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## PROGRAMME FOR INTERNATIONAL STUDENT ASSESSMENT (PISA) 2009: RESULTS FOR ENGLAND

### INTRODUCTION

The Programme for International Student Assessment (PISA) is a survey of educational achievement organised by the Organisation for Economic Co-operation and Development (OECD).

PISA assesses the knowledge and skills of students aged fifteen as they near the end of their schooling and is carried out on a three-year cycle, with each cycle focusing on one of the three areas of literacy in which knowledge and skills are assessed: reading, mathematics and science. 65 countries participated in the fourth cycle in 2009, including all 33 OECD members and 25 of the 27 EU members (the two exceptions being Cyprus and Malta). Note: Nineteen countries are members of both the OECD and the EU.

The full NFER report for England, "*PISA 2009: Achievement of 15-year-olds in England*" is at [www.nfer.ac.uk/pisa](http://www.nfer.ac.uk/pisa)

The full OECD international report, "*PISA 2009 Results: What Students Know and Can Do – Student Performance in Reading, Mathematics and Science (Volume 1)*" is at [www.pisa.oecd.org](http://www.pisa.oecd.org)

### KEY POINTS

Within England:

- There has been no significant change in performance compared with the results for 2006.
- There has been a fall in the country ranking across all three domains since 2006.
- In reading, there was a slightly wider distribution of scores around the mean than the OECD average although the proportion of pupils performing at each level was very similar to the OECD average.
- In reading, there was a smaller gender gap than in most OECD countries, with only Chile and the Netherlands recording a smaller difference between boys and girls.
- In mathematics, there were relatively few high performers.
- In mathematics, there was a relatively smaller distribution of scores around the mean than the OECD average.
- In science, performance was significantly above the OECD average and England also did well when compared with EU countries.
- In science, there was a relatively long tail of low performance when compared to the best-performing countries.

## COMMENTARY

The mean scores of English pupils show little change compared with the previous round for all three subject domains.

**Table 1: England mean scores, 2006 and 2009**

Subject	Mean Score for England	
	2006 (57 Countries)	2009 (65 Countries)
Reading	496	495
Mathematics	495	493
Science	516	515

However, England's position in the rankings has fallen in each subject. Two new countries/systems entered PISA for the first time in 2009 (Shanghai-China and Singapore) and significantly outperformed England. A number of existing countries have also increased their mean performance and pushed England down the rankings.

**Table 2: England rankings, 2006 and 2009**

Subject	Rankings for England	
	2006 (57 Countries)	2009 (65 Countries)
Reading	17 <sup>th</sup>	25 <sup>th</sup>
Mathematics	24 <sup>th</sup>	27 <sup>th</sup>
Science	14 <sup>th</sup>	16 <sup>th</sup>

NOTE: In the following text and tables, the comparison group comprises those countries who meet at least one of the following criteria (and non-OECD member names are shown in italics):

- OECD member
- EU member (shown with an asterisk after name)
- Achieved a mean score of at least 430

Outcomes for England derive from analysis carried out at 'sub-national' level (i.e. for the constituent countries within the UK) by NFER and from additional analysis using the international dataset.

A summary of the main findings from the national report for England is at **Annex A**

The full country rankings are at **Annex B**.

## Reading

Reading was the major domain in the PISA 2009 survey and the comparison group (based on the criteria noted above) consists of 47 countries including 24 who are EU members and 32 who are OECD members (some countries belong to both organisations).

England's students achieved a mean score of 495 in reading which was slightly above the OECD mean of 493 (the difference is not statistically significant). Of the 12 countries with mean scores significantly above England (see Table 3), three (Shanghai-China, Hong Kong-China and Singapore) are not OECD countries. Two of the countries are English-speaking (New Zealand and Australia), one has a substantial number of English speakers (Canada) and two (Hong Kong-China and Singapore) have strong historical links with the UK education system.

Internationally, fourteen countries performed at a level not significantly different from that of England and the remaining thirty eight countries performed significantly less well (see Tables 4 and 5).

Three of the countries that significantly outperformed England are EU members (Finland, Netherlands and Belgium). Nine EU countries did not perform significantly differently from England and twelve performed less well. Among OECD countries, nine performed significantly better than England, eleven performed similarly to England and twelve performed less well.

### Table 3: Countries with a significantly higher mean score than England in reading

*Shanghai-China* 556, *Korea* 539, *Finland\** 536, *Hong Kong-China* 533, *Singapore* 526, *Canada* 524, *New Zealand* 521, *Japan* 520, *Australia* 515, *Netherlands\** 508, *Belgium\** 506 and *Norway* 503

### Table 4: Countries with a mean score not significantly different to England in reading

*Estonia\** 501, *Switzerland* 501, *Poland\** 500, *Iceland* 500, *United States* 500, *Liechtenstein* 499, *Sweden\** 497, *Germany\** 497, *Ireland\** 496, *France\** 496, *Chinese Taipei* 495, *Denmark\** 495, **ENGLAND 495**, *Hungary\** 494, *Portugal\**

### Table 5: Countries with a significantly lower mean score than England in reading

*Macao-China* 487, *Italy\** 486, *Latvia\** 484, *Slovenia\** 483, *Greece\** 483, *Spain\** 481, *Czech Republic* 478, *Slovak Republic\** 477, *Croatia* 476, *Israel* 474, *Luxembourg\** 472, *Austria\** 470, *Lithuania\** 468, *Turkey\** 464, *Dubai (UAE)* 459, *Russian Federation* 459, *Chile* 449, *Serbia* 442, *Bulgaria\** 429, *Mexico* 425 and *Romania\** 424

### Distribution of performance in reading

England's score at the 5<sup>th</sup> percentile was 334 while its score at the 95<sup>th</sup> percentile was 646, a difference of 312 scale points. This was slightly larger than the OECD average difference of 305 scale points and only 14 countries had a wider distribution than England. These included the

OECD countries Israel, France, Luxembourg, New Zealand, Belgium, Japan, Austria, Australia, Sweden, United States and Iceland.

In England, 5.1 per cent of students scored below PISA level 1, which was slightly less than the OECD average of 6.7 per cent. Below level 2, England had 17.4 per cent compared with an OECD average of 18.8 per cent. Although England compared reasonably well with the overall OECD average, it did less well when compared with the high-scoring countries. In Shanghai-China for example only 4.1 per cent performed below level 2 and in Finland the figure was 8.1 per cent. In all, only 20 countries had a larger proportion of pupils performing below level 2.

At the top end of the distribution, England had 1.0 per cent at level 6, slightly above the OECD average of 0.8 per cent. This pattern repeats for the top two levels combined, with England at 8.1 per cent compared with an OECD average of 7.6 per cent. However, the numbers of pupils scoring at these high levels do not compare well with some of the highest-scoring countries. Shanghai-China had 19.5 per cent of pupils at level 5 or above Singapore and New Zealand both had 15.7 per cent of pupils in the top two levels.

PISA assesses reading literacy in relation to text format (continuous and non-continuous texts) and in relation to three reading processes:

- the ability to *access and retrieve* information
- to *integrate and interpret* information in order to demonstrate understanding of the text
- to *reflect and evaluate* form, features and purpose

In addition to their overall performance, pupils' reading performance was analysed separately by text format and by reading process. In some countries, pupils showed notably stronger or weaker performance in some of these areas, relative to their mean performance – such differences could have implications for teaching and learning.

In relation to text format, England achieved a higher mean score on the *non-continuous texts* scale (506) than on the *continuous texts* scale (492). England's highest reading process score was attained on the *reflect and evaluate* subscale, with a mean of 504, nine scale points higher than its overall mean for reading. On both the *access and retrieve* and the *integrate and interpret* scales, England scored a mean of 491, four points below its overall reading mean of 495 scale points. Although the differences are not large, this may suggest that, in England, pupils are relatively strong in skills such as making judgements about authorial techniques and determining the usefulness of a text for a particular purpose; and relatively less strong in skills such as locating and selecting explicit information (*access and retrieve*) or using inference and deduction and linking ideas within or across texts (*integrate and interpret*).

A similar level of variation was seen in several other countries, although larger differences were generally confined to lower-attaining countries. Even some of the 12 countries which significantly outperformed England did not have consistent performance across the three reading processes and the two text formats (see Table 6 below). For example, Shanghai-China scored 17 scale points lower than its mean on *non-continuous texts* but eight points higher on *continuous texts*.

Comparing mean scores for the three reading processes, other English speaking countries, like England, tended to have relatively higher scores on the *reflect and evaluate* subscale. The scores on this scale for Australia, New Zealand, Canada and the United States were eight, ten, 11 and 12 scale points higher respectively than their overall mean for reading.

**Table 6: Differences between reading scale scores in countries outperforming England**

	Overall reading mean	Difference from overall reading mean				
		Reading aspect			Text format	
		Access and retrieve	Integrate and interpret	Reflect and evaluate	Continuous text	Non-continuous text
Shanghai-China	556	-7	2	1	8	-17
Korea	539	3	2	3	-1	3
Finland*	536	-4	2	0	-1	-1
Hong Kong-China	533	-3	-3	7	5	-11
Singapore	526	0	-1	3	-4	13
Canada	524	-7	-2	11	0	3
New Zealand	521	0	-4	10	-3	11
Japan	520	10	0	1	0	-2
Australia	515	-2	-2	8	-2	9
Netherlands*	508	11	-4	2	-2	6
Belgium*	506	7	-2	-1	-2	5
Norway	503	9	-1	2	2	-5
<b>ENGLAND</b>	495	-4	-4	9	-3	11

**Gender differences in reading**

Of the 65 participating countries, all had a statistically significant difference in gender performance, favouring females. In England, there was a difference of 25 scale points between females and males. This was lower than the OECD average difference of 39 scale points and was one of the lowest among the comparison countries, with only Chile and the Netherlands having a smaller difference. The largest difference among OECD countries was a 55-point difference in Finland, while the largest among the comparison group countries was a 61-point difference in Bulgaria.

**Mathematics**

Mathematics was a minor domain in the PISA 2009 survey. Only a sub-set of questions from the 2003 mathematics test items were used and not all students were assessed in this subject. The results reported are estimates for the whole population, based on the performance of those who were presented with mathematics test items. These estimates take into account information about how pupils with specific characteristics performed. The scores therefore give a snapshot of performance in mathematics rather than the fuller more rigorous assessment which is available for science (see '*PISA 2009 Technical Report*', OECD, for more information).

England's students achieved a mean score of 493 in mathematical literacy which was slightly below the OECD mean of 496 (the difference is not statistically significant). The comparison group for Mathematics consists of 48 other participating countries. This group includes all 32 other OECD members and all of the other 24 participating EU members.

Twenty members of the comparison group achieved a mean score significantly higher than England (see Table 7) with a further twelve performing at a level not significantly different from that of England (see Table 8). The remaining sixteen countries performed significantly less well (see Table 9).

Seven of the countries that significantly outperformed England are EU members. While ten EU countries did not perform significantly differently from England, only seven performed less well.

Among OECD countries, thirteen outperformed England, twelve performed similarly, and only seven performed less well.

**Table 7: Countries with a significantly higher mean score than England in mathematics**

*Shanghai-China* 600, *Singapore* 562, *Hong Kong-China* 555, *Korea* 546, *Chinese Taipei* 543, *Finland\** 541, *Liechtenstein* 536, *Switzerland* 534, *Japan* 529, *Canada* 527, *Netherlands\** 526, *Macao-China* 525, *New Zealand* 519, *Belgium\** 515, *Australia* 514, *Germany\** 513, *Estonia\** 512, *Iceland* 507, *Denmark\** 503 and *Slovenia\** 501

**Table 8: Countries with a mean score not significantly different to England in mathematics**

*Norway* 498, *France\** 497, *Slovak Republic\** 497, *Austria\** 496, *Poland\** 495, *Sweden\** 494, **ENGLAND** 493, *Czech Republic\** 493, *Hungary\** 490, *Luxembourg\** 489, *United States* 487, *Ireland\** 487 and *Portugal\** 487

**Table 9: Countries with a significantly lower mean score than England in mathematics**

*Spain\** 483, *Italy\** 483, *Latvia\** 482, *Lithuania\** 477, *Russian Federation* 468, *Greece\** 466, *Croatia* 460, *Dubai (UAE)* 453, *Israel* 447, *Turkey* 445, *Serbia* 442, *Azerbaijan* 431, *Bulgaria\** 428, *Romania\** 427, *Chile* 421 and *Mexico* 419

**Distribution of performance in mathematics**

England's mean score at the 5<sup>th</sup> percentile was 349 while its mean score at the 95<sup>th</sup> percentile was 634, a difference of 285 scale points. This was smaller than the OECD average difference of 300 scale points. About four fifths of the OECD countries had a larger difference than England between the highest and lowest percentiles.

In England, 6.1 per cent of students scored below PISA level 1, which was slightly less than the OECD average of 8.0 per cent. In the lower two levels combined, England had 19.8 per cent compared with an OECD average of 22.0 per cent. At the top end of the distribution, England had 1.7 per cent at level 6, below the OECD average of 3.1 per cent. This pattern repeats for the top two levels combined, with England at 9.9 per cent compared with an OECD average of 12.7 per cent.

**Gender differences in mathematics**

Of the 65 participating countries, 41 had a statistically significant difference in gender performance, in 36 countries favouring males and in 5 (Albania, Kyrgyzstan, Lithuania, Qatar and Trinidad and Tobago) favouring females. In England, there was a significant difference favouring males. The difference of 21 scale points between females and males was higher than the OECD average of 12 scale points. It was one of the highest differences within the 48 comparison countries with only two countries (Belgium and Liechtenstein) having a higher figure. There was no direct relationship between a country's overall performance and the pattern of gender differences in attainment.

## Science

Science was a minor domain in the PISA 2009 survey. Only a sub-set of questions from the 2006 science test items were used and not all students were assessed in this subject. The results reported are estimates for the whole population, based on the performance of those who were presented with science test items. These estimates take into account information about how pupils with specific characteristics performed. The scores therefore give a snapshot of performance in mathematics rather than the fuller more rigorous assessment which is available for science (see '*PISA 2009 Technical Report*', OECD, for more information).

England's students achieved a mean score of 515 in science, significantly above the OECD mean of 501. The comparison group for Science consists of 47 other participating countries. This group includes all 32 other OECD members and all of the other 24 participating EU members.

Ten of the other participating countries achieved a mean score significantly higher than England (see Table 10). Internationally, nine countries performed at a level not significantly different from that of England, while the remaining forty-five countries performed significantly less well (see Tables 11 and 12).

Only two of the countries that significantly outperformed England are EU members (Finland and Estonia). While five EU countries did not perform significantly differently from England, 17 performed less well. Similarly, among OECD countries, only Finland, Japan, Korea, New Zealand, Canada and Australia outperformed England, six performed similarly and twenty performed less well.

### Table 10: Countries with a significantly higher mean score than England in science

*Shanghai-China* 575, Finland\* 554, *Hong Kong-China* 549, *Singapore* 542, Japan 539, Korea 538, New Zealand 532, Canada 529, *Estonia*\* 528 and Australia 527

### Table 11: Countries with a mean score not significantly different to England in science

Netherlands\* 522, *Chinese Taipei* 520, Germany\* 520, *Liechtenstein* 520, Switzerland 517, **ENGLAND 515**, Slovenia\* 512, *Macao-China* 511, Poland\* 508 and Ireland\* 508

### Table 12: Countries with a significantly lower mean score than England in science

Belgium\* 507, Hungary\* 503, United States 502, Czech Republic\* 500, Norway 500, Denmark\* 499, France\* 498, Iceland 496, Sweden\* 495, Austria\* 494, Latvia\* 494, Portugal\* 493, *Lithuania*\* 491, Slovak Republic\* 490, Italy\* 489, Spain\* 488, Croatia 486, Luxembourg\* 484, *Russian Federation* 487, Greece\* 470, *Dubai (UAE)* 466, Israel 455, Turkey 454, Chile 447, *Serbia*, 443, *Bulgaria*\* 439, *Romania*\* 428 and Mexico 416

### Distribution of performance in science

England's score at the 5<sup>th</sup> percentile was 349 while its score at the 95<sup>th</sup> percentile was 673, a difference of 324 scale points. The gap was wider in 17 of the countries participating in the study and 13 of these were in the comparison group of countries (the OECD countries of New Zealand,

Israel, Luxembourg, Belgium, France, Australia, Austria, Germany, Sweden and Japan plus Bulgaria, Dubai (UAE) and Singapore from the non-OECD comparison countries). The average difference across the OECD countries was 308 scale points.

In all PISA countries there were some students at the lowest level of achievement (level 1), while in most of the 65 participating countries, at least some students achieved the highest level (level 6). The proportion of students doing so varied across countries and there was no straightforward relationship between overall mean score and variation in achievement.

In England, 3.8 per cent of students scored below PISA level 1, compared with an OECD average of 5.0 per cent. In the lower two levels combined, England had 15.0 per cent compared with an OECD average of 18.0 per cent. Although the numbers performing at these lower levels compares well with the OECD average, England's distribution of scores needs consideration alongside the score distributions for those countries significantly outperforming or not significantly different from England in their science achievement. All countries that significantly outperformed England or were not significantly different from England in their science achievement have a smaller proportion of pupils at level 1 or below, except for Ireland. England has a relatively long tail of underachievement when compared with the highest scoring countries.

However, at the top end of the scale, 1.9 per cent of England's students achieved PISA level 6 compared to an OECD average of 1.1 per cent. This pattern repeats for the top two levels combined, with England at 11.6 per cent compared with an OECD average of 8.5 per cent.

### **Gender differences in science**

Of the 65 participating countries, 32 had a statistically significant difference in gender performance with 21 favouring males and 11 favouring females. In England there was no significant difference in performance between males and females and this was also true for the OECD average. However, many of the high achieving countries did have significant gender differences.

## PISA in the United Kingdom

Table 13 shows the average mean scores by subject domain within the UK.

**Table 13: Average 2009 mean scores:**

Subject	Mean Score			
	England	Scotland	N. Ireland	Wales
Reading	495	500	499	476
Mathematics	493	499	492	472
Science	515	514	511	496

The highest attainment for **reading** was in Scotland (500), followed by Northern Ireland (499) and England (495). However, the differences between these three countries were not significant. The lowest attainment was in Wales (476), and the mean score for Wales was significantly lower than the other three parts of the UK.

The lowest scoring pupils in Scotland (341), Northern Ireland (336) and England (334) performed slightly higher than the OECD average (332) at this percentile. In Wales, the score of 319 at the lowest percentile was lower than the OECD average. At the highest percentile, the OECD average was 637 and the equivalent scores in Scotland (650), Northern Ireland (651) and England (646) were above this. The smallest difference was in England where there was only a 9 point difference while the largest was Northern Ireland with a 14 point difference. The score at the highest percentile in Wales (626) was again lower than the OECD average.

The percentage of pupils scoring below level 2 was below the OECD average (18.8 per cent) in Scotland (16.2 per cent), Northern Ireland (17.5 per cent) and England (18.5 per cent) but above in Wales (23.1 per cent). At the top end of the performance scale, the percentage of pupils in the top two levels was above the OECD average (7.6 per cent) in Scotland (9.2 per cent), Northern Ireland (9.3 per cent) and England (8.1 per cent) but below in Wales (5.0 per cent).

In all cases, females had higher mean scores and the difference was statistically significant. This was in fact the case in every country in the PISA survey. The differences in each part of the UK were of a similar size, ranging from 24 scale points in Scotland to 29 scale points in Northern Ireland. In all parts of the UK, the differences between males and females were not as great as those in many other countries and less than the OECD average (39 scale points).

The highest attainment for **mathematics** was in Scotland (499), followed by England (493) and Northern Ireland (492). The lowest attainment was in Wales (472), and the mean score for Wales was significantly lower than that for the other three UK countries.

The lowest achieving students were in Wales where the 5<sup>th</sup> percentile score (336) was lower than the OECD average (343). England (349), Scotland (348) and Northern Ireland (348) had similar scores and were slightly higher than the OECD average. The greatest proportions of the highest achieving students were in Scotland where the score at the 95<sup>th</sup> percentile (650) was above the OECD average (643). Northern Ireland (637) and England (634) were both slightly below the OECD average. Pupils in Wales had the lowest performance of any UK country at the 95<sup>th</sup> percentile with a score of 607.

Looking at the range of performance, as shown by the number of score points difference between the highest and lowest achievers, the largest gap was in Scotland (303 scale points) and the smallest in Wales (271 scale points). The average OECD gap measured this way was 300 scale points.

The percentage of pupils scoring below level 2 was below the OECD average (22.0 per cent) in Scotland (19.7 per cent), England (19.8 per cent) and Northern Ireland (21.4 per cent) but above in Wales (25.9 per cent). At the top end of the performance scale, the percentage of pupils in the top two levels was below the OECD average (12.7 per cent) in all four countries with Scotland (12.3 per cent), Northern Ireland (10.3 per cent) and England (9.9 per cent) all outperforming Wales (5.0 per cent).

The differences between males and females were statistically significant and above the OECD average (12 scale points) in all four countries. The difference in score points between males and females was similar in England (21 scale points) and Wales (20 scale points) and slightly lower in Northern Ireland (17 scale points) and Scotland (14 scale points).

For **science**, performance was relatively consistent for England (515), Scotland (514) and Northern Ireland (511). Only Wales (496) had an average score below the OECD average (501) and this was significantly below the rest of the UK.

The lowest achieving students were in Wales where the 5<sup>th</sup> percentile score (336) was lower than the OECD average (341). Scotland (358) and England (349) scored above the OECD average and Northern Ireland (341) was at the average. Northern Ireland (676) had the highest score at the 95<sup>th</sup> percentile, followed by England (673) and Scotland (669). Pupils in Wales had the worst performance of any UK country at the 95<sup>th</sup> percentile with a score of 655 but even this performance was above the OECD average (649). Looking at the range of performance, as shown by the number of score points difference between the highest and lowest achievers, the largest gap was in Northern Ireland (335 scale points) and the smallest in Scotland (311 scale points). The average OECD gap measured this way was 308 scale points.

The percentage of pupils scoring below level 2 was below the OECD average (18.0 per cent) in Scotland (14.1 per cent), England (14.8 per cent) and Northern Ireland (16.7 per cent) but slightly higher in Wales (18.7 per cent). At the top end of the performance scale, the percentage of pupils in the top two levels was above the OECD average (8.5 per cent) in Northern Ireland (11.8 per cent), England (11.6 per cent) and Scotland (11.0 per cent) but below in Wales (7.8 per cent).

The differences between males and females were statistically significant in Wales and above the OECD average (0 scale points) in all four countries. The difference in score points between males and females was similar in England (10 scale points), Scotland (9 scale points) and Wales (9 scale points) and slightly lower in Northern Ireland (5 scale points).

## **Annex A: Summary of the main findings from the national report for England**

### ***Gaps – High and low performers***

- There was a relatively **large difference between the score points in reading of the lowest scoring pupils and the highest scoring pupils** compared with many other countries.
- There was a relatively **low difference between the score points in mathematics of the lowest scoring pupils and the highest scoring pupils** compared with other countries. Compared with the top performing countries in the world **England was lacking in high achievers in mathematics**.
- There was a relatively **large difference between the score points in science of the lowest scoring pupils and the highest scoring pupils** compared with other countries.

### ***Gaps - Gender***

- **Girls scored significantly higher than boys in reading**, which was the case in every country which participated in the PISA study. However, this gender difference, while statistically significant, was not as large as that in the majority of other countries.
- **Boys performed significantly better than girls in mathematics**. This was a common pattern internationally, with more than half the PISA countries showing a similar difference. However, England did have one of the biggest gender differences.
- **There was no significant gender difference in science**, which was also the case for the OECD average. Performance by gender was variable across the countries that participated.

### ***The School Environment***

- Head teachers in England reported a high degree of responsibility for most aspects of management of their schools. School governing bodies also have a large influence. Local or national education authorities had less responsibility. Head teachers in England also report a higher frequency for most school leadership activities than their OECD counterparts.
- Responses on the School Questionnaire on issues which hinder learning showed a more positive school climate on most aspects than the OECD average. This was particularly the case for disciplinary problems. Pupils were on the whole very positive about the climate of their school, although they were least positive on the extent to which they felt their teachers were interested in or listened to them. They were generally more positive about the value of school and their relationship with their teachers than the average across OECD countries.
- The most frequently reported staffing problem was a lack of qualified maths teachers. The most frequently reported resource problem was shortage or inadequacy of computers for instruction.

### ***The Pupils and their Reading Habits***

- More than 60 per cent of pupils in England spend some time reading for enjoyment. Both internationally and in England, there was a large difference in scores between those who never read for enjoyment and those who do, even if only for half an hour or less each day. Responses to statements measuring attitudes to reading were on the whole similar to the OECD average.

- The most popular and frequent reading materials were magazines and newspapers. Pupils read fiction more often than non-fiction books. Very few ever read comic books. Here again pupils were similar to those in other OECD countries except that they were much less likely to read comic books than the OECD average. They also reported borrowing library books less often than the OECD average.
- Pupils reported a high level of activity in online communication and less activity in other types of online reading. They spend more time chatting online and reading emails than the OECD average but are similar to their OECD counterparts in the frequency of other online activities.
- Pupils' reports of their reading at school show that they spend more time on reading non-continuous texts<sup>1</sup> than the OECD average. They also report reading poetry in class more frequently than their OECD counterparts, and this was the text type which they had read most frequently for school in the previous month.

### ***The Influence of Socio-Economic Background on Reading Scores***

- Socio-economic background in PISA is reported as the Economic, Social and Cultural Status (*ESCS*) *Index* and is based on pupils' responses to questions about their parents' background and education and possessions in their homes. The index is set to a mean of zero across OECD countries. England's mean score on the ESCS Index was 0.21, indicating that on average pupils in the PISA sample in England have a higher socio-economic status than the average across OECD countries.
- England, in common with the general pattern among OECD countries, had an achievement gap between those who are highest and those who are lowest on the ESCS Index. Those in the bottom quarter of the ESCS Index have a reading score of 451 whilst those in the top quarter had a score of 544. This compares with the overall mean score of 495.
- The change in score for each unit of the index in England is relatively large at 44 points on the PISA reading scale. This means that for a change of one standard deviation on the ESCS index, there will be a predicted difference in score of 44 points. The OECD average is 38. This suggests that socio-economic background has a larger effect in England than the average in OECD countries. Only seven OECD countries had a larger change in score.
- However, in order to understand the interactions between reading score and ESCS it is also necessary to look at the amount of variance in scores which can be explained by socio-economic background.
- For both England and the OECD average, 14 per cent of the variance in scores can be explained by socio-economic background. In Germany, where the change in score per unit of ESCS was the same as that in England, the amount of variance explained was 18 per cent. This means that the more disadvantaged pupils in England have more chance of performing as well as their more advantaged peers than their counterparts in Germany. On the other hand, in Japan where the predicted change in reading score per unit of ESCS was 40, the amount of explained variance was only 9 per cent. This suggests that the education system in Japan is more successful at overcoming the effects of socio-economic background.
- So, although the performance gap between the most advantaged and disadvantaged pupils is relatively high in England compared with other OECD countries, pupils in England are relatively well able to overcome the disadvantages of their background.

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<sup>1</sup> Continuous texts are typically composed of sentences which are organised into paragraphs. Non-continuous texts are not organised in this type of linear format and may require, for example, interpretation of tables or diagrams. Such texts require a different reading approach from that needed with continuous text.

## Annex B: Country Performance Tables

### READING

	Country	Mean Score		Country	Mean Score
1	Shanghai-China	556	32	Greece	483
2	Korea	539	33	Spain	481
3	Finland	536	34	Czech Republic	478
4	Hong Kong-China	533	35	Slovak Republic	477
5	Singapore	526	36	Croatia	476
6	Canada	524	---	<b>(Wales)</b>	<b>476</b>
7	New Zealand	521	37	Israel	474
8	Japan	520	38	Luxembourg	472
9	Australia	515	39	Austria	470
10	Netherlands	508	40	Lithuania	468
11	Belgium	506	41	Turkey	464
12	Norway	503	42	Dubai (UAE)	459
13	Estonia	501	43	Russian Federation	459
14	Switzerland	501	44	Chile	449
15	Poland	500	45	Serbia	442
16	Iceland	500	46	Bulgaria	429
17	United States	500	47	Uruguay	426
---	<b>(Scotland)</b>	<b>500</b>	48	Mexico	425
18	Liechtenstein	499	49	Romania	424
---	<b>(Northern Ireland)</b>	<b>499</b>	50	Thailand	421
19	Sweden	497	51	Trinidad and Tobago	416
20	Germany	497	52	Colombia	413
21	Ireland	496	53	Brazil	412
22	France	496	54	Montenegro	408
23	Chinese Taipei	495	55	Jordan	405
24	Denmark	495	56	Tunisia	404
---	<b>(England)</b>	<b>495</b>	57	Indonesia	402
25	<b>United Kingdom</b>	<b>494</b>	58	Argentina	398
26	Hungary	494	59	Kazakhstan	390
---	<b>(OECD Average)</b>	<b>493</b>	60	Albania	385
27	Portugal	489	61	Qatar	372
28	Macao-China	487	62	Panama	371
29	Italy	486	63	Peru	370
30	Latvia	484	64	Azerbaijan	362
31	Slovenia	483	65	Kyrgyzstan	314

## MATHEMATICS

	Country	Mean Score		Country	Mean Score
1	Shanghai-China	600	32	Ireland	487
2	Singapore	562	33	Portugal	487
3	Hong Kong-China	555	34	Spain	483
4	Korea	546	35	Italy	483
5	Chinese Taipei	543	36	Latvia	482
6	Finland	541	37	Lithuania	477
7	Liechtenstein	536	---	<b>(Wales)</b>	<b>472</b>
8	Switzerland	534	38	Russian Federation	468
9	Japan	529	39	Greece	466
10	Canada	527	40	Croatia	460
11	Netherlands	526	41	Dubai (UAE)	453
12	Macao-China	525	42	Israel	447
13	New Zealand	519	43	Turkey	445
14	Belgium	515	44	Serbia	442
15	Australia	514	45	Azerbaijan	431
16	Germany	513	46	Bulgaria	428
17	Estonia	512	47	Romania	427
18	Iceland	507	48	Uruguay	427
19	Denmark	503	49	Chile	421
20	Slovenia	501	50	Thailand	419
---	<b>(Scotland)</b>	<b>499</b>	51	Mexico	419
21	Norway	498	52	Trinidad and Tobago	414
22	France	497	53	Kazakhstan	405
23	Slovak Republic	497	54	Montenegro	403
24	Austria	496	55	Argentina	388
---	<b>OECD Average</b>	<b>496</b>	56	Jordan	387
25	Poland	495	57	Brazil	386
26	Sweden	494	58	Colombia	381
---	<b>(England)</b>	<b>493</b>	59	Albania	377
27	Czech Republic	493	60	Tunisia	371
---	<b>(Northern Ireland)</b>	<b>492</b>	61	Indonesia	371
28	<b>United Kingdom</b>	<b>492</b>	62	Qatar	368
29	Hungary	490	63	Peru	365
30	Luxembourg	489	64	Panama	360
31	United States	487	65	Kyrgyzstan	331

## SCIENCE

	Country	Mean Score		Country	Mean Score
1	Shanghai-China	575	31	Latvia	494
2	Finland	554	32	Portugal	493
3	Hong Kong-China	549	33	Lithuania	491
4	Singapore	542	34	Slovak Republic	490
5	Japan	539	35	Italy	489
6	Korea	538	36	Spain	488
7	New Zealand	532	37	Croatia	486
8	Canada	529	38	Luxembourg	484
9	Estonia	528	39	Russian Federation	478
10	Australia	527	40	Greece	470
11	Netherlands	522	41	Dubai (UAE)	466
12	Chinese Taipei	520	42	Israel	455
13	Germany	520	43	Turkey	454
14	Liechtenstein	520	44	Chile	447
15	Switzerland	517	45	Serbia	443
---	<b>(England)</b>	<b>515</b>	46	Bulgaria	439
---	<b>(Scotland)</b>	<b>514</b>	47	Romania	428
16	<b>United Kingdom</b>	<b>514</b>	48	Uruguay	427
17	Slovenia	512	49	Thailand	425
18	Macao-China	511	50	Mexico	416
---	<b>(Northern Ireland)</b>	<b>511</b>	51	Jordan	415
19	Poland	508	52	Trinidad and Tobago	410
20	Ireland	508	53	Brazil	405
21	Belgium	507	54	Colombia	402
22	Hungary	503	55	Montenegro	401
23	United States	502	56	Argentina	401
---	<b>OECD Average</b>	<b>501</b>	57	Tunisia	401
24	Czech Republic	500	58	Kazakhstan	400
25	Norway	500	59	Albania	391
26	Denmark	499	60	Indonesia	383
27	France	498	61	Qatar	379
28	Iceland	496	62	Panama	376
---	<b>(Wales)</b>	<b>496</b>	63	Azerbaijan	373
29	Sweden	495	64	Peru	369
30	Austria	494	65	Kyrgyzstan	330

## **TECHNICAL NOTES**

### **THE CONCEPT OF 'LITERACY' IN PISA**

Reading literacy was the main focus of PISA 2009 with mathematical and scientific literacy as the two minor domains. In PISA the term 'literacy' is defined so as to measure the extent to which students have acquired the ability to put their knowledge to functional use in different situations in adult life. What PISA does not do is to attempt to measure student success in their mastery of school subjects taught to a nationally defined curriculum.

International comparisons such as PISA provide a valuable way of understanding and benchmarking the standards our students are attaining in comparison with students in other countries. The PISA tests themselves are different from GCSEs, and so they do not measure exactly the same skills. In addition, PISA allows further interpretation of the results by collecting background information on pupils - covering parental background and education, possessions in their homes and the school environment.

For further detail about the conceptual framework underlying the PISA assessment see '*PISA 2009 Assessing Framework – Key Competencies in Reading, Mathematics and Science*, (OECD, 2009)'.

### **SAMPLE AND DATA**

In England, Wales and Northern Ireland, the survey was carried out on behalf of the respective governments by the National Foundation for Educational Research (NFER). A total of 4,081 pupils across 165 schools in England participated, including independent schools and academies in proportion to their numbers nationally. Students sat the two-hour assessment in November 2009 under test conditions, following the standardised procedures implemented by all countries. A proportion of the questions used in the 2-hour test were ones used in previous rounds. This continuity between rounds provides a measure of change.

In Scotland, the PISA survey was carried out earlier in 2009.

Students also completed a questionnaire to provide information on their economic and social backgrounds, study habits, and attitudes to science and to science learning. Head-teachers in the participating schools completed a school questionnaire to provide information on the school's size, intake, resources and organisation, as well as science activities available in the school.

Age, rather than year group, is used to define participation in the survey because of the variance of grade levels and in policies on grade promotion around the world. The fifteen year olds who took part in the UK were mainly in Year 11 in England, Wales and Scotland, and Year 12 in Northern Ireland (these year groups are equivalent since Year 1 in Northern Ireland corresponds to the Reception Year in England and Wales).

The PISA study has strict sampling requirements regarding both the participation rate which is acceptable and the replacement of schools which decline to take part. PISA 2009 focused on reading and approximately half the total test items assessed this subject while the others were divided between mathematics and science. All pupils were assessed in reading and random sub-samples of pupils were also assessed in mathematics and science, with approximately 70 per cent of pupils doing each subject.

## HOW PROFICIENCY IS RATED IN PISA

The mean score for each scale was set to 500 among OECD countries, with each country contributing equally to the average. The reading literacy scale was set to 500 in its first year in 2000. Similarly the mathematics scale was set to 500 in 2003 and the science scale to 500 in 2006. As with any repeated measurement that uses samples it should be expected that the mean varies slightly from year to year without necessarily indicating any real change in the global level of skills. This year the OECD average for reading is 493, for mathematics is 496 and that for science is 501. The table below shows the score points for each level in each subject.

	<b>Below Level 1</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
Reading	below 335	335-407	407-480	480-553	553-626	626-698	above 708
Mathematics	below 358	358-420	420-482	482-545	545-607	607-669	above 669
Science	below 335	335-410	410-484	484-559	559-663	663-708	above 708

The method by which these scales are derived is explained further in '*PISA 2003 Technical Report*, (OECD, 2005)'.

PISA uses proficiency levels to describe the types of skills that students at each particular level are likely to demonstrate and tasks that they are able to complete. Test questions that focus on simple tasks are categorised at lower levels whereas those that are more demanding are categorised at higher levels. The question categorisations were based on both quantitative and qualitative analysis, taking into account question difficulty as well as expert views on the specific cognitive demands of each individual question. All PISA questions have been categorised in this manner.

Students described as being at a particular level not only demonstrate the knowledge and skills associated with that level but also the proficiencies required at lower levels. For example, all students proficient at Level 3 are also considered to be proficient at Levels 1 and 2. The proficiency level of a student is the highest level at which they answer more than half of the questions correctly.