NFER Education Briefings

Key insights from PISA 2018 for the United Kingdom

NFER
National Foundation for Educational Research

What is PISA?

The Programme for International Student Assessment (PISA) is an important worldwide research study involving schools and pupils from 79 participating countries and economies. It is run by the Organisation for Economic Co-operation and Development (OECD) and takes place every three years.

PISA is designed to examine how 15-year-olds can apply what they have learned in school to real life situations. Pupils are asked to use their skills of reasoning, interpretation and problem solving rather than simply remembering facts.

Each cycle of PISA has a different focus. The main focus in PISA 2018 was reading, but it also included questions on mathematics and science[1]. PISA also gathers extensive background information about pupils' home and school learning environments and experiences. This information can provide powerful insights into how well education systems are functioning, and how teaching and learning can be improved for all pupils in the UK and around the world.

Who is NFER?

The lives of children and young people worldwide are inextricably linked to the amount and quality of education they receive. At NFER, our mission is to improve outcomes for future generations everywhere and to support positive change across education systems.

We do this by:

- creating and sharing research evidence and insights on education policy and practice
- informing policymakers and other key decision-makers
- providing insights, resources and support to strengthen practice in the classroom.

Making a positive impact on children's and young people's experience of education, their outcomes and on teaching and learning is at the heart of everything we do.

What can PISA tell us about reading, mathematics and science in the UK?

PISA is designed to assess pupils' skills in reading, mathematics and science.

It allows us to draw comparisons with a large number of other countries from around the world and, more importantly, to monitor education in our own countries over time in a global context.

PISA provides information to support improvements to education systems worldwide and all four UK countries participate.

In the majority of countries that participated in PISA, pupils who saw themselves as competitive scored higher in reading than pupils who perceived themselves as less competitive (OECD, 2019).

Pupils in all UK countries expressed a high degree of disapproval of bullying behaviours (Sizmur et al, 2019).

Internationally, the results from PISA 2018 showed that the more anti-bullying attitudes there were in a pupil's school, the less likely they were to be bullied (OECD, 2019).

[1] Some pupils in Scotland also answered questions on global competence.

Interpreting the results

It is important that the PISA results are interpreted appropriately, as a simplistic view can be misleading. The following points should, therefore, be borne in mind.

Comparisons between countries

Rather than focussing on the rankings of countries, it is more important to know whether countries are statistically similar or different. For example, a country may have an improved score in a particular subject, but may have fallen in the rankings due to the improved performance of other countries, or just the mix of countries in any given cycle.

Changes over time

An increase or decrease in score from one cycle to the next does not necessarily indicate that national achievement has improved or declined. It is crucial to consider whether a score is statistically different from previous scores and that changes have not arisen solely by chance. Moreover, any change in scores may not necessarily be attributed directly to national education policies, as it may take many years to understand the full picture. Further analysis is often needed to follow up initial headline findings.

Variations in pupil achievement

A simple average score does not provide a full picture of a particular country. For this reason, PISA also looks at the range of pupil achievement within countries. It examines the differences between the highest and lowest scores and the proportions of pupils working at high, medium and low international benchmarks, known as proficiency levels. For example, two countries could have the same overall mean score but one might have all its pupils demonstrating similar 'average' performance, while the other has high proportions of pupils achieving very high scores, but also high proportions with very low scores, perhaps not even reaching basic proficiency levels. This would suggest less equity across pupils. This kind of evidence can be used to identify particular groups of pupils where resources can be targeted most effectively.

Comparisons with national exams

PISA assessments are not curriculum based and use different methods from national examinations, as they have different goals and outputs. PISA is designed to look at the performance of education systems, not of individual pupils. Comparisons with national exams should be interpreted with some caution.

Education policy

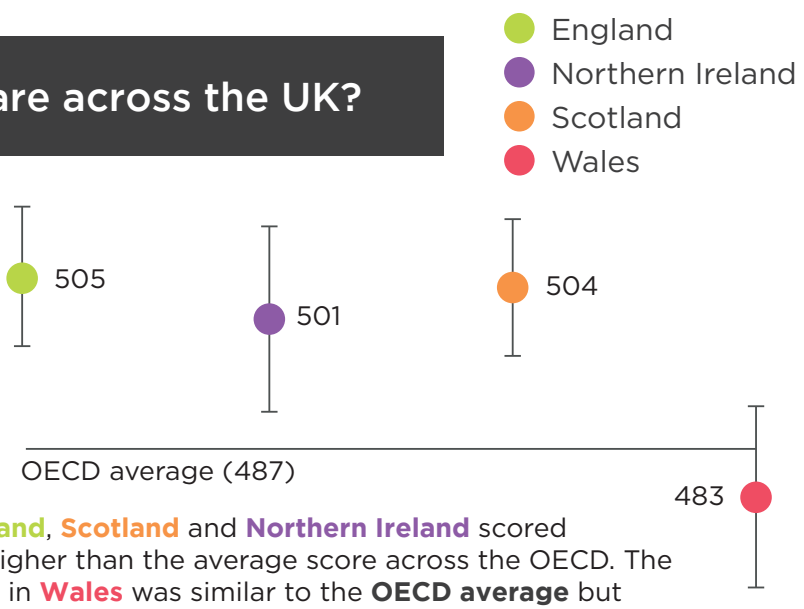
PISA provides in-depth information about education systems, schools and pupils. It explores the relationship between contextual background factors and pupil achievement. This information can help countries to make evidence-based decisions, using PISA results alongside other sources of evidence to develop and adapt education policy.

How do the results compare across the UK?

Reading was the main focus of the OECD PISA study in 2018.

PISA conceives of reading as a broad set of competencies that allows readers to engage with written information, presented in one or more texts, for a specific purpose.

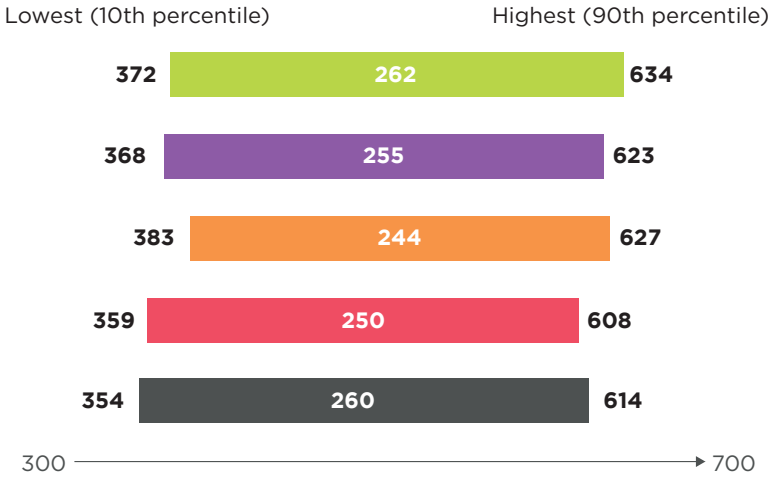
Reading scores



Pupils in **England**, **Scotland** and **Northern Ireland** scored significantly higher than the average score across the OECD. The average score in **Wales** was similar to the **OECD average** but significantly lower than England, Scotland and Northern Ireland.

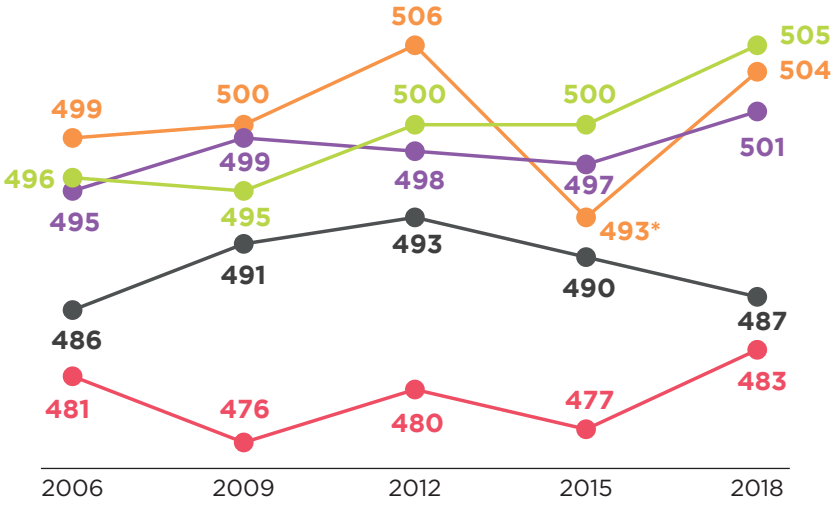
Achievement gap in reading

PISA shows some variation in the size of the achievement gap in different countries. In reading, the gap between highest and lowest achievers was largest in **England** and smallest in **Scotland**.



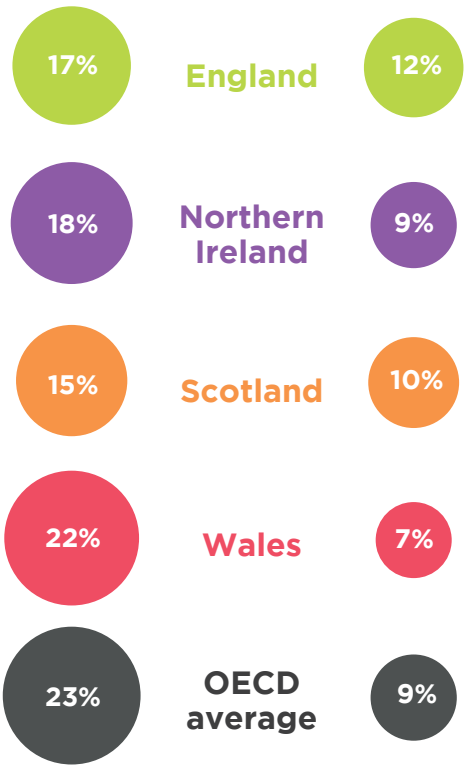
Reading trends over time

Reading in **Scotland** has improved since 2015 while the trend is stable in other parts of the UK.



*The mean score of that year is was statistically different from the mean score in 2018.

Proportions of low and high performers in reading



Lowest performers: Below Level 2 which is defined by OECD as basic proficiency.

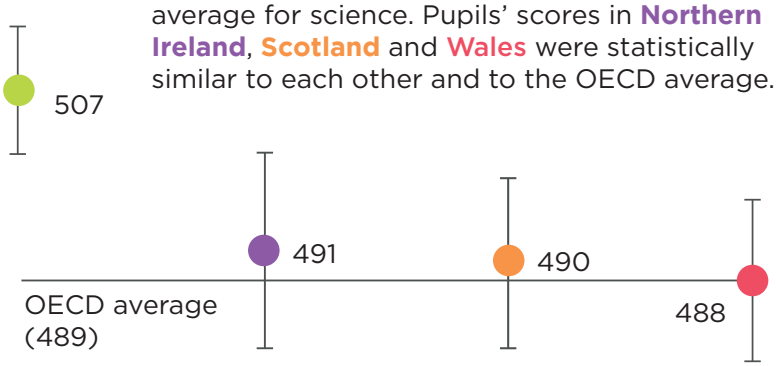
Top performers: Pupils reaching Levels 5 and 6 in reading are considered to be 'top performers' in the global context.

England had the largest proportion of high-scoring pupils (significantly higher than the OECD average). **Scotland** had the smallest proportion of pupils working at the lowest levels (below basic proficiency).

Science in PISA 2018 is defined by three competencies of explaining phenomena scientifically; evaluating and designing scientific enquiry; and interpreting data and evidence scientifically.

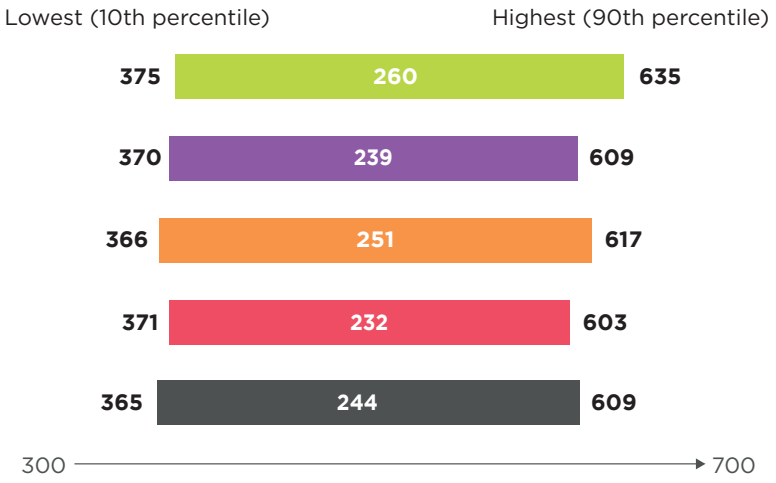
Science scores

Pupils in **England** scored significantly higher than the other UK nations and the OECD average for science. Pupils' scores in **Northern Ireland**, **Scotland** and **Wales** were statistically similar to each other and to the OECD average.



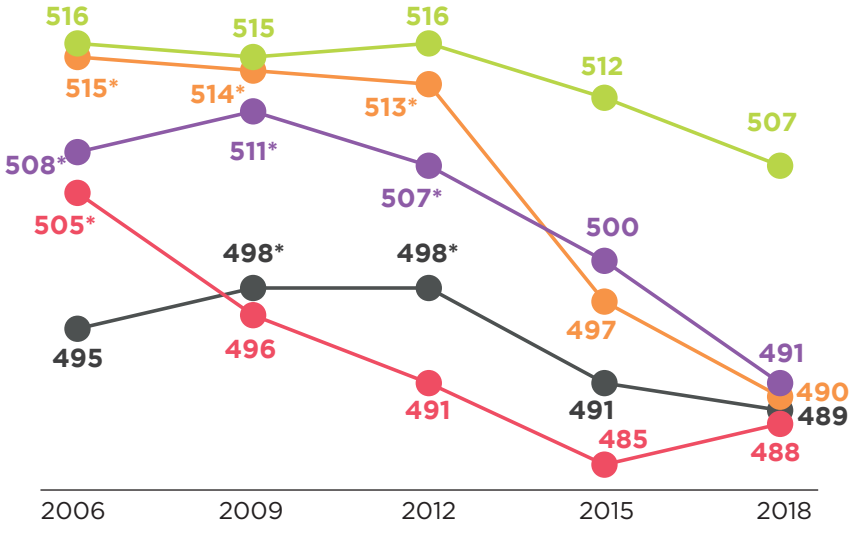
Achievement gap in science

In science, the gap between highest and lowest achievers was largest in **England** and smallest in **Wales**.



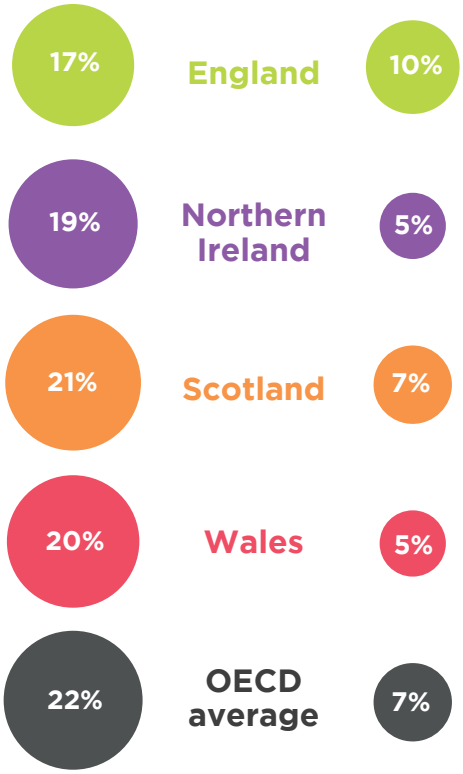
Science trends over time

The trend in science was downwards in **Northern Ireland**, **Wales** and **Scotland** while **England** has remained stable.



*The mean score of that year was statistically different from the mean score in 2018.

Proportions of low and high performers in science



Lowest performers: Below Level 2 which is defined by OECD as basic proficiency.

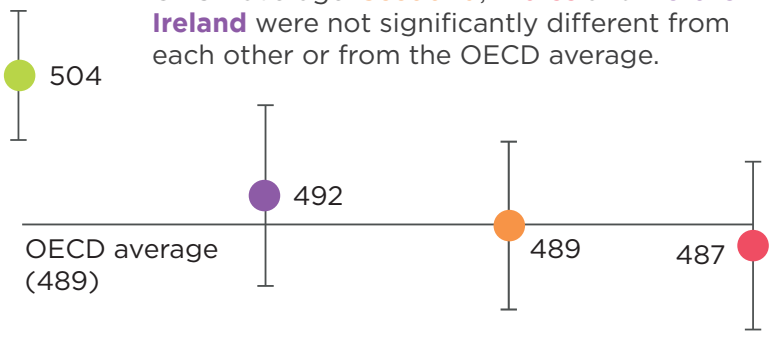
Top performers: Pupils reaching Levels 5 and 6 in science are considered to be 'top performers' in the global context.

England had the largest proportion of high-scoring pupils (significantly higher than the OECD). **Wales** had a significantly smaller proportion of high-achieving pupils than across the OECD. **England** also had the smallest proportion of low-scoring pupils (significantly lower than the OECD) while other UK countries were similar to the OECD average.

The construct of mathematical literacy used in PISA 2018 describes the capacities of individuals to reason mathematically and use mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena.

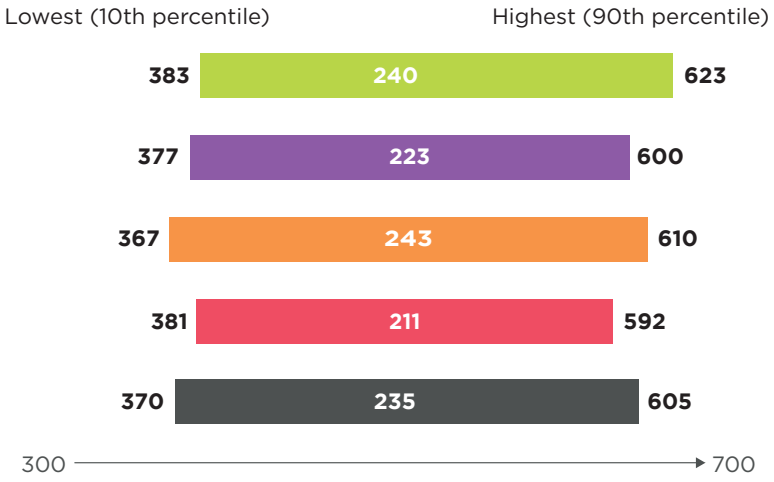
Mathematics scores

The highest attainment for mathematics was in **England**, where scores were significantly higher than other UK countries and higher than the OECD average. **Scotland**, **Wales** and **Northern Ireland** were not significantly different from each other or from the OECD average.



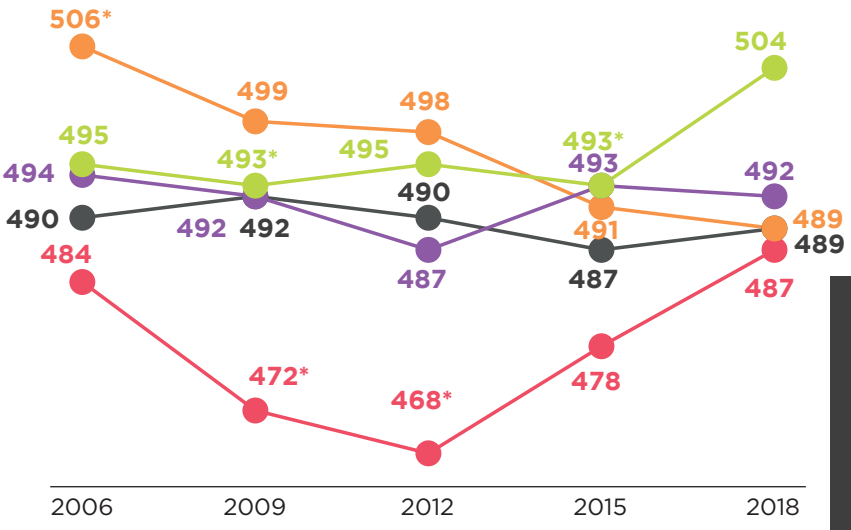
Achievement gap in mathematics

In mathematics, the gap between highest and lowest achievers was largest in **Scotland** and smallest in **Wales**.



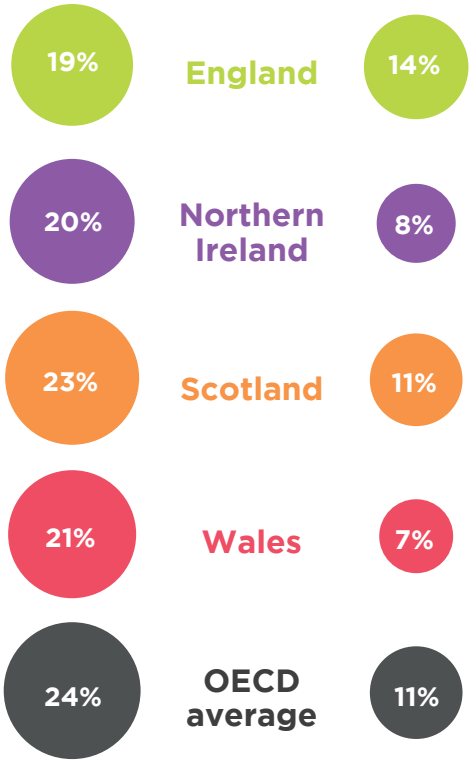
Mathematics trends over time

England and **Wales** have improved their maths score over time, **Scotland** has declined and **Northern Ireland** has remained stable.



*The mean score of that year was statistically different from the mean score in 2018.

Proportions of low and high performers in mathematics



Lowest performers: Below Level 2 which is defined by OECD as basic proficiency.

Top performers: Pupils reaching Levels 5 and 6 in mathematics are considered to be 'top performers' in the global context.

England had the largest proportion of high-scoring pupils (significantly higher than the OECD). **Northern Ireland** and **Wales** had a significantly smaller proportion of high achieving pupils than across the OECD. (Scotland was similar to the OECD average.)

Scotland had the largest proportion of low-scoring pupils (similar to the OECD) while other UK countries had significantly lower proportions working at the lower levels in mathematics than **Scotland** and the OECD.

How do the results compare across the UK?

Socio-economic background

On average, pupils in the UK have a higher socioeconomic status than the average across the OECD countries, according to the economic, social and cultural status (ESCS) index. ESCS is estimated based on household possessions and parents' occupation and education.

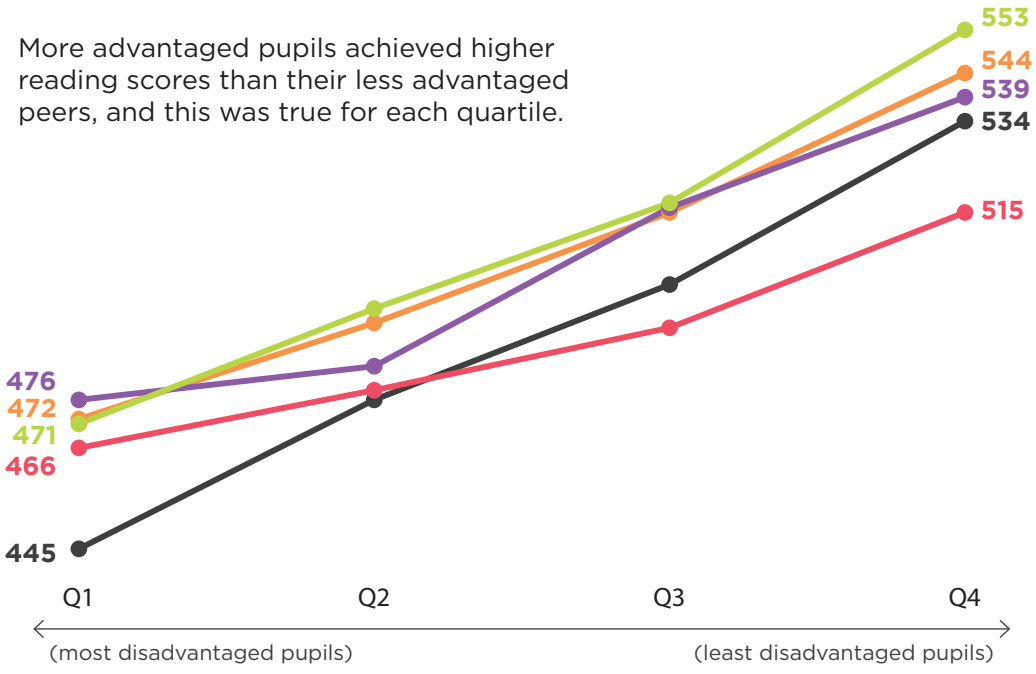
In spite of socio-economic disadvantage, some pupils attain high levels of academic proficiency. On average across OECD countries, one in ten disadvantaged pupils was able to score in the top quarter of reading performance in their countries (known as academic resilience), indicating that disadvantage is not destiny. (OECD 2019)

Reading performance of UK countries and OECD by ESCS quartile

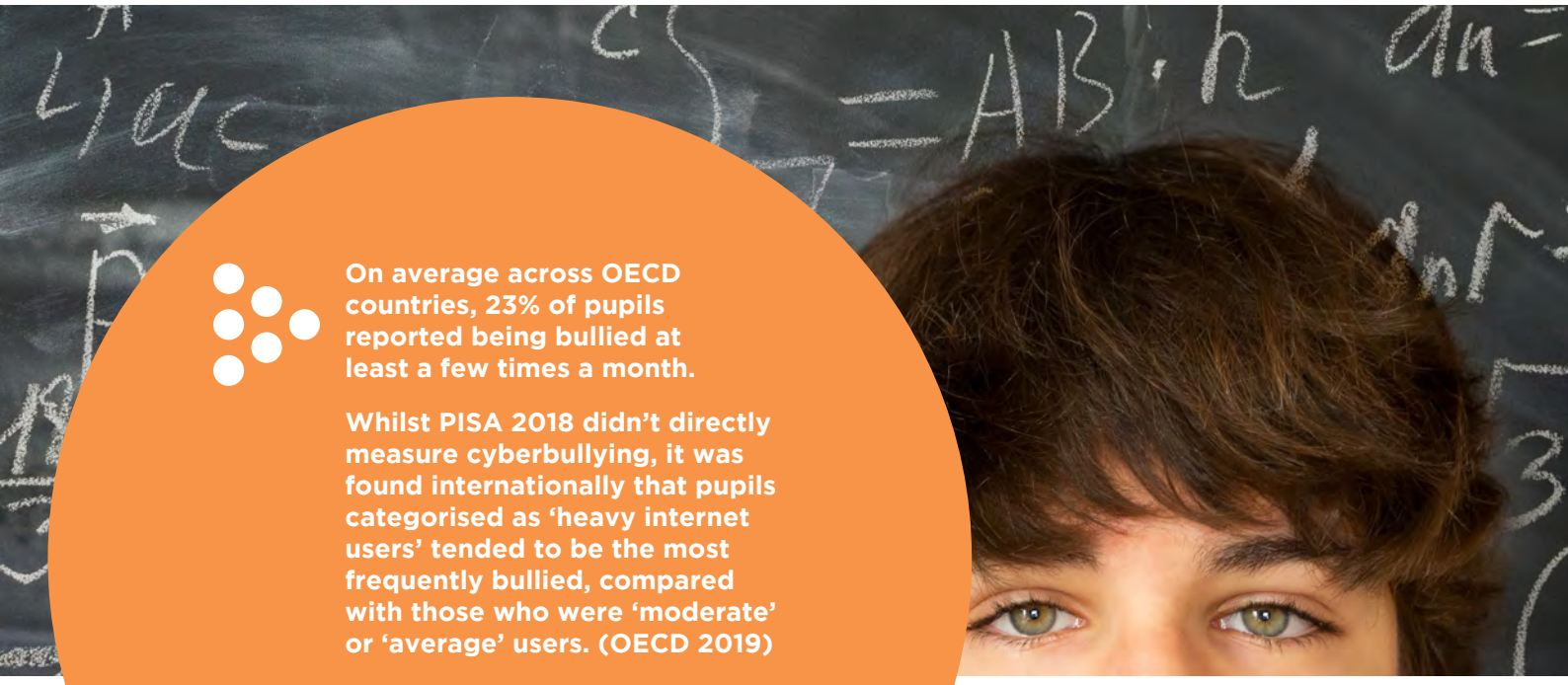
The gap between the most and least disadvantaged pupils was smaller in **Scotland**, **Wales** and **Northern Ireland** than across the OECD, indicating that pupils in those countries were more able to overcome the effects of socio-economic background.*

The gap was smallest in **Wales**, but its more advantaged pupils also had lower scores than other countries.

More advantaged pupils achieved higher reading scores than their less advantaged peers, and this was true for each quartile.



*The gap between the most and least disadvantaged in England was not significantly different from that in OECD overall.



On average across OECD countries, 23% of pupils reported being bullied at least a few times a month.

Whilst PISA 2018 didn't directly measure cyberbullying, it was found internationally that pupils categorised as 'heavy internet users' tended to be the most frequently bullied, compared with those who were 'moderate' or 'average' users. (OECD 2019)

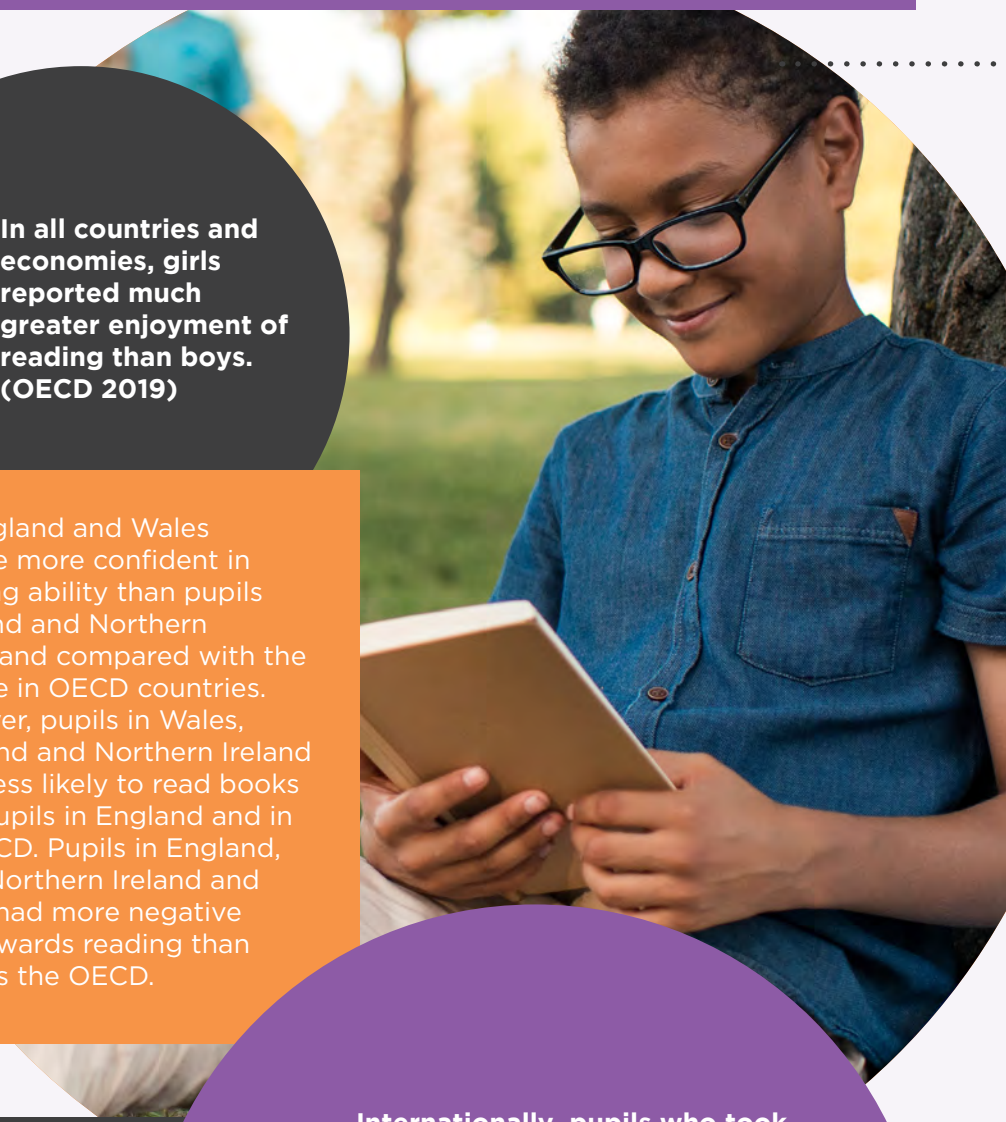
GENDER

In all countries of the UK, girls significantly outperformed boys in reading, as was the case across the OECD.

In science, girls significantly outperformed boys in Northern Ireland but there were no significant gender differences in England, Wales or Scotland.

In mathematics, boys significantly outperformed girls in England and Scotland but there were no significant differences in Wales or Northern Ireland.

In all countries and economies, girls reported much greater enjoyment of reading than boys. (OECD 2019)



READING HABITS

Pupils in England and Wales tended to be more confident in their reading ability than pupils in Scotland and Northern Ireland, and compared with the average in OECD countries. However, pupils in Wales, Scotland and Northern Ireland were less likely to read books than pupils in England and in the OECD. Pupils in England, Wales, Northern Ireland and Scotland had more negative attitudes towards reading than pupils across the OECD.

Internationally, pupils who took part in PISA 2018 cited three main aspects of their lives that influence how they feel: how satisfied they are with the way they look, with their relationships with their parents, and with life at school. (OECD 2019)

LIFE SATISFACTION

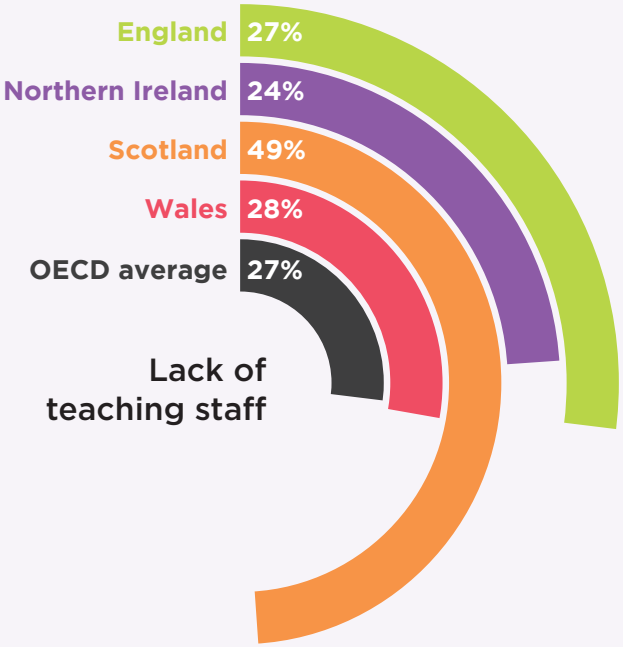
Pupils were asked to rate how satisfied they were with their life as a whole, the extent to which their life has meaning or purpose, their subjective wellbeing and their experiences of bullying.

Pupils in all UK countries were less satisfied with their lives than the OECD average.

SCHOOL RESOURCES

Headteachers and principals across the four UK countries reported different resourcing issues.

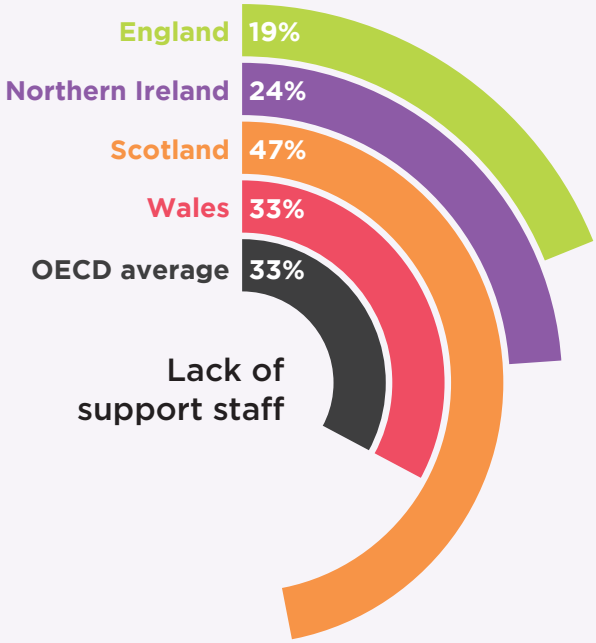
Is your school's capacity to provide teaching hindered by any of the following issues?



STAFFING

Nearly half of headteachers in Scotland reported that teaching was hindered by a lack of teaching staff, compared to just over a quarter in the rest of the UK.

In England, less than 20% of headteachers reported a lack of support staff as a hindrance, compared with 24% in Northern Ireland, 47% in Scotland and 33% in Wales.



RESOURCES

Headteachers in Wales reported greater shortages or inadequacies of educational materials (e.g. textbooks, IT equipment etc.) than those in the rest of the UK.

Principals in Northern Ireland reported more inadequacies with the physical infrastructure than headteachers in the rest of the UK.

Teacher enthusiasm and teachers' stimulation of reading engagement were the teaching practices most strongly (and positively) associated with pupils' enjoyment of reading. (OECD 2019)

around **600,000** pupils from **79** countries across the world took part in PISA 2018

England
170 schools and 5,174 pupils

Northern Ireland
75 schools and 2,360 pupils

Wales
107 schools and 3,165 pupils

Scotland
107 schools and 2,969 pupils

Across the UK, a total of **13,668** pupils from **459** schools participated across the **4** UK countries.

Pupils in England, Wales, Northern Ireland and Scotland had lower expectations of their highest level of qualification than pupils across the OECD

All UK countries used pupil assessment to guide pupils' learning, to adapt teaching to pupils' needs and to inform parents about their child.

Schools in Scotland were less likely to use pupil assessments to judge teacher effectiveness than the rest of the UK.

As with previous cycles of PISA, the highest performing countries, in all subjects, were East Asian.

Headteachers in England were more likely than those in the rest of the UK to report that they had sufficient digital devices connected to the internet. Headteachers in Scotland and Wales were more likely to report that their internet bandwidth or speed was insufficient than headteachers and principals in England and Northern Ireland.

Principals in Northern Ireland were least likely to report truancy as a problem while headteachers in Scotland reported it most.

Education system context across the UK

School structures **Curriculum and assessment**

Scotland

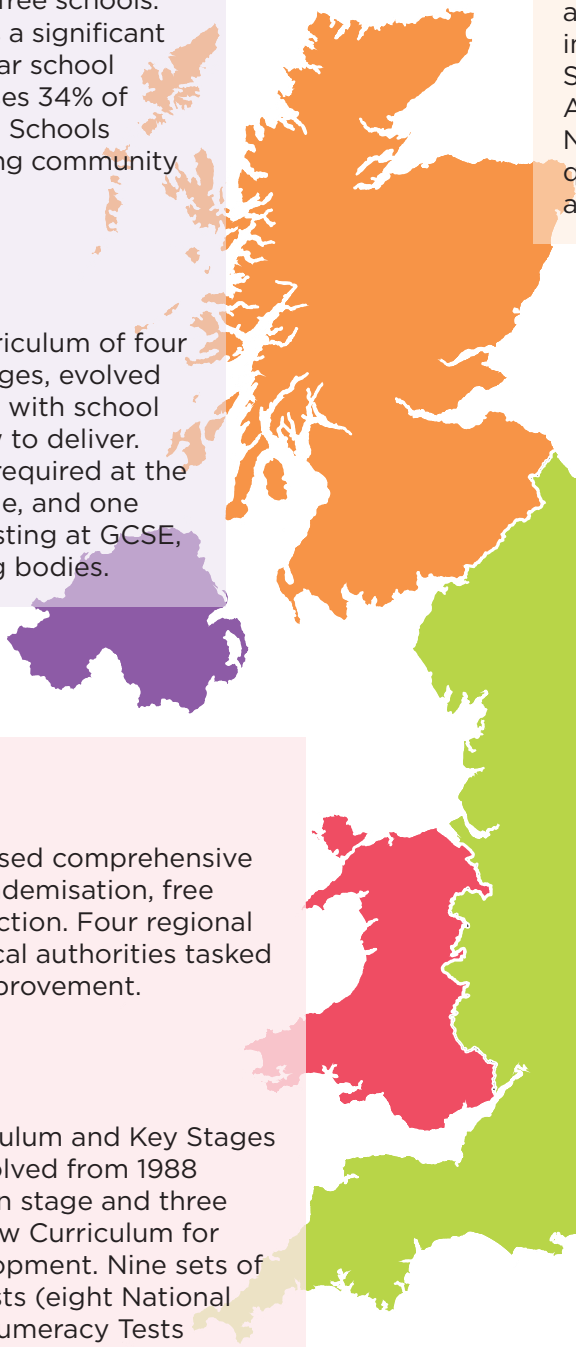
Community-based comprehensive schools, no academisation, free schools or selection.

Significantly different system from the other three countries, the 1988 Education Reform Act does not apply. Curriculum for Excellence implemented 2010. Four sets of Scottish National Standardised Assessments introduced 2017/18. No GCSEs or A levels, but National qualifications with a single awarding body.

Northern Ireland

No academisation or free schools. Academic selection is a significant feature of the grammar school sector, which comprises 34% of post-primary schools. Schools largely organised along community background lines.

Northern Ireland Curriculum of four themes, with Key Stages, evolved from 1988/1999 Acts, with school autonomy about how to deliver. Teacher assessment required at the end of each Key Stage, and one set of compulsory testing at GCSE, with several awarding bodies.



England

An emphasis on parental choice and school diversity. Academies (including free schools) represent 32% of primary and 75% of secondary schools. Limited selection by ability.

National Curriculum and Key Stages evolved from 1988 Education Reform Act. Four sets of compulsory tests (phonics and multiplication table checks, two sets of National Curriculum testing), plus GCSEs with several awarding bodies. Accountability system focuses on academic subjects.

Wales

Community-based comprehensive schools, no academisation, free schools or selection. Four regional consortia of local authorities tasked with school improvement.

National Curriculum and Key Stages and exams, evolved from 1988 Act. Foundation stage and three Key Stages. New Curriculum for Wales in development. Nine sets of compulsory tests (eight National Reading and Numeracy Tests plus GCSEs, which have several awarding bodies).

Overview of PISA – who takes part?

PISA 2018 involved 79 participating countries/jurisdictions worldwide.

The 2018 participants were varied and included a range of high, middle and low income countries or regions. Education systems differ considerably across countries, including the age at which pupils start school and the policies and practices employed.

Argentina
Brazil
Canada
Chile
Colombia
Costa Rica
Dominican Republic
Mexico
Panama
Peru
United States
Uruguay
—
Morocco

Albania
Austria
Baku (Azerbaijan)
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia

Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Italy
Kosovo
Latvia
Kazakhstan
Lithuania
Luxembourg
Macedonia
Malta

Moldova
Montenegro
Norway
Poland
Portugal
Republic of Ireland
Romania
Russian Federation
Serbia
Slovak Republic
Slovenia
Spain

Sweden
Switzerland
The Netherlands
Turkey
Ukraine
United Kingdom
—
B-S-J-Z (China)[1]
Brunei Darussalam
Chinese Taipei
Hong Kong (China)

Indonesia
Israel
Japan
Jordan
Korea
Lebanon
Macao (China)
Malaysia
Philippines
Qatar

Saudi Arabia
Singapore
Thailand
United Arab Emirates
Vietnam
—
Australia
New Zealand

[1] B-S-J-Z (China) refers to the four Chinese provinces that participated (Beijing, Shanghai, Jiangsu and Zhejiang).

NFER has a long history of involvement in international large scale assessments dating back over fifty years. We have delivered PISA to UK schools since 2006. For more information see: www.nfer.ac.uk/pisa/about-pisa. The PISA 2018 reports are available at www.nfer.ac.uk/pisa/pisa-national-reports

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Sizmur, J., Ager, R., Bradshaw, J., Classick, R., Galvis, M., Packer, J., Thomas, D. and Wheater, R. (2019). *Achievement of 15-year-olds in England/Wales/Northern Ireland: PISA 2018 Results*. Slough: NFER.

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