadership and teaching surveys

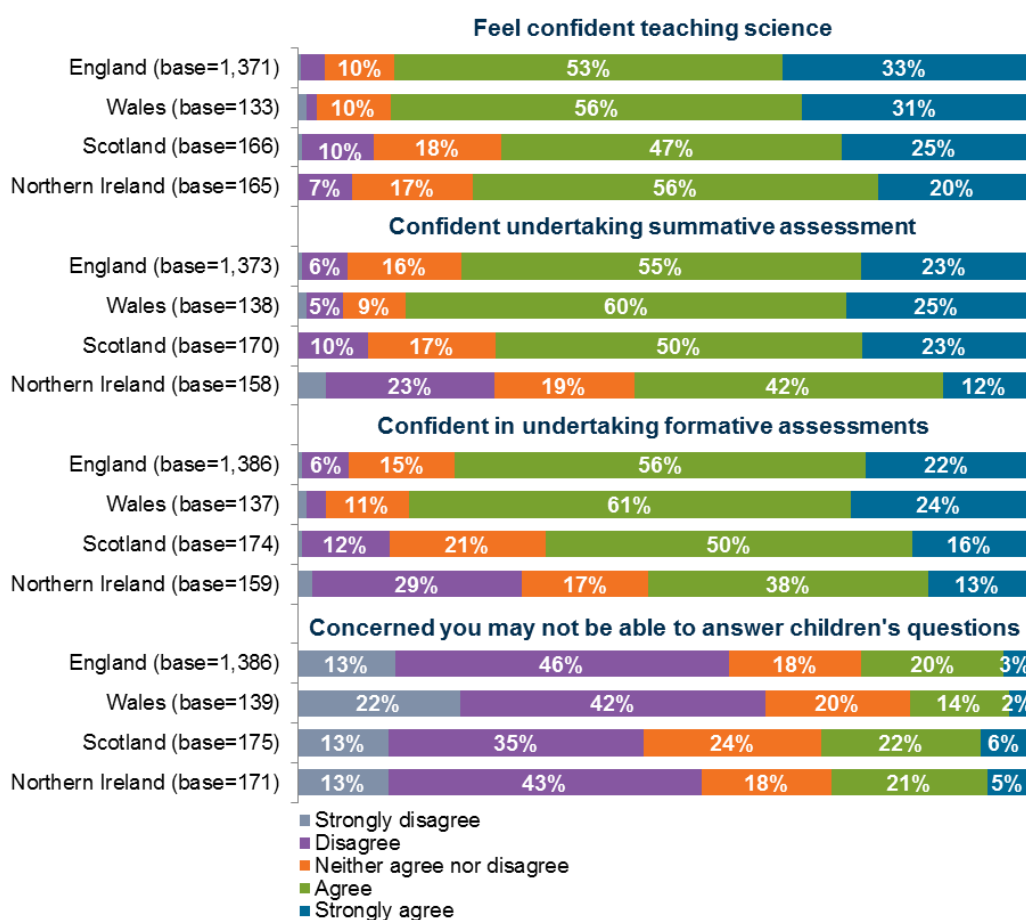


Figure 39: Extent of agreement about confidence teaching science by other variables as reported in the teaching survey (excluding Science Leaders)

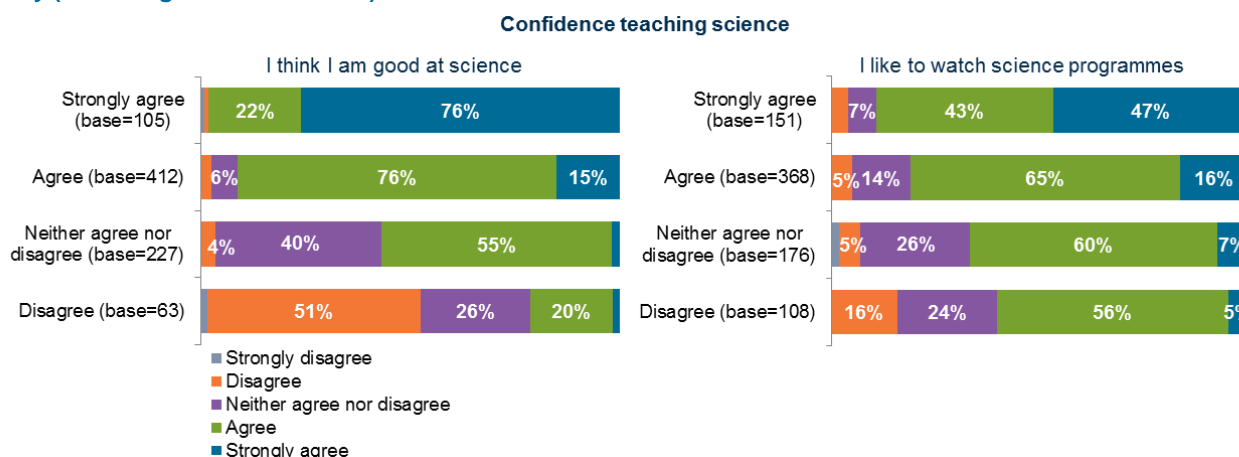
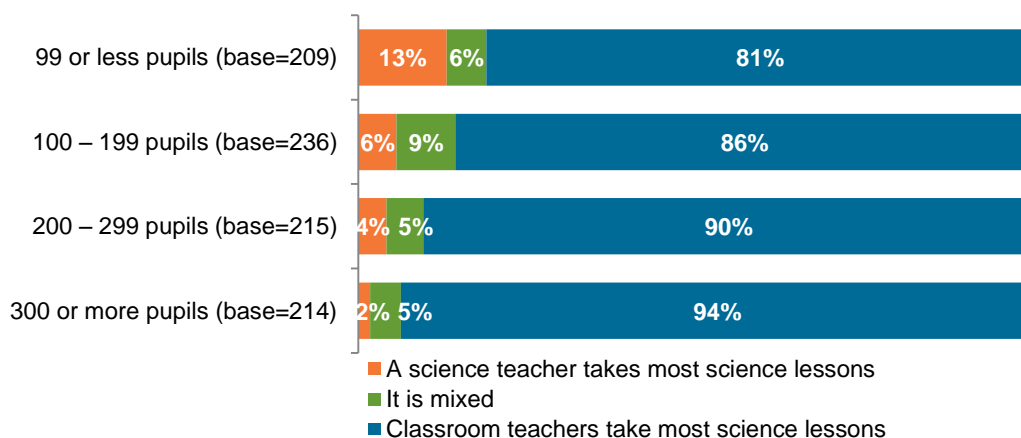


Table 15: Extent to which pupils agree with how science can help by gender and age

	Proportion of pupils stating 'I agree a lot' or 'I agree'						Base
	Science can help animals		Science can help people be healthy		Science can help people make things		
	I agree a lot	I agree	I agree a lot	I agree	I agree a lot	I agree	
Male	35%	45%	34%	44%	43%	47%	938-942
Female	28%	51%	27%	52%	35%	55%	916-919
Year 3	37%	35%	37%	38%	50%	40%	427-432
Year 4	32%	43%	32%	44%	41%	47%	445-449
Year 5	29%	54%	28%	52%	38%	54%	457
Year 6	30%	58%	27%	56%	31%	62%	447-448

Figure 40: Who teaches science in schools by size of school as reported in the science leadership survey³²



³² Differences for 'A science teacher takes most science lessons' between 99 or less pupils compared to all other categories are statistically significant



Figure 41: Weekly science delivery by year group and mode of delivery as reported in the teaching and science leadership survey

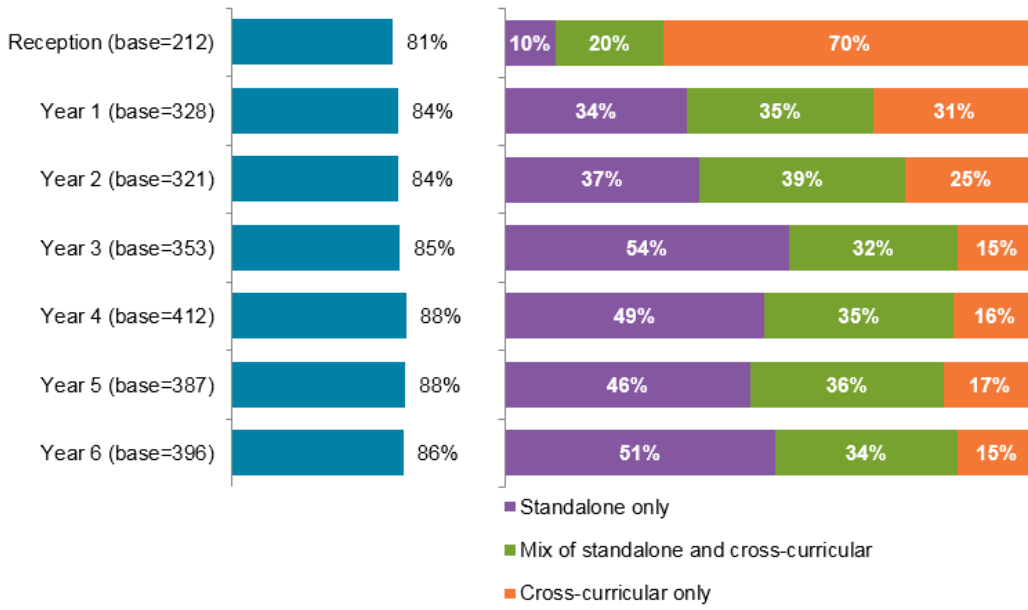


Figure 42: Weekly science delivery by year group and country as reported in the science leadership survey. Base=variable. England 531-555, Wales 86-98, Northern Ireland 95-97 and Scotland 101-104.

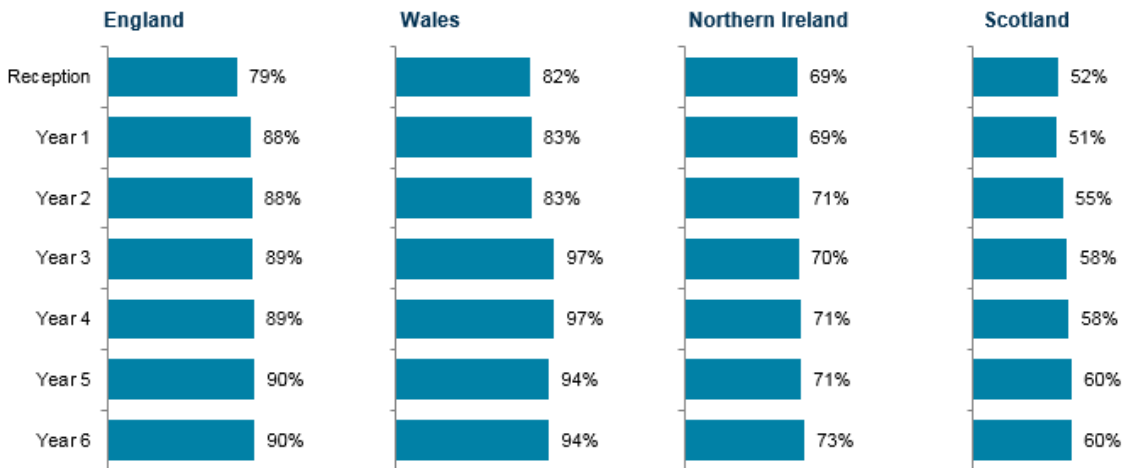


Figure 43: Use of dedicated science weeks in schools by year group as reported in the science leadership survey

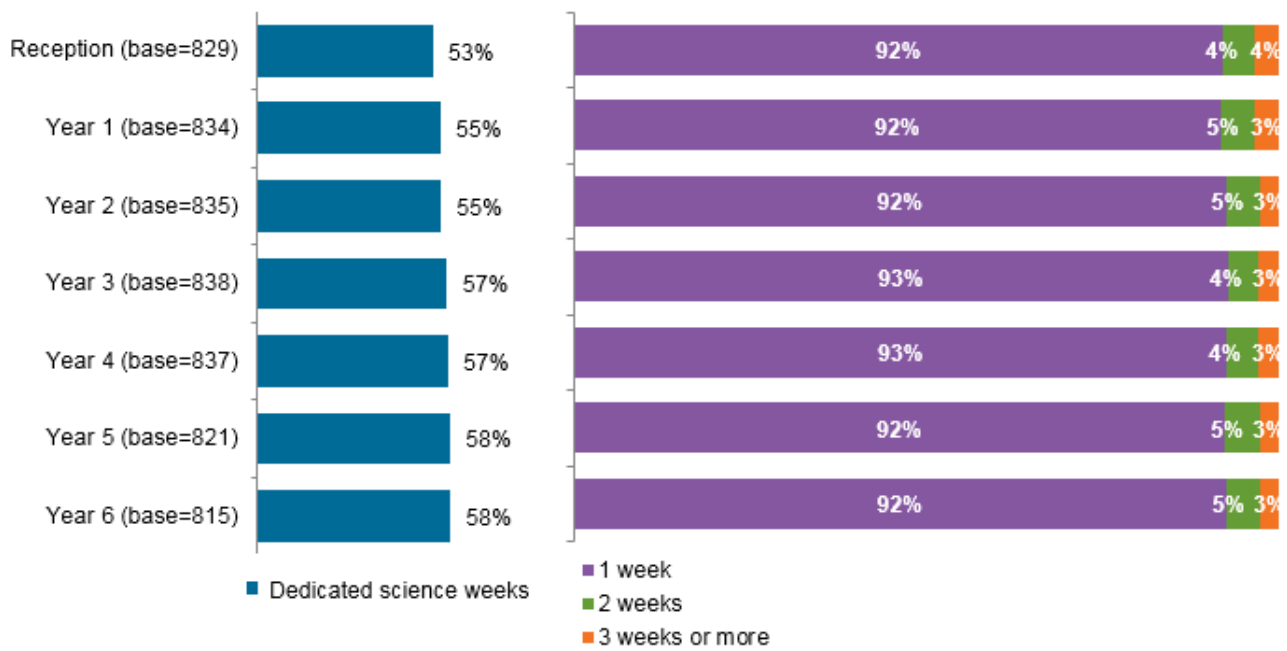


Figure 44: Use of science weeks by year group as reported in the teaching and science leadership survey

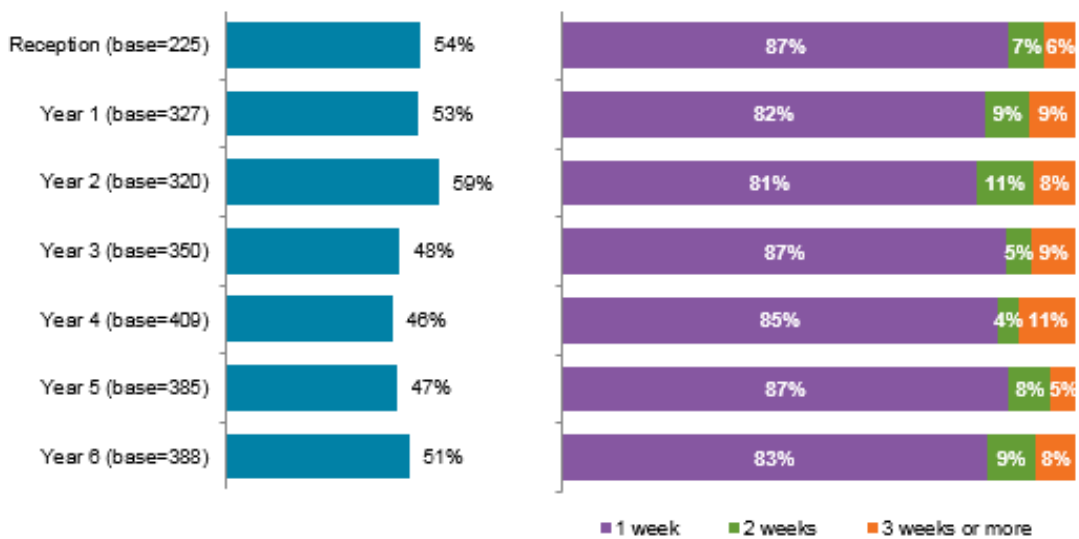


Figure 45: Use of dedicated science weeks in schools by year group and country as reported in the science leadership survey. Base=variable; England 533-550, Wales 86-95, Northern Ireland 95-99 and Scotland 101-104.

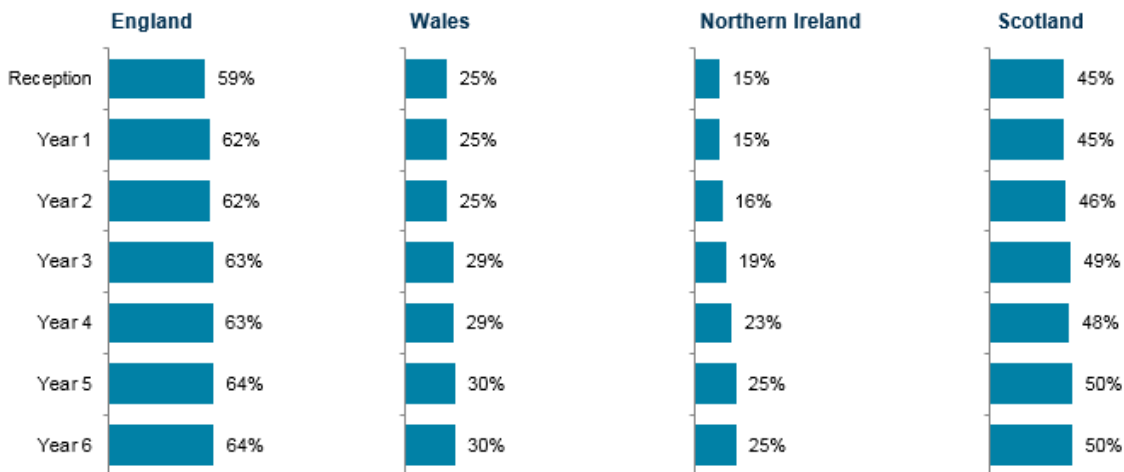


Figure 46: Dedicated science week delivery across the school by school size as reported in the science leadership survey

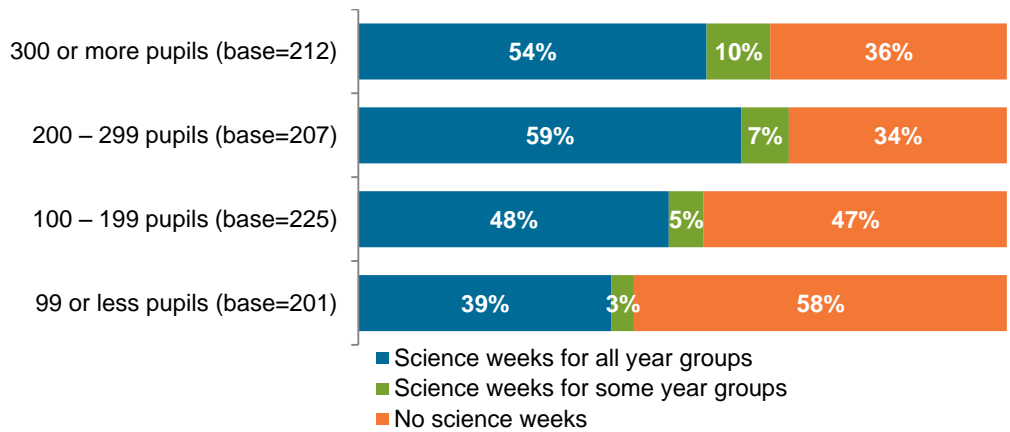


Figure 47: Delivery methods by year group as reported in the teaching and science leadership survey

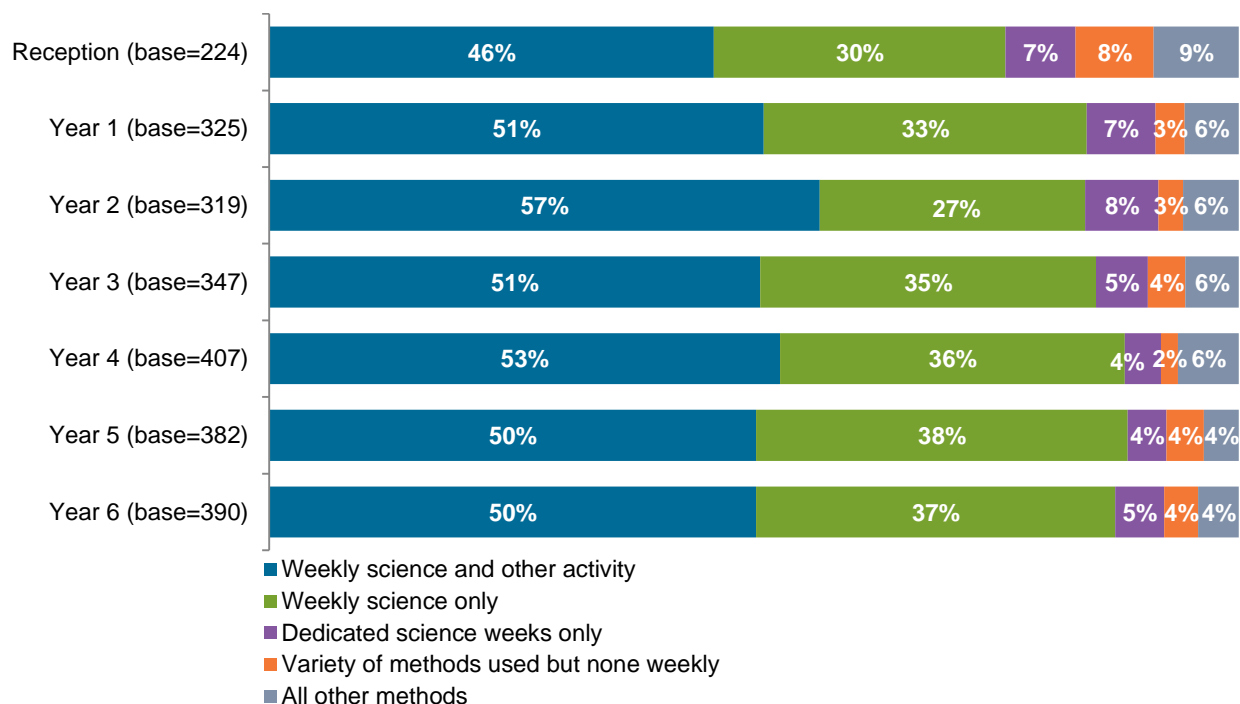


Table 16: Rank order of variables affecting each question through logistics regression for frequency of science delivery methods used in lessons as reported in the science leadership and teaching surveys

	Rank of logistic regression for influences						
	Encourage pupils to predict what will happen	Encourage pupils to take part in class discussions	Encourage pupils to interpret their science data	Arrange for pupils to record data or observations	Encouraging pupils to do investigations	Demonstrate science investigations	Pupils design their own science investigations
Northern Ireland compared to England (Northern Ireland schools less likely)	1	2	2	2	1	1	1
Person is a Science Leader	2	1	3	3		5	5
Headteacher/Acting or deputy compared with other roles			1	1	2	2	2
You enjoy teaching science				4	4	4	4
How important is science to the school	3	4	5	6	5	6	6
You generally find science interesting		3		5			
You feel confident teaching science			6				3
Teacher works part-time			4				
Scotland compared to England (Scotland schools less likely)					3		
There is a Science Leader in the school						3	
Number of years working in the teaching profession (fewer years)						7	



Figure 48: Frequency of science delivery methods used in lessons by country as reported in the science leadership and teaching surveys

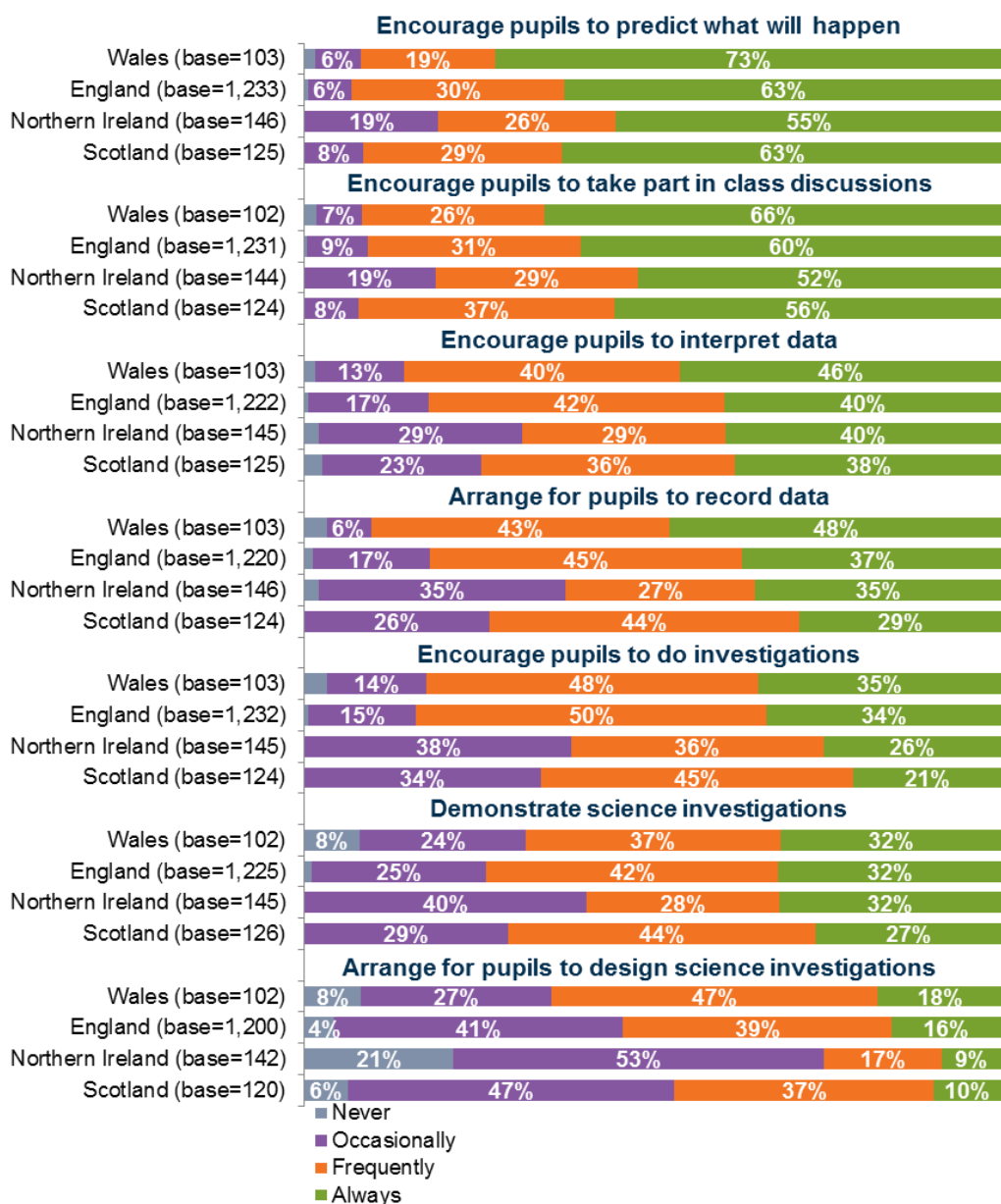


Figure 49: Frequency of science delivery methods used in lessons by role as reported in the science leadership and teaching surveys

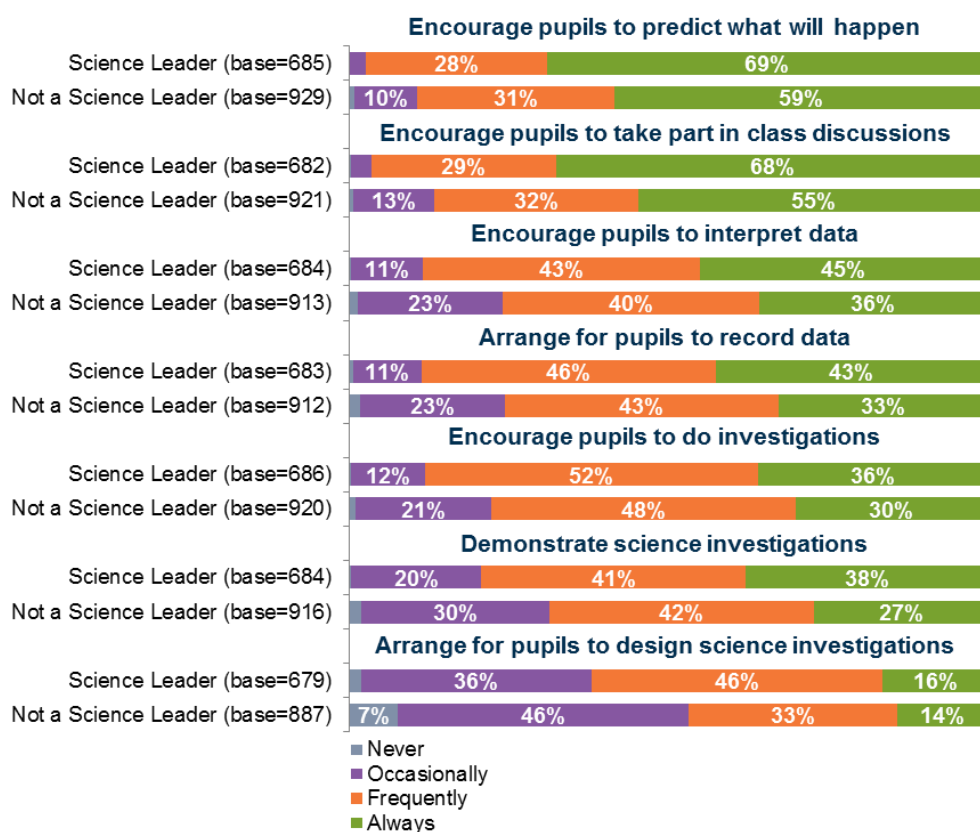


Table 17: Extent of agreement about the suitability of science resources in schools by school size and perception of science as important to school as reported in the science leadership survey

	Proportion stating 'Yes'			Base
	Your school has a good range of science equipment to carry out hands-on science investigations	Your school has science equipment suitable for different ages in the school	The school has appropriate budget for resources	
99 or less pupils	42%	53%	32%	201-209
100 – 199 pupils	40%	51%	35%	228-236
200 – 299 pupils	47%	62%	42%	211-215
300 or more pupils	55%	65%	51%	210-214
Very unimportant to Neither unimportant or important	34%	43%	27%	105-107
Important	44%	56%	41%	383-394
Very important	53%	66%	46%	388-401

September 2017

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**Wellcome Trust, 215 Euston Road,
London NW1 2BE, UK
T +44 (0)20 7611 8888, F +44 (0)20 7611 8545,
E contact@wellcome.ac.uk, wellcome.ac.uk**

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