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The Programme for International Student Assessment (PISA) is the world's largest international education study. Every three years, a representative sample of 15-year-old pupils from schools in participating countries are tested in reading, mathematics and science (one of these has a main focus each time). Pupils are also asked questions about their school experience and wider life. Wales has been part of the study since 2006.

In 2018, for the first time, there is no statistically significant difference between Wales and the average for OECD countries in reading, mathematics and science.

Reading

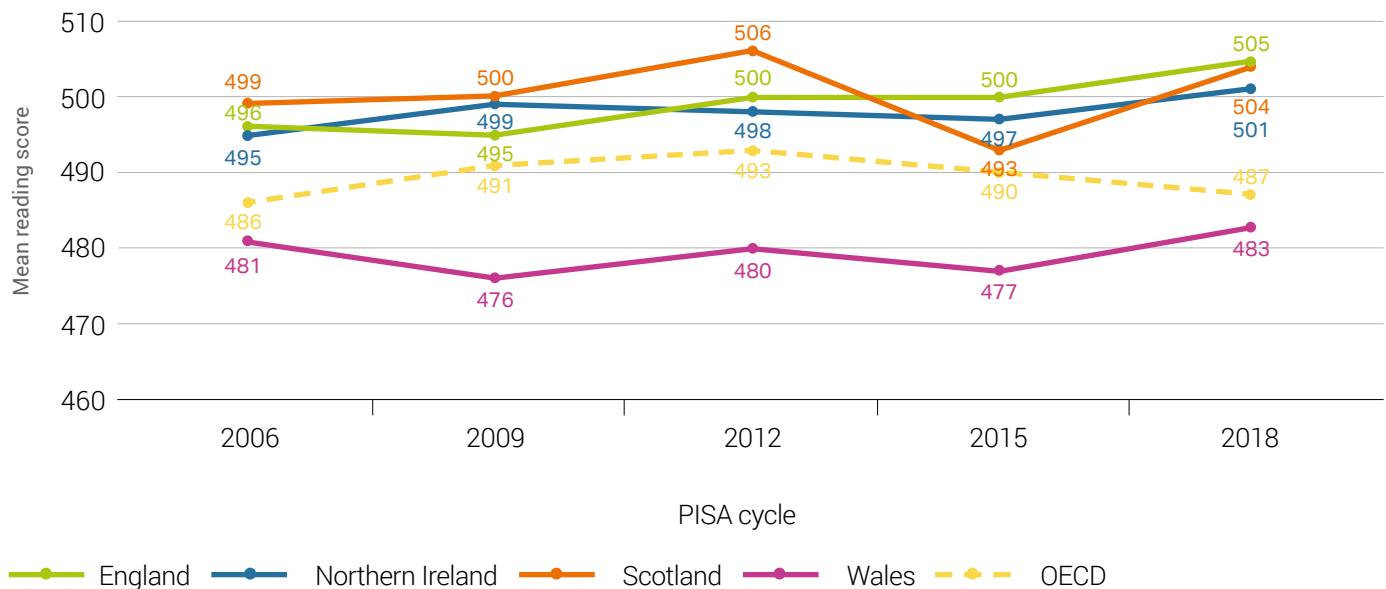
Reading was the main focus of PISA in 2018.

Pupils' overall reading score improved in 2018 and for the first time was close to the OECD average, which fell for the second cycle running. England, Scotland and Northern Ireland continue to perform significantly better than Wales. Over the period 2006-2018, there has been no significant change in the reading score for Wales.

Of the 75 other reported countries, 22 outperformed Wales significantly in 2018, compared to 30 in 2015.

In 2018, girls outperform boys significantly in Wales, as is the case in England, Northern Ireland and Scotland. This gender gap has closed and is not significantly different from the OECD average, but remains greater than in England and Scotland.

Trends in reading scores across the UK



¹The figures and charts in this section are taken from Sizmur et al. (2019) or the OECD website..

PISA 2018 findings

The performance of the top 10% of pupils in Wales improved in 2018 and is now above the OECD average, but remains lower than in England, Scotland and Northern Ireland. That of the weakest 10% fell in 2018. Again, it is above the OECD average but also lower than in England, Scotland and Northern Ireland.

In 2018, the effect of socio-economic status was less in Wales than across the OECD countries. The most disadvantaged pupils in Wales scored higher than their counterparts across the OECD countries although the least disadvantaged pupils, on average, scored lower.

For pupils to read successfully, it is necessary for them to complete a range of cognitive processes which PISA identifies through four processes: 'locating information'; 'understanding'; 'evaluating and reflecting' and 'reading fluency'. Reading fluency underpins the other three processes and was included for the first time in PISA in 2018. Reading fluency contributed to pupils' overall scores.

Locating information

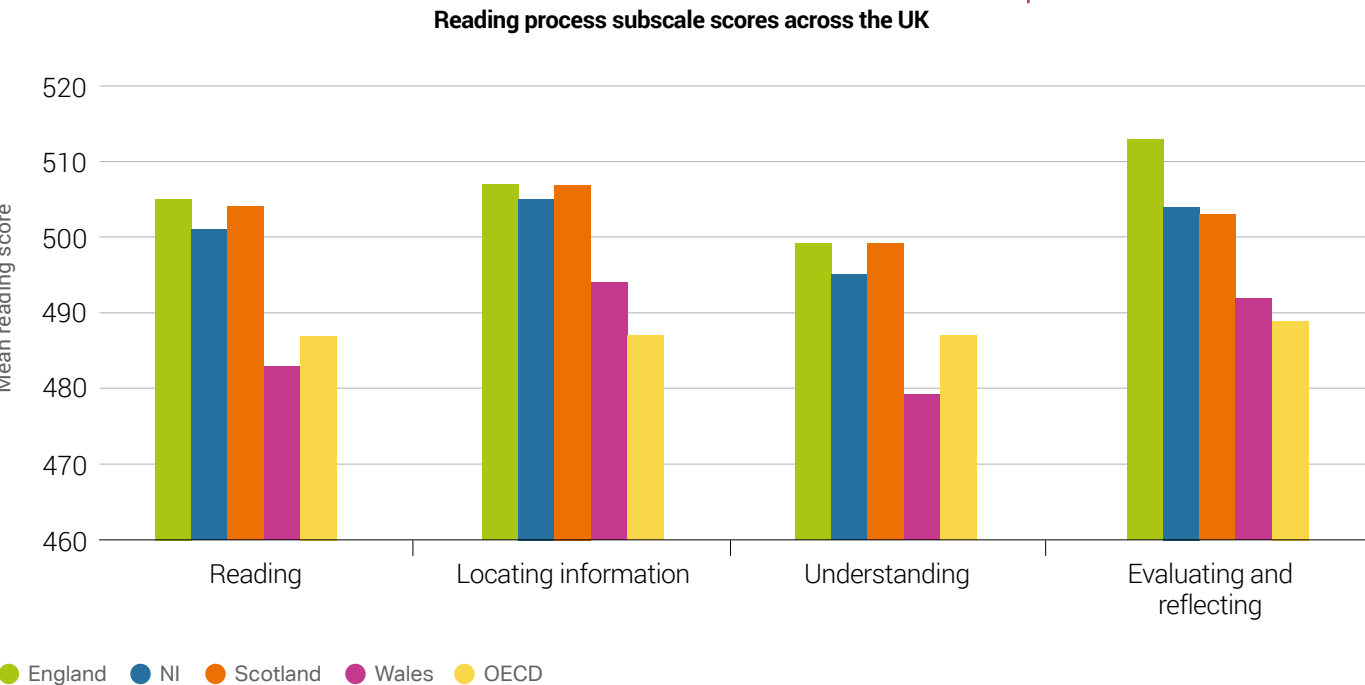
This category required pupils to scan a single text for information or to search several texts to find information relevant to the task. Pupils in Wales performed strongest in this area where they were required to employ familiar and widely-used skills. Whilst these skills are essential, in a minority of inspection reports, we identify pupils being overly-reliant upon these skills and not using a wide enough range of reading strategies to support their learning effectively.

Understanding

This category identified how well pupils could comprehend the literal meaning of text and move beyond including using inference and deduction, and to integrate information to create a main idea, or to produce a summary, or a title for a passage. Pupils were also assessed on how well they can integrate pieces of information that are located within two or more texts. This was the area that pupils performed least well in. Inspection reports usually identify how well pupils use these higher level skills, although this is often based upon their understanding of texts that pupils already know well, such as English or Welsh literature set texts. The PISA tests require pupils to look at a wide range of texts. This raises concerns about how well pupils can use these skills when reading unfamiliar texts. A key factor in pupils' understanding of text is vocabulary. Vocabulary development and knowledge are critical to supporting academic success. Pupils with a limited vocabulary cannot read and understand more advanced texts, and this creates a ceiling to their attainment.

Evaluating and reflecting

This category determined how well pupils were able to assess the credibility of a text through considering the source of the information and how the author presented it. They needed to consider authorial intent and, when required, to reflect on their own experience and knowledge to compare, contrast or hypothesise different perspectives or viewpoints. In addition, pupils had to compare and contrast the views of authors and explain why they may accept the views of the more reliable source.



Two of the main reading skills integral to this area are synthesis and comparison involving multiple source texts. In 2018, pupils performed well in this area as was the case in 2009. From 2017 onwards, there was a renewed focus in schools on summary, comparison and synthesis for GCSE English language examinations. In addition, the ability to synthesise information from various sources is a key component of other examination courses such as GCSE history.

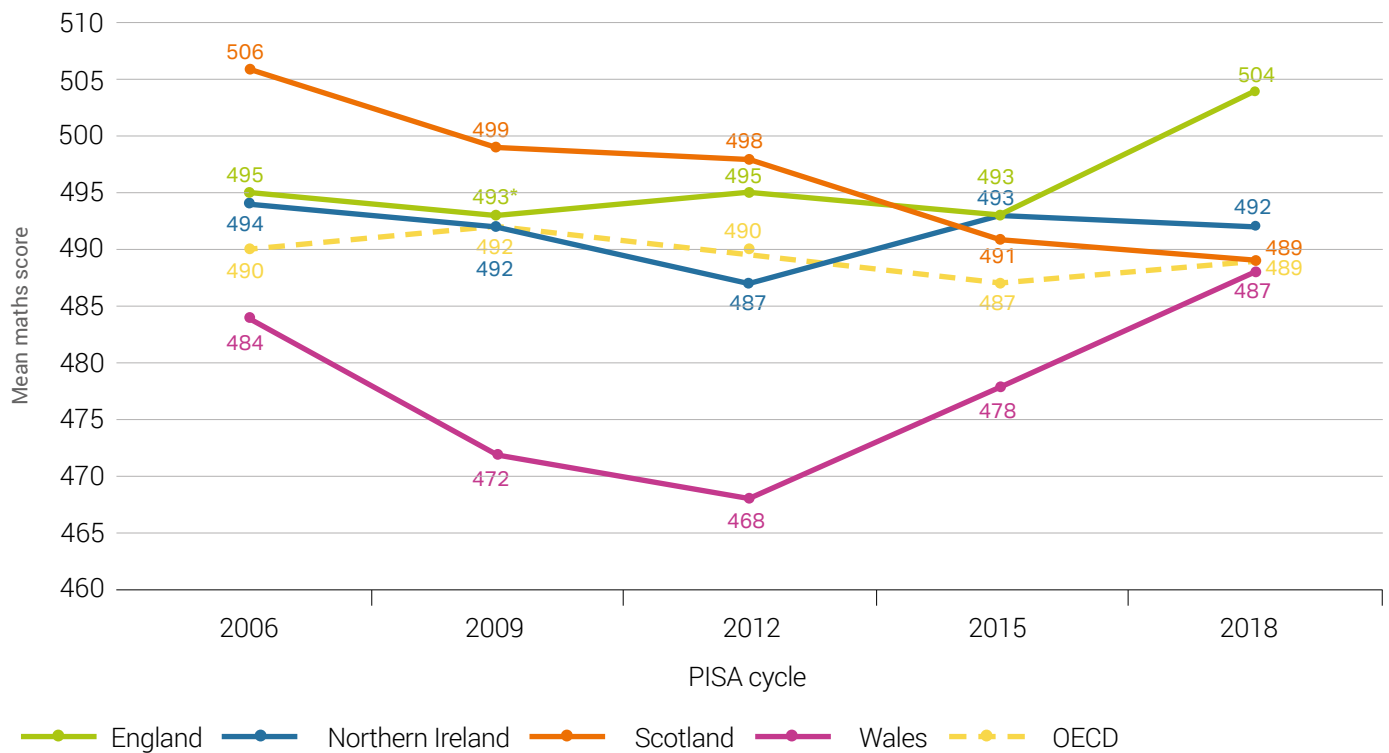
In 2018, pupils performed better in tasks that required them to consider more than one text. They are more confident in their reading ability than the average pupil across the OECD but less likely to read a book. Pupils in Wales displayed more negative attitudes to learning than across other OECD countries, with the majority claiming that they read only for information as was the case in 2009.

PISA 2018 findings

Mathematics

In 2018 the overall mean score achieved in mathematics of 487 is similar to the OECD mean average of 489. This is Wales' highest performance in PISA and, for the first time, the mean score for mathematics is not significantly lower than the OECD average. Since PISA 2012, there has been a sustained improvement in the performance in mathematics.

Trends in mathematics scores across the UK



Performance in mathematics in Wales is still lower than that in Northern Ireland and Scotland, and significantly lower than in England.

In 2018, boys in Wales achieved a mean average marginally better than the mean average score for girls. Girls performed significantly better in 2018 than in 2015 and, as a result, this is the first time the performance of boys is not significantly higher than that of girls.

The top 10% of pupils achieved a significantly higher score in 2018 compared to 2015 in Wales. However, the performance of this group of pupils is still lower than the OECD average and the corresponding groups of pupils in the rest of the UK. The proportion of pupils attaining the highest levels in mathematics (proficiency levels 5 and 6) increased from 5% in 2015 to 7% in 2019. However, this proportion remains lower than the OECD average of 11%.

The overall performance in mathematics improved between 2012 and 2015 and this was due to the improved performance of weaker and middle ability pupils. During this period, there was a fall in the percentage of pupils who were achieving the higher proficiency levels in mathematics. Between 2015 and 2018, overall performance improved again. This was due to a further improvement in the performance of middle ability pupils, an improvement in the performance of more able pupils and weaker pupils sustaining the performance seen in 2015.

The performance of the weakest 10% of pupils improved in 2018 and is now above the OECD average. It is also above the score of the corresponding group of pupils in Scotland and Northern Ireland, although it remains slightly below that of England.

The improvement in mathematics scores over the last two cycles coincides with the introduction by the Welsh Government of three strategies which were specifically aimed at raising pupils' standards in mathematics:

- the introduction of the literacy and numeracy framework in 2013
- the introduction of numerical reasoning tests in May 2014
- the introduction of the new GCSEs in mathematics and mathematics-numeracy for first teaching in September of 2015

The new GCSE numeracy and mathematics qualification requires pupils to be able to have a deep understanding of mathematical concepts, to be able to reason mathematically and to solve problems that are set in context. These skills are also at the core of the mathematics domain of the PISA framework. Our thematic report in 2018 found that these strategies were beginning to raise pupils' standards in these areas. The report states that:

In mathematics departments, the major changes [in the curriculum] are to provide increased opportunities for pupils to develop problem-solving skills for the new numeracy GCSE and for pupils to have a deeper understanding of mathematics concepts.....

.....Many mathematics departments are placing a greater emphasis on developing pupils' problem-solving skills. For example, teachers adapt the structure of lesson plans to teach the skills first and then giving pupils valuable opportunities to practise these skills in context during each lesson. Teachers in these departments use strategies such as problem-solving grids to help pupils recall the steps they need to take to solve problems. Overall, these strategies are successful, especially in improving pupils' ability to extract key information from problems (Estyn, 2018d, pp.21, 26).

PISA 2018 findings

The greater focus on problem solving and developing numerical reasoning in the teaching of mathematics is likely to be one of the key reasons for the significant improvement in Wales' mathematics scores since 2012.

However, in the thematic review on new qualifications we also stated that:

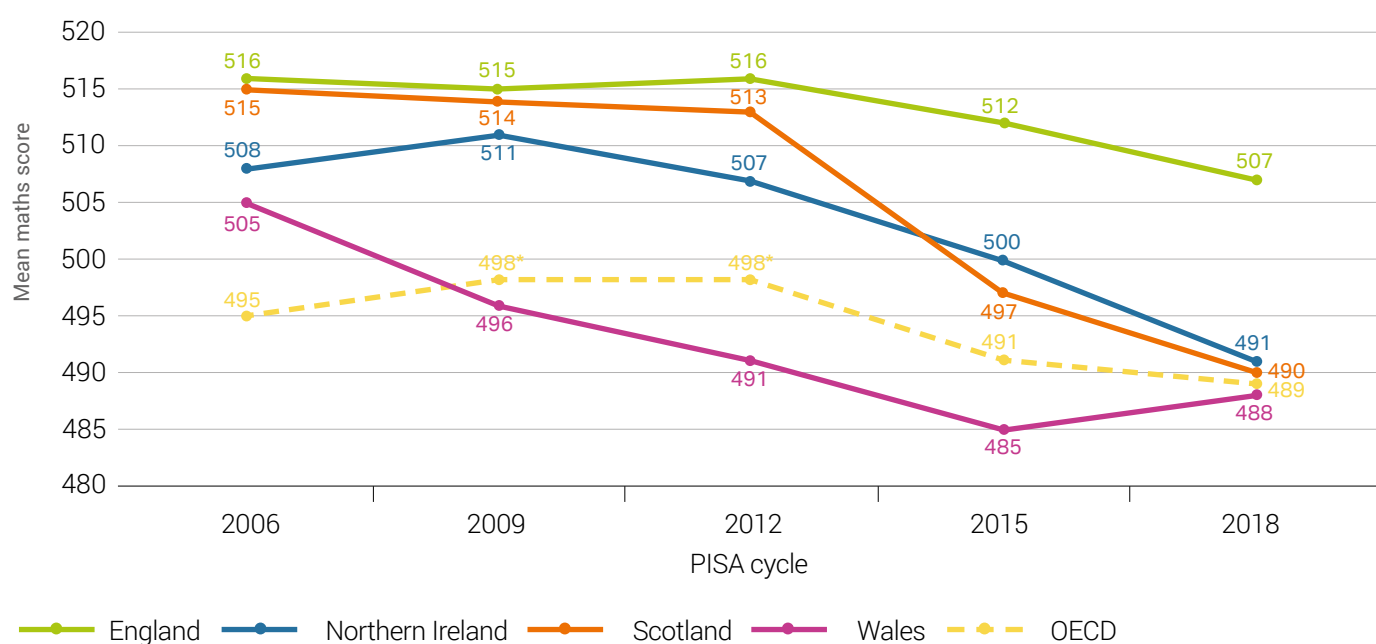
In a minority of schools, arrangements for developing pupils' problem-solving skills and strategies in mathematics and numeracy are not strong enough (Estyn, 2018d, p.27).

This highlights the fact that there is still work to do in improving the teaching of mathematics in Wales, and therefore raising the mathematics and numeracy standards of Welsh pupils.

Science

In 2018, the average score in science achieved by pupils in Wales was in line with the OECD average. Wales' score has improved since 2015, the first time Wales has seen an improvement in its science score, while the OECD average score has weakened during the same period. Wales' science score had fallen for each of the four PISA rounds from 2006 to 2015 and, despite improvements in 2018, the score for 2018 is significantly lower than in 2006. Wales' performance in science remained slightly lower than that of Scotland and Northern Ireland, and significantly lower than that of England.

Trends in science scores across the UK



For the first time in science, girls slightly outperformed boys in Wales. The margin by which girls outperformed boys in Wales in 2018 was in line with the overall margin across the OECD countries.

The proportion of pupils who achieved basic proficiency of level 2 or higher for science was slightly better in Wales, at 81%, than the OECD average of 78%. This reflects a slight improvement for these pupils since 2015, and is in line with performance from earlier PISA tests. The lowest performing 10% of pupils in Wales scored slightly higher on average than the corresponding pupils in Scotland and Northern Ireland as well as higher than those across the OECD. However, the top 10% of pupils in Wales scored below the OECD, below the scores of Scotland, Northern Ireland and England.

A similar proportion of pupils attained the highest levels in science (proficiency levels 5 and 6) in 2018 compared to 2015, and Wales remains below the OECD average.

It is too early to tell whether the slight improvement in the performance of pupils in science is the beginning of an improving trend. The improvement is too small to be attributed directly to changes in secondary school science education in Wales, particularly the increase in the proportion of key stage 4 pupils undertaking GCSE science qualifications rather than vocational science courses over the last four years.