Election factsheet

What you don’t find out about England’s educational performance in the PISA league table.

- It isn't always possible to say with certainty from looking at a country's rank in the PISA educational league tables alone whether one country or economy has definitely performed better than another.
- England's position in the league tables is dependent on which countries and economies participate in a given year and whether the performance of these countries and economies is better, worse or the same as in the last round of PISA.
- England has maintained the *same* level of performance in science in the last four rounds of PISA (2006, 2009, 2012, and 2015), performing significantly above average. Although England’s level of performance has remained stable, the *relative* position compared to the number of higher performing countries and economies has fluctuated in the last three rounds of PISA. England ranked 14th in 2006, 16th in 2009, 18th in 2012, and 14th in 2015. The changes in England’s *relative* position are mainly due to changes in the ranking of several top performing countries and economies. For instance, Australia and New Zealand performed significantly better than England in 2009 but performed similarly to England in 2012 and 2015; and other countries and economies, especially in South East Asia, have maintained or even improved their performance and consistently ranked among the world’s top performers.
- PISA data alone doesn't tell us why some countries and economies are higher achieving, why some pupils perform better than others or which teaching practices result in higher performance.

England’s position in the league tables is dependent on which countries and economies participate in a given year

Election factsheet

The Programme for International Student Assessment (PISA) is a survey of the educational achievement of 15-year-olds developed by the Organisation for Economic Co-operation and Development (OECD). PISA assesses students' science, maths and reading skills. 15-year-olds from across the world take tests in the three key subjects, with a focus on one subject in each year of the assessment.

In PISA 2015, the main subject was science and in the next PISA survey in 2018 the focus will be on reading.

All four countries of the UK participated in PISA 2015. This briefing document focuses on England. Where relevant the briefing also references the findings for the whole of the UK.

This piece sets out to explore how PISA results can be used to judge the success of education systems, particularly in terms of the claims that are made about PISA findings by politicians and the media. There are ongoing debates surrounding the methodology of PISA (for example, see this piece in the TES), which this piece does not seek to address.

Here's what it can tell us...

England's performance has generally stayed the same since 2006.

The current Secretary of State for Education, Justine Greening, as well as the two previous ones, Michael Gove and Nicky Morgan, have stated the intention of the Department for Education to use the results of international large scale surveys as a benchmark to evaluate the effectiveness of the Government's extensive school system and exam reforms. And so, when the results of PISA 2015 were released, the focus from politicians and the media was primarily on how the UK ranked against the other participating countries and economies.

While England ranked 14th (and the UK taken as a whole ranked 15th) in the world for science, based on its score there were only nine countries and economies which significantly outperformed England.

Each country's PISA score has a margin of error associated with it (because of factors like not every pupil in the country is tested, and because the pupils who are tested may have performed particularly well or badly on the day). This means we cannot conclude that differences between similar scores (over time or across countries) reflect genuine differences in performance or have arisen simply due to chance. Differences which are large enough that they're unlikely to have arisen solely by chance are termed "significant differences".

So it isn't always possible to tell from looking at the rankings in the league table whether one country or economy has performed better than another.

Looking at whether this *score* is higher or lower than in the previous PISA assessment year also doesn't tell us accurately whether England has improved, or is 'in decline' or 'stagnating'. We have to establish whether the score for that particular year is significantly different from the score obtained previously. For example, in 2006 England's PISA score for science was 516, in 2009 it was 515, in 2012 it was 516 and in 2015 it was 512. Although the score decreased by four points between 2012 and 2015, analysis by the UCL Institute of Education found that, in 2015, England maintained the *same* level of performance in science as in the previous three rounds of PISA (2006, 2009 and 2012).

Looking at whether this score is higher or lower than in the previous PISA assessment year also doesn't tell us accurately whether England has improved

Election factsheet

If we want to get a sense of whether England is "falling behind global rivals" or if England's educational system is moving from "'must try harder' to world class" we can look at how many countries and economies outperformed England in a particular subject in the previous rounds of the PISA assessment. The number of countries and economies outperforming England in science was seven in 2006, ten in 2009 and 2012, and nine in 2015. So England's position in terms of the number of countries and economies performing significantly better has remained relatively stable over time.

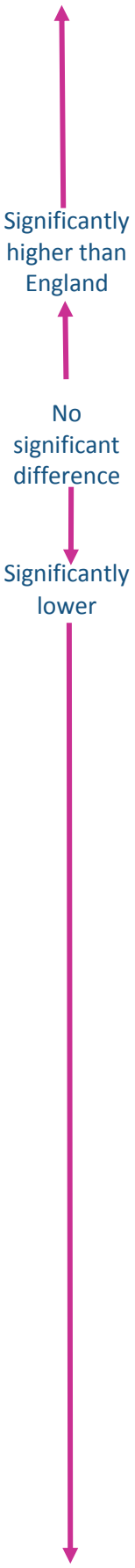
A country's position relative to other countries and economies is not just based on its own performance. It's also influenced by which countries and economies participate and whether their own performance is better, worse or the same as in the last round of PISA. The significant improvement of some high-performing East Asian countries and economies, such as Korea and Macao-China, coupled with a significant decline in science scores of some of the highest performing English-speaking countries, such as Australia or New Zealand, mean that England's position in terms of the number of countries and economies performing significantly better has remained relatively stable over the last three PISA rounds.

If you look at England's science performance compared to other predominantly English speaking economies, only Canada scored significantly higher than England in 2015.

PISA also provides data on the "spread" of achievement

PISA scores on the science scale
2015 PISA results

Singapore	556
Japan	538
*Estonia	534
Taiwan	532
*Finland	531
Macao	529
Canada	528
Vietnam	525
Hong Kong	523
China	518
South Korea	516
New Zealand	513
*Slovenia	513
England	512
Australia	510
*Germany	509
*Netherlands	509
Switzerland	506
*Republic of Ireland	503
*Belgium	502
*Denmark	502
*Poland	501
*Portugal	501
Northern Ireland	500
Norway	499
Scotland	497
United States	496
*Austria	495
*France	495
*Sweden	493
*Czech Republic	493
*Spain	493
*Latvia	490
Russian Federation	487
Wales	485
*Luxembourg	483
*Italy	481
*Hungary	477
**Lithuania*	475
**Croatia*	475
Iceland	473
OECD Average	**468**
Israel	467
Malta	465
*Slovak Republic	461
*Greece	455
Chile	447
**Bulgaria*	446
.....	



* EU countries, non-italicised-OECD, italicised-non-OECD
Source: Department for Education Achievement of 15-Year-Olds in England, PISA 2015 National Report - data tables

The difference in performance in science by low achieving and high achieving students is one of the largest in OECD countries.

A country's *average* PISA score doesn't tell us everything someone might need to know to judge whether a country has a successful education system. For example, PISA also provides data on the 'spread' of achievement (the achievement gap). England has a wide spread of achievement—that is, although England has an above average proportion of high achievers in science, there are still a number of students who don't do well in PISA.

Only one of the highest performing countries and economies (Singapore) has a wider (but not significantly different) achievement gap—although Singapore's overall science performance in PISA 2015 was higher than that seen in England.

Some high-performing countries are better at reducing the effect of family background on PISA

England's least advantaged 25 per cent of students scored 80 points lower than the most advantaged 25 per cent of students, which corresponds to just under three years of schooling and is similar to the average difference in OECD countries.

PISA data can show us how much socio-economic background determines achievement in each country. NFER's analysis of the 2012 PISA data found that in England the effect of socio-economic background on mathematics attainment was greater than that seen on average across OECD countries and that in only 12 OECD countries was the effect of socio-economic background on maths attainment larger than that seen in England. A slightly different picture was seen for science attainment in PISA 2015, where the comparison of English and international data revealed that the impact of socio-economic status upon pupil's science scores, although considerable, was identical to OECD's average.

As well as comparing the *average* difference in attainment of students from different socio-economic backgrounds, we can also consider the strength of the association, which is slightly weaker in England than in OECD countries. This means that the science performance of English students is slightly less determined by their socio-economic backgrounds and that other factors are more influential.

The 2015 findings on the association between science attainment and socio-cultural background are in line with the findings of NFER's in-depth analysis of the PISA 2015 mathematics attainment data, which also suggested that the English educational system was more equitable than the international average.

The OECD found out that socio-economically disadvantaged students across OECD countries are about three times more likely than their advantaged peers to fall short of attaining the baseline level of proficiency in science. Nonetheless, about 29 per cent of disadvantaged students beat the odds and succeed, performing among the top quarter of students in all participating countries-these students are considered *resilient*. In England, the proportion of disadvantaged students who overcome the odds is even higher, with about one in three disadvantaged students being considered resilient.

High-performing countries in 2015, such as England, were also characterised by having a higher than OECD average proportion of resilient students. The six East Asian countries and economies that significantly outperformed England, as well as Estonia and Finland, are amongst OECD's top ten for percentage of resilient students. But without looking at other

background characteristics (some of which started being collected in 2015 and are going to be collected in future PISA rounds) it is not possible to say why students with similar socio-cultural backgrounds perform differently.

English students are among the least happy in the world

PISA 2012 was the first PISA survey that asked students to evaluate their happiness at school, and in 2015 they were also asked about their well-being and how they spent their time outside of school.

The majority of English students reported being satisfied with life and feeling that they belong in school, but less so then their international counterparts. But, the proportion of English students who considered themselves very satisfied with life was one of the lowest in the OECD (28 per cent against an OECD average of 34 per cent), and the proportion of students who considered themselves not satisfied one of the highest (16 per cent against an OECD average of 12 per cent).

Another key issue highlighted in 2015 was school disengagement: an average of 73 per cent of students across the OECD reported feeling that they belong at school but 68 per cent of English pupils felt the same.

According to the OECD, there is good evidence that students who feel that they are part of a school community are more likely to perform better academically and less likely to engage in risky and anti-social behaviour, substance abuse, and truancy, as well as less likely to drop out of school and never return.

What PISA does and doesn't tell us...

Should England emulate the teaching practices of successful East Asian countries?

PISA provides us with limited information about the teaching practices that are used in high-achieving countries and economies as it does not collect information about these directly from teachers. It only captures this information through reports from students about what they do in their lessons.

Other international surveys such as the Teaching and Learning International Survey (TALIS), TIMSS and PIRLS collect information about teaching practices directly from teachers. We can use these to look at the link between achievement and particular teaching practices, but it still can't tell us whether the high performance of Singapore and other East Asian top performers is a result of specific teaching practices.

PISA can help identify which are the higher performing countries, and give us some indication of the things that are associated with higher performance. However, PISA can't give us a detailed understanding of why some countries and economies are higher achieving, why some pupils perform better than others or which teaching practices result in higher performance.

Does selective schooling improve social mobility?

Plans to expand grammar and independent schools have been widely discussed in the media, with those in favour of promoting a more selective school system in England arguing that selection on the basis of academic ability promotes social mobility. It is often assumed that selective systems allow

gifted but disadvantaged young people to do better in school thus overcoming their low socio-economic background.

Evidence from PISA doesn't support the notion that selectiveness fosters resilience: the capacity to perform much better than expected given one's socio-cultural background. The PISA 2015 results may actually point to the opposite: the proportion of resilient students in a country or economy tends to decrease as school systems become more selective. For example, in the UK and Canada, where most secondary school students attend non-selective comprehensive schools, the proportion of resilient students is similar to that of Germany, which has one of the most selective school systems in OECD.

Are boys better than girls at science?

You may have seen headlines and read news pieces on how women and men's brains are hardwired differently, and even consider that natural sciences are "male" fields while humanities and social sciences are "female". However, PISA data doesn't provide any significant evidence that boys or girls are naturally more apt to be proficient in science.

In 2015, across OECD countries boys' mean performance in science was four points higher than girls', which was a statistically significant but very small difference, but there were also some countries where girls as a group significantly outperformed boys by more than 15 points.

Boys scored significantly above girls on science, on average, in 24 countries and economies and girls scored significantly above boys, on average, in 22 countries and economies. In a third group of countries, which includes England, the differences between boys' and girls' performance in science were not statistically significant.

This briefing was written by Bethan Burge of the National Foundation for Educational Research in collaboration with Full Fact in 2015. It was updated by Joana Andrade of the National Foundation for Educational Research in 2017